Department of Agriculture and Food
GOVERNMENT OF WESTERN AUSTRALIA

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The role of supplements for Pilbara cattle

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Executive Summary:

The Pilbara region of Western Australia is a unique area of the northern Australian cattle industry. It is a hot climate, with an average of 20 days a month during the December to March period exceeding 35℃ at Port Hedland on the Pi lbara coast and exceeding 35℃ for an average of 27 days each month for the 6 month period from October to March at Marble bar in the east Pilbara. Rainfall is unreliable and highly variable averaging around 255 mm a year in the east Pilbara to 315 mm a year at Port Hedland.

This background of climatic conditions together with the land systems and pasture systems results in low stocking rates with cattle dispersed over large areas making fencing to segregate classes of cattle for management purposes expensive and not always practical. Cattle management systems adopted by many pastoralists include mustering breeders once a year and conducting all husbandry practises at this time. Mustering is often scheduled to coincide with live export sale demands.

The combination of these factors make for a somewhat unique cattle industry when compared to other areas of northern Australia and the widespread adoption of dry season supplementation of breeders should be treated with caution.

The reasons for caution include:

- Research has indicated that breeders maintain body condition for extended periods following useful falls of rain.
- The logistical problems of supplying supplements to relatively small numbers of cattle on widely dispersed watering points.
- Achieving useful animal intakes on a range of pasture types where observation of individual groups of animals is difficult.
- Cost/benefit of supplements not yet demonstrated in the area.

It is suggested that supplementation is likely to be most cost effective if specific groups of animals are segregated and supplemented as appropriate. While mustering breeders twice a year could improve herd productivity the economics of the system may be questionable on many enterprises. It would almost certainly be more cost effective for many enterprises to wean to a younger age and lighter weight at an annual muster and concentrate the supplementation budget on feeding these young weaners than supplement breeders for extended periods.

General recommendations for supplementing cattle in the Pilbara that are likely to improve herd productivity and produce the most favourable return include:

- Supplementing weaners – particularly young weaners if they are to remain on the property.
- Supplementing heifers and young breeders until they wean their first calf that have been segregated from the breeder herd. Segregating this group of cattle also provides the opportunity to conduct two weaning musters a year.
- Phosphorus supplementation during the growing season is also likely to benefit these heifers and young breeders in some locations.
- Supplements including up to 30% urea in both block and loose mix form have been successfully fed to cattle in different areas of the Pilbara

Is the Pilbara 'different'? – (from other areas of northern Australia)

While herd sizes are similar to other areas of northern Australia (Pilbara range 3000 – 17,000 head) the pastoral leases are considerably larger and therefore the stocking rates are much lower. There are generally multiple watering points and with wide dispersion of cattle and often small numbers at any one watering site (often fewer than 100 head). This is one indication that the Pilbara could be considered as different to most other areas of northern Australia.

The climate in the Pilbara is typically hot and dry with highly variable predominately summer rainfall, (Figure 1). Mean annual rainfall ranges from 315 mm at Port Hedland on the central Pilbara coast to 255 mm at Balfour Downs near Newman in the east Pilbara. Rainfall is highly variable both between and within years (Figure 2) and is usually associated with summer cyclonic influences. The probability of receiving more than 50 mm of rain in any month is highest in February when the probability is then only 50%.

Figure 1: Monthly rainfall (mm) Port Hedland

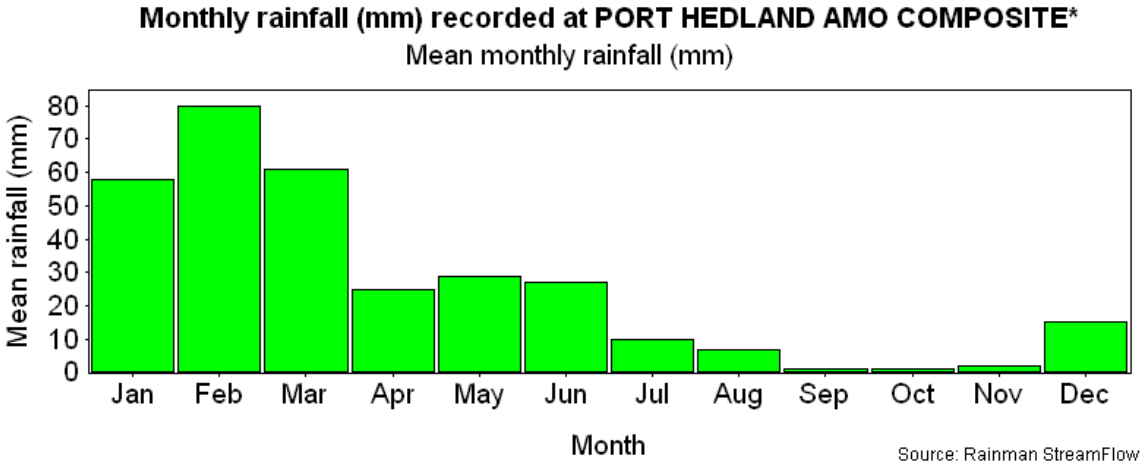

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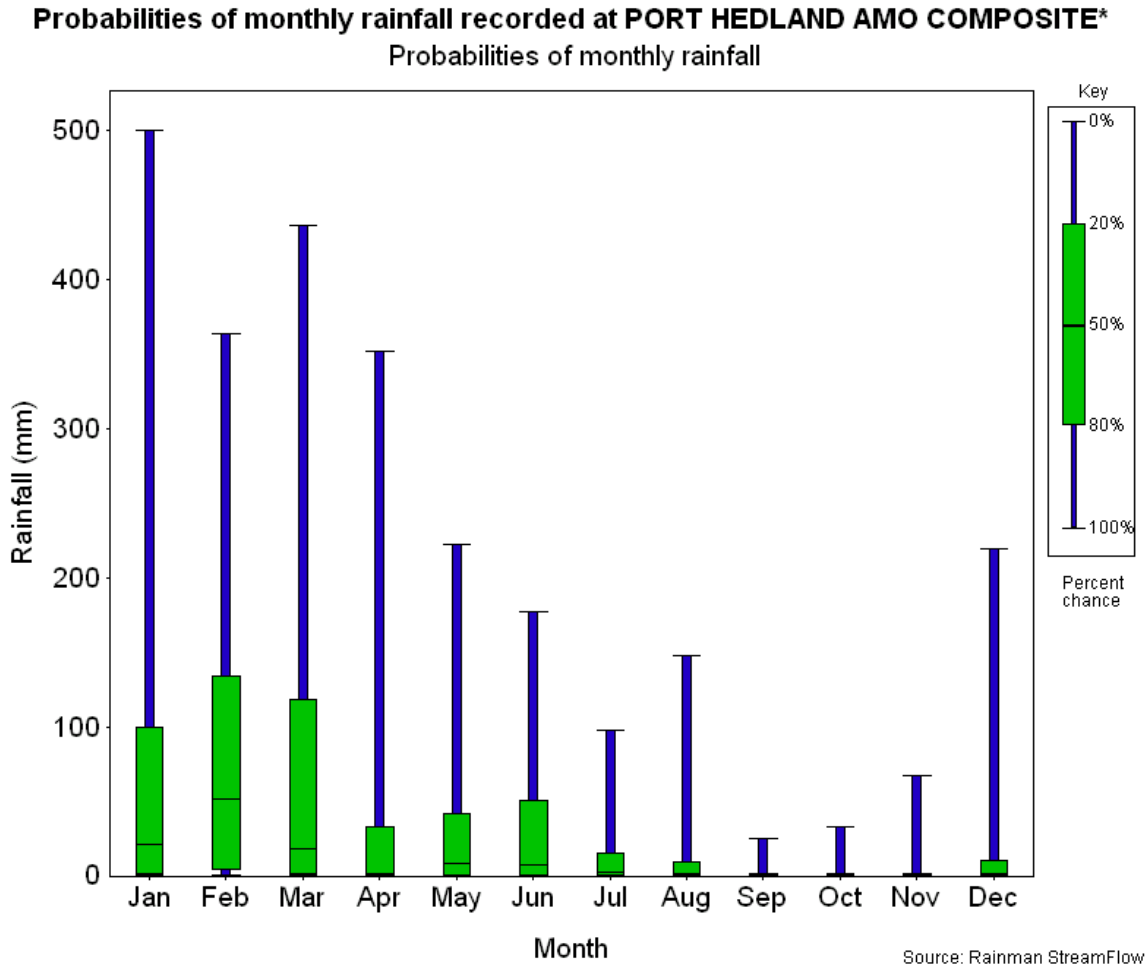
Figure 2: Rainfall probability – Port Hedland



Coupled with the low rainfall, significant areas of the Pilbara are either hills or stony plains supporting hard spinifex and Aristida grasslands of very low productive grazing potential. The productive areas of the Pilbara are associated with soft Spinifex sandy plains, the Roebourne plains and areas of ribbon, mitchell and buffel grasses. These areas include drainage lines and watercourse frontages around natural waters and often include drainage lines within the grazing radius around often shallow bores. Buffel grass is present in many of these drainage lines and is widely dispersed throughout the Pilbara..

Due to the climatic constraints of temperature, rainfall and rainfall variability pasture production and carrying capacity of the Pilbara in general is considered moderate when compared to other areas of northern Australia. This carrying capacity of the more productive areas of the Pilbara is estimated to average up to 4 – 5 adult equivalents (A/E)/square km. Coupled with the scatter of areas of low carrying capacity within many grazing areas, fencing to manage different groups of cattle or land systems is expensive. Due to the extended length of fencing to contain any group of cattle, fencing is also likely to be less effective; the longer the fence, the more opportunity for damage by feral animals and bulls, resulting in higher maintenance costs.

Cattle production is a relatively new enterprise in the Pilbara as sheep progressively disappeared from the area during the 1980's – 1990's. The last sheep only left the Pilbara in the early 2000's period. As a result, little information about cattle production had been documented in the area and only anecdotal information was available early in the early 2000's on which to base any recommendations on cattle management practises to optimise animal productivity.

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Introduction:

Information on diet quality selected by grazing cattle, researched in areas of north Queensland in the 1960's, was not available for any of the Pilbara pasture systems. It is difficult to provide useful and relevant recommendations on management and supplementation practises without some understanding of diet quality and changes in cattle condition on different pasture systems during different seasons.

An MLA supported project "Diet quality selected by grazing animals in the Pilbara" (NIRS project for short) was initiated in 2002/03 to provide information on the quality of diet that cattle select at different times of the year. The project has provided this information for several of the major pasture systems in the Pilbara. Information generated by this project provides a basis for making more informed decisions about the role supplements may have in the Pilbara.

In addition to the information generated by the NIRS project in the Pilbara these notes also include information from a number of publications and research reports in addition to documentation of some experiences of producers and industry advisers from across northern Australia.

This publication has been prepared to help Pilbara pastoralists make better informed decisions about supplementation. It is intended as a summary of useful research information and experiences of particular relevance to the Pilbara cattle industry, not as a review of supplementation research across northern Australia.

The MLA publications; Beef cattle nutrition, an introduction to the essentials and; Grazing land management, sustainable and productive natural resourse management, while not specifically targeted at the Pilbara industry, provide a good overview of the digestive anatomy and principles of cattle nutrition and grazing management. These publications are recommended reading for Pilbara pastoralists considering a broadscale supplementation program.

1. NIRS project summary

This project was initiated to provide some background information on changes in the body condition of both lactating and non lactating breeder cattle during the year in respect to the quality diet grazing animals select on various pasture types in the Pilbara. In addition to these broad objectives the project also provided information on the reliability of faecal Near Infra-red Reflectance Spectroscopy (NIRS) to predict body condition changes based on current diet quality predictions.

Faecal samples were collected from representative females at selected stock water 'collection sites' on a regular 4 – 6 weekly basis. Sites were selected on the basis of accessibility for regular sample collection, likelihood of having cattle grazing continuously throughout the year, the type of pasture within a 3 km grazing radius of the water and the willingness of pastoralists to be involved.

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Table 1. Pilbara sites with land systems and pasture types within a 3 km grazing radius.

Sites	Land systems	Pasture types
Cliffs Mill, Horseshoe, No6	Hooley, Brockman, Paraburdoo, Pindering.	Roebourne plains grass, buffel
Christmas Tank, Midway No3, Ram Quarry	Uaroo	Soft spinifex, Aristida spp.
Crossroads, Tragedy	Cane, Horseflat, River	Ribbon, roebourne plains, buffel grasses and spinifex
Fredericks, Yorks Mill, Manawar	Brockman, Hooley	Mitchell, roebourne plains
Minsons, River, Parsons	River, Mallina,	Buffel, soft spinifex,
Stirrup Iron, Shaws, Stewarts	Sylvania, River, Divide, Fortesque.	Aristida, buffel, soft spinifex, (east Pilbara)
Victory Mill	Yamerina.	Buffel, marine couch
Nimmingarra	Uaroo, River, Boolaloo.	Soft and hard spinifex (limited collections only)

Information recorded at the time of each collection included:

- Body condition of lactating and dry cows.
- Estimates of the quantity of feed on offer – within 3 km of water.
- Estimate of green leaf on available pasture
- Rainfall recordings for the period between sampling collection.

Note: *There are several methods of estimating feed on offer. Estimates for this project were determined using a combination of the project officer's experience with photo standards of yields from other areas and local pastoralists experience of edible plant species. Yield estimates were grouped in broad categories of less 500 kg/ha (very little edible feed); 500 – 1000 kg/ha (some useful feed); 1000 – 1500kg/ha (reasonable quantity of edible feed); and so on up to above 2500 kg/ha. Other useful methods include estimating an area capable of feeding an animal for a day and calculating the number of grazing days in a given area.*

A bulk faecal sample collected from at least 20 individual and fresh dung pats was sub sampled, dried and sent to CSIRO, Townsville for NIRS prediction of diet quality. NIRS predictions supplied included:

- Diet crude protein.
- Digestibility.
- Non grass (e.g. shrubs, herbs) in the diet.

The project commenced late in 2002 and continued for up to 3 years at some sites.

Key findings of the project included:

- Dry (non lactating) breeders gained and then maintained body condition for a considerable period following useful falls of rain. Lactating breeders were generally at least 0.7 of a condition score lower in body condition than dry cows.
- For the duration of the project, breeders generally maintained better body condition for longer periods following useful rain than might be expected in many other areas of northern Australia.
- During the years of the project, dry cow condition at the end of the dry season (Table 2) ranged from condition score 4.4 – 6.2 (1 – 9 scale) indicating a reasonable chance of conception during their following lactation.

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Note: *Research in northern Australia has demonstrated that the body condition of dry pregnant cows at the end of the dry season is a key factor in determining the probability of them conceiving again during their subsequent lactation. Breeders in strong store condition (e.g. score 5 of 1-9 scale) have around a 60% chance of conceiving during their subsequent lactation while poorer conditioned cows have less than a 40% chance of conceiving again while lactating..*

- Based on information from other areas of northern Australia the dry matter digestibility:diet crude protein ratio indicated that there would likely be a response to nitrogen (urea) supplements for extended periods in some years.
- Breeders lactating late in the year were in strong condition in most years, (Table 3).
- Lactating breeder body condition declined rapidly late in the year; presumably reflecting declining diet quality and increasing daily temperatures.

Table2:
Dry cow condition (1 – 9 scale) at the end of the dry season in the Pilbara

Pasture type	**Dry cow condition Dec 2002**	**Dry cow condition Dec 2003**	**Dry cow condition Dec 2004**	**Dry cow condition Dec 2005**
Buffel, roebourne plains grass		4.4	5.7	6.0
Soft spinifex, Aristida spp.	4.5	4.8	5.3	-
Ribbon, buffel, roebourne plains grasses and spinifex	5.0	5.0	-	6.1
Mitchell and roebourne plains		4.5	5.5	6.2
Buffel, soft spinifex (river frontages)	4.5	5.3	5.6	-
Aristida, buffel, soft spinifex, (east Pilbara)	5.5	5.6	5.9	6.1
Marine couch, buffel, (coastal plain)	4.8	4.8	5.0	-
Soft and hard spinifex	-	-	5.6	5.1

Table3:
Lactating (wet) cow condition (1 – 9 scale) at the end of the dry season in the Pilbara

Pasture type	**Wet cow condition Dec 2002**	**Wet cow condition Dec 2003**	**Wet cow condition Dec 2004**	**Wet cow condition Dec 2005**
Buffel, roebourne plains grass		3.5	4.4	4.6
Soft spinifex, Aristida spp.	3.5	3.9	3.6	-
Ribbon, buffel, roebourne plains grasses and spinifex	3.2	4.4	-	4.6
Mitchell and roebourne plains	-	3.4	4.1	-
Buffel, soft spinifex (river frontages)	3.4	4.3	4.3	-
Aristida, buffel, soft spinifex, (East Pilbara)	4.4	4.5	4.5	4.6
Marine couch, buffel, (coastal plain)	3.5	4.2	4.1	-
Soft and hard spinifex	-	-	4.2	3.9

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2. Cattle management Vs supplements

A survey to document current cattle management practises in the Pilbara conducted in 2003 indicated that around 60% of pastoralists mustered breeders once a year with all management practises (weaning, vaccinations, culling, sales etc) taking place at that muster. Depending on seasonal conditions, potential markets and other factors, mustering commonly commences around mid year and might continue into September/October or when pastoralists consider that it is too hot to handle large mobs of cattle. Anecdotal information combined with pastoralists' experience suggests that mustering efficiency seldom exceeds 90% at any muster.

Pastoralists mustering breeders more than once a year consider that it ensures that all breeders are handled at least once a year, thus receiving treatments including botulism vaccinations and weaning. Research in other areas of northern Australia indicated that weaning calves earlier in the year is likely to have up to twice the effect of supplements in improving breeder condition during the dry season and subsequent reproductive performance.

The cost of mustering large areas for relatively few cattle is expensive. The majority of mustering in the Pilbara is conducted with a combination of either helicopter or fixed wing aircraft (or both) and people on the ground with motorbikes or 4 wheel drive 'buggies'. Few properties use horses for mustering and the presence of natural waters in many areas limit the effectiveness of trapping. With the cost of mustering ranging from <$10 a head to >$40 a head for some areas, the cost benefit of mustering all breeders twice a year on many more extensive leases may well be doubtful. Segregating young breeders from the main breeder herd and mustering them to wean their calves twice a year is more likely to produce economic and productivity benefits in these situations.

3. What are Supplements?

The diet that cattle can select from most of the pasture systems in this environment is generally only adequate in all nutrients to promote good growth rates in dry cattle for limited periods of any year. With few exceptions, lactating cows will seldom be able to maintain, let alone gain, weight during lactation.

Cattle can only perform up to the level of the limiting nutrient in their diet. The old story; "It makes no difference how much water and oil a vehicle has it will only run until the fuel runs out", applies to cattle diets and cattle performance. e.g. Supplementing cattle with trace elements and minerals will not improve animal performance if energy or protein are the nutrients limiting performance.

Supplements are aimed at correcting deficiencies in diets. By correcting one deficiency, cattle will potentially perform up to the level of the next limiting nutrient. In general terms, supplementary feeding is about providing small amounts of a nutrient or nutrients to cattle diets to correct these deficiencies and improve animal performance.

Intakes of supplements are typically measured in grams a head a day (g/hd/day).

4. Why Supplement?

Supplements are aimed at improving growth, condition and liveweight of cattle. There are a number of cattle and herd management practises that can also have a big effect on cattle condition, liveweight and growth. The effect of weaning on lactating breeders is a striking example. Removing a calf from a cow reduces her nutrient requirements by up to 50% immediately. It is just not possible to achieve the same result by supplementing the cow calf

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unit. Substantial levels of energy feeding, with grain or protein meals, would be required to ensure the same improvement in breeder performance as achieved by weaning a calf.

Supplementation has often been used as a substitute for making different management decisions and changing management practises. Cattle management changes may produce better long term results and be more cost effective than supplements in achieving improved herd performance.

Information in these notes will focus on the role of supplements in correcting nutrient deficiencies, reducing deaths and improving animal performance. Supplements have also been used in some areas of northern Australia to encourage cattle to congregate to improve mustering efficiency and to reduce the incidence of depraved appetites e.g. eating dirt and bone chewing.

5. How do supplements work?

Nutrient deficiencies often affect animal performance by suppressing rumen activity and rate of passage of feed through the rumen thus reducing feed intake. Common examples include protein deficiency and phosphorus deficiency.

Correction of these deficiencies seldom results in more efficient digestion i.e more of the feed eaten being actually digested and utilised by animals, but significantly increases the amount of feed eaten. Nutrient intake is improved because animals are eating more feed from which to extract nutrients.

The potential response to supplements depends to a large degree on the quantity and quality of pasture available. If the feed quality is adequate, say 50 - 55% digestible, reasonable responses to supplements to increase intake could be expected providing cattle have access to an adequate quantity of feed. As feed quality declines, 40% or less digestible, responses will be considerably less. It doesn't matter how much intake increases in response to supplementation cattle are unable to digest enough of the feed to improve their performance.

As feed quality and digestibility decreases, nutrients available to rumen organisms decreases and rumen function declines. This results in decreased feed intakes of lower quality feed and so the spiral of declining rumen function and animal performance continues until the cycle is interrupted by supplements, or better still rainfall events and fresh pasture growth.

Supplementation with small amounts of urea and sulphur (S) can result in an increase in feed intake of up to 30% or more. This is largely achieved by improving the nutrient flow to rumen organisms and increasing their numbers this resulting in more rapid breakdown of feed and improved 'rate of passage' through the rumen. This increase in feed intake results in cattle accessing the nutrients from 30% or more of feed.

Depending on the quality of the diet this may be sufficient to improve liveweight gain or more commonly reduce the rate at which cattle lose weight. In either case supplements can improve animal performance. This may result in reducing breeder deaths, improved reproductive rates from breeders in better body condition or improving growth rates of weaners and growing cattle to meet market weights at a younger age.

6. Cattle responses to supplements.

There has been a considerable amount of supplementation work carried out in many areas of northern Australia over a number of years. Unfortunately there has been little work in the Pilbara which has documented the cattle responses to various supplements. The findings of a number of the various supplementation trials from across northern Australia have been

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summarised in an MLA Report (DAQ .98) by Rob Dixon, a research officer with the QDPI. Many of the comments in this section are based on this review.

There are a number of opportunities to measure the response of cattle to supplements:

- **Reduction in deaths due to normal or prolonged dry seasons.**

  From the research information and estimates based on sale records, the average mortality rate of breeders in northern Australia is probably around 10% pa. This figure may sound high but it is based on measured losses and females actually turned off from northern herds over a number of years.

Note: *The number of females sold (surplus heifers, cull and aged cows) as a percentage of total sales averaged over a period of years will provide a good indication of female losses on individual properties. If the breeder numbers are not being built up then the female sales % should be approaching 50%. While this is seldom possible due to the longer time breeders are in the herd and the stress of calving and rearing calves over the years female sales in excess of 45% are achieved in some northern Australian herds.*

These losses have a number of causes including poor nutrition, disease and age. Vaccination programs and age culling practises will reduce these losses but changes to breeder management systems, which might include supplements are still required to reduce the losses from the seasonally poor nutrition often experienced in many areas of northern Australia.

One Kimberley property with good records documented average breeder losses over a 9 year period of 11.5% with a range of 5.7 % to 24.5% in different years. When a breeder management system including supplementation, Botulism vaccination and twice a year weaning was introduced on this property and breeder losses were reduced to around 5% within 2 years.

Pilbara experience indicates that a combination of good weaning management, opening up waters in ‘new’ country and urea supplementation will markedly reduce breeder losses during prolonged dry seasons. In this instance breeders were fed a commercial 30% urea block (Uramol) from late August until storm rains were received at the end of November 2002.

Around 2500 breeders, including 500 ‘really old cows’, were supplemented mostly with 100 kg blocks. The breeders consumed 8.2 t of blocks during the feeding period for a cost of around $9000 landed on the property.

Pastoralist comments on this supplementation program included:

- Supplementation certainly substantially reduced cattle losses
- Cattle left the waters earlier in the day
- Cattle fed out further than in the past
- Cattle took to the blocks and consumed them fairly steadily
- Blocks were kept up to the cattle at all times
- Lost a total of 8 head from suspected urea toxicity
- Cattle really “bounced away” when it rained.

Please note that these examples are quoted to demonstrate that losses from poor nutrition can be reduced by supplementation. This is only one avenue to address potential breeder losses. Other options include moving cattle to more favoured

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country, changes to management practises e.g. weaning and feeding the weaners well, selling problem breeders, etc.

- **Improved reproductive rates as a result of heavier breeder live weights.**

  Research in north Queensland has documented benefits of urea supplementation on breeder liveweight loss during the dry season of ranging from nil, in years when there was some winter rain, to around 35kg in dry years. In areas with longer dry seasons (Pilbara) responses may be higher. The cost of the supplement to produce these responses must be justified in terms of increased sale values or more calves.

  Research from a number of sites has shown that lighter breeders (below 340 kg) are likely to respond better in terms of higher reproductive rates than heavier breeders. Heifers lactating for the first time are more likely to respond than mature breeders. The information from several research projects indicates that reproductive rates are likely to increase by 5% units for each additional 10 kg of liveweight, from supplementation or other management change, for breeders less than 340 kg at mating. This means that if lighter breeders are say 30 kg heavier at mating as a result of supplementation or some management input, reproductive rates are likely to be increased by some 15%.

  Younger breeders rearing their first calf are likely to be in this 'lighter' category and therefore likely to respond better to supplementation or management changes. To allow "best bang for the supplement $"it makes sense to manage these heifers as a separate group until at least they wean their first calf. Management may well include supplementation in the dry season before first calving to maximise body condition and probability of conception during their subsequent lactation and P supplementation, depending on land type during the growing season when they are calving.

  The increase in reproductive rates for breeders over 340 kg is likely to be less at around 3% units with responses likely to cut out in breeders over 400 kg at the commencement of mating. The improvement in reproductive rate in a herd as a result of improved nutrition therefore largely depends on the profile of liveweights of individual animals in the herd.

  Substantial increases in pregnancy rate are only likely to occur where a large proportion of the breeder herd is in the lower liveweight ranges.

- **Increased growth rates of sale cattle.**

  Supplements are used in some areas of northern Australia to increase sale weight and/or reduce sale ages of growing cattle. On more favoured pasture types supplements have been used to 'hold' cattle for expected market price rises later in the year.

  This can be a more attractive option as the cost/benefit of supplementation can be budgeted a lot more accurately. Supplementation with urea should be planned so that cattle are sold before rains are received. Compensatory growth following rain will often reduce the liveweight advantage supplemented cattle have over unsupplemented cattle. There is often little cumulative advantage of supplementing growing cattle in successive years as responses are likely to be reduced by compensatory growth each growing season.

  The response to urea supplementation by growing cattle on reasonable dry feed is limited to around 0.25 kg/hd/day. In some situations as mentioned above this may allow cattle to gain more weight or to hold weight for longer to take advantage of sale opportunities. In

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practise this 0.25 kg/hd/day is often a reduction in liveweight loss in the latter part of the dry season.

7. Supplement delivery options.

- Water medication is an option worth serious consideration and has a number of advantages including: All cattle receive the targeted amount of supplement as all cattle must drink and water intake at any one time is proportional to body size; only the active ingredients of the supplement are included, there is no need for 'carriers' as in loose mixes or blocks.

  The disadvantage of water medication for many Pilbara situations is the small number of cattle on individual water points. Medication units cost in excess of $2500 installed (in 2006) so are most cost effective where they can be installed in a reticulation system watering a large number of cattle.

  The potential problem of providing medicated and non medicated water in the same paddock and mustering cattle from non medicated on to medicated waters needs to be considered.

  If using water medication it is essential to 'get the sums right' in mixing the concentrate solution and calibrating the medication unit.

  The MLA publication, *Water medication, a guide for beef producers*; is strongly recommended as a very useful reference and recommended reading for pastoralists considering water medication as a delivery system for supplements.

- Dry mixes: Mixes should be based around supplying 30 – 50 g/hd/day urea + S to breeders or 20 – 30 g/hd/day to weaners and growing cattle. These levels are generally regarded as "safe" levels for these classes of cattle.

  Intakes of dry mixes can vary widely between areas and within mobs of cattle. Intakes that are too low are unlikely to be achieving target performance while intakes that are too high will be unnecessarily expensive and possibly dangerous. In the absence of local experience it is suggested that the following approach will be useful in developing a local 'recipe' for individual properties:

  1. Feed a measured amount of salt at each water point in the paddock and monitor intake over at least a week and preferably longer. This will determine if salt is likely to be a suitable intake control agent. If satisfactory intakes of salt (50 g/day or more) are not achieved something else will need to be tried. e.g. add small amounts of grain or lupins to the salt.

  2. Once a satisfactory amount of an intake controller is determined, for example salt, make up a mix of 10% urea, 2% sulphate of ammonia and balance salt or other intake controller as determined during the pre-feeding period. Feed this at each water point for at least a week, preferably longer and monitor intake.

  3. A second mix containing 20% urea, 4% sulphate of ammonia and the balance salt (intake controller) can then be fed out. To achieve an intake of 30 g urea a day, intake of this 20% mix should be around 1 kg/hd/week.

  Mixes containing 30% and higher levels of urea are commonly fed in many areas of northern Australia with good results and a corresponding reduction in freight cost of the intake controller. High levels of ground limestone products as fillers in dry mixes is not

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recommended as this may result in mineral imbalance problems particularly in marginal P country.

While developing a local 'recipe' will be a time consuming and possibly frustrating exercise it should result in a urea based supplement that will be potentially useful into the future. Once a 'recipe' has been developed it can be custom mixed by a supplement supplier to reduce on property labour commitments.

- Custom mixed loose mixes. These should be selected following discussion with people that have actually fed the specific products to their cattle and preferably on a similar land system. The basis of selecting these products should be on supplying urea + S to cattle safely. Low urea mixes, 10% or less, are usually more expensive on a nutrient supplied and freight basis than higher urea concentration mixes. High urea does not necessarily mean higher risk of toxicity. Many people in NE Qld have successfully fed mixes containing 50% urea for years. Others have killed cattle on 15% mixes.

- Blocks are a convenient method of feeding urea but achieving target intakes of urea can be a problem. Due to manufacturing inputs blocks are usually more expensive than loose mixes of similar urea content.

8. Feeding management:
Warning: Urea is highly toxic to cattle and can and will kill if consumed too quickly.

- The majority of deaths from urea toxicity have resulted from management problems. The most common problem is refeeding cattle that have been on a supplement for some time and have been allowed to run out of supplement for as little as only a day or two. When refed there is a risk that some of the cattle may gorge the supplement to satisfy their appetite for supplement.
- Changes in urea concentrations in mixes should be made while there is still some of the previous mix at the feeding site. Mixes with different urea concentrations should not be mixed in the one trough – feed in separate troughs.
- All troughs should have good drainage through the bottoms or ends. Urea readily dissolves with saliva and rain. Urea in concentrated solution is particularly toxic as cattle can drink it and therefore these solutions should not be allowed to concentrate in troughs.
- Feeding 1000 breeders with a 30% urea supplement will require the transport to property and to the feeding sites of some 4 t of supplement each month.

9. Conclusions:

Based on current knowledge and experience the widespread adoption of urea supplementation of breeders in the Pilbara should be treated with caution. The supplementation of specific groups of cattle, e.g. weaners and young breeders, is most likely to produce economic benefits and the best responses to supplements during the dry season supplementation with urea based supplements.

Responses to supplements by these young breeders would include improved growth, improved survival and increased and earlier conceptions of lactating first calf cows. Effective supplementation is only one of the potential benefits of managing young breeders as a separate group. The segregation of these animals from the breeder herd should be encouraged.

The role of phosphorus supplements during the growing season in some areas of the Pilbara is likely to improve the productivity of particularly young breeders and possibly growing steers.

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Careful consideration of the costs and potential benefits of supplementation is required before programs are commenced. This is probably best achieved by simple break even analysis. The cost of supplements is reasonably easy to calculate; the likely benefit in productivity is more difficult to calculate in this area.

The principles of practical urea based supplementation developed in other areas of northern Australia have been demonstrated to be relevant to the Pilbara.

Above all remember that urea can and will kill cattle if they consume it too quickly!

MLA publications for more information:

Beef cattle nutrition - an introduction to the essentials
Managing the breeder herd – practical steps to breeding livestock in northern Australia
Grazing land management – sustainable and productive natural resource management
Water medication – a guide for beef producers

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