

Calf ALIVE



S Y M P O S I U M

Friday 24th – Saturday 25th November 2017

Capella, Queensland's Central Highlands





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Program

Chair: Geoff Murrell, General Manager Northern Australia Operations,
Paraway Pastoral Company

Day 1

12:00	LUNCH	
13:00	Welcome	
13:15	Kieren McCosker	<i>The prevalence of calf loss across northern Australia</i>
13:30	Tom Kasari	<i>The makings of a strong week-old calf</i>
14:30	Jarud Muller	<i>Hydration in newborn calves in the tropics</i>
14:45	Dan Lynch	<i>What calf loss costs</i>
15:00	SMOKO	
15:00	Michael McGowan	<i>Managing infectious and non-infectious causes of calf loss</i>
16:00		<i>Open questions to speakers</i>
19:00	DINNER	<i>"All hell breaks loose": tribute to Dr Peter O'Rourke</i>

Day 2

08:30	Frank Garry	<i>Causes and management of calf loss in north America</i>
09:30	Dahlanuddin	<i>Reducing calf loss through management in Indonesia</i>
10:00	SMOKO	
10:30	Kieren McCosker	<i>Defining the level of calf loss and identifying causes in your own herd</i>
10:50	Kylie Schooley	<i>What producers can do about calf loss</i>
11:10		<i>Open questions to speakers</i>
12:00	Michael McGowan	<i>Close</i>
12:10	LUNCH	

MANAGING LIVELWEIGHT PRODUCTION FROM BEEF BREEDING HERDS

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Introduction – asking the right question

Too often when the question is asked, 'How is your beef breeding herd going?' the answer is a performance measure such as the proportion of cows pregnant or calves weaned. However, profit is primarily a function of live weight production, its value, and the cost of production. Therefore, the question should be 'How many kilograms of live weight do you produce annually from this management group (herd) of breeding females per hectare?' For example, if the farmer puts 100 tonne of cows in a paddock after completing pregnancy diagnosis of the herd then 12 months later how many tonnes of beef have been harvested from the herd (includes calves weaned and any cows and bulls sold). The role of veterinarians consulting to beef breeding farms should be to develop management strategies to improve herd live-weight production and identify opportunities to reduce cost of production. However, beef cattle farmers typically use veterinarians only to conduct pregnancy diagnosis, breeding soundness examination of bulls, and investigate outbreaks of disease or lower than expected reproductive performance.

Measuring live weight production and fertility of beef herds

Annual pregnancy diagnosis and foetal aging, assessment of lactation status at branding and weaning, and weighing a representative sample of cows and weaned calves provide the data required to define liveweight production and fertility of breeding herds. Transrectal foetal ageing enables estimation of month of conception and calving, which when conducted in two consecutive years enables the interval from calving to conception to be estimated. Assessment of lactation status after the expected period of calving enables determination of the incidence of foetal and calf loss. Summarising the data in the form of predicted month of calving histograms informs decisions on when to conduct branding or weaning, and enables the veterinarian to identify potential causes of reduced performance (Figure 1).

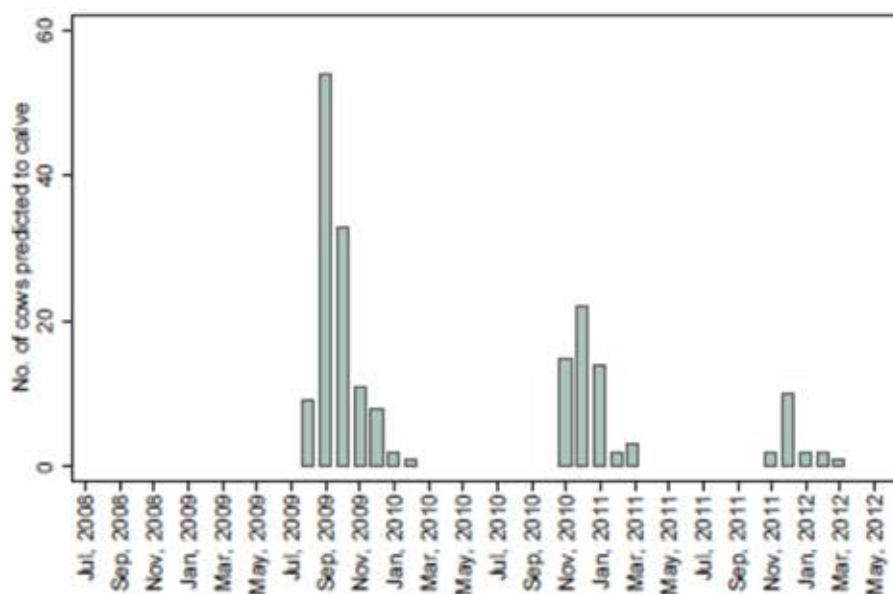


Figure 1. Calving pattern for a group of heifers that were monitored for 3 years in a herd which had a defined mating period. Note the shift to the right in month of calving which reduces the opportunity for late calving females to reconceive.

Relatively simple paper-based recording systems have been developed by Fordyce *et al.* (2014a) that enable live weight production and performance of beef breeding herds to be monitored. However, adoption of these recording systems has been highly variable with many extensive rangeland farmers in particular, still unable to accurately count the number of females on their farm or the number of calves weaned annually. The development of electronic identification (EID) systems to enable crush/chute-side and remote electronic data capture can be effective in monitoring the production and performance of extensively managed beef cattle (McGowan *et al.* 2014a; Swain and Friend 2013).

Operating herd management software using a ruggedized laptop and an electronic enter pad connected to an EID reader mounted to the crush/chute and electronic scales mounted under the crush/chute enables capture of 12 to 20 pieces of data on cattle at typical processing rates of 60 to 100 animals per hour (McGowan *et al.* 2014). Currently, the major limitations of this system are loss of EID tags from cattle, estimated at about 8% within 3 years of insertion in a tropical rangeland environment (McGowan *et al.* 2014a), and the inability to complete data analysis on the day of data capture. Cloud-based systems will allow real-time assessment of individual management information through viewing and recording farm data from any location using many devices (eg, laptops, phones, tablets). This will also enable interconnectivity for external on-the-fly data analyses that could validate data plausibility and estimate individual and management group production and performance indices.

Predicting live weight production that can be sustainably achieved by breeding cattle

Beef breeding herd management varies considerably across the world, but the fundamental principles remain constant. A key principle is to know what level of live weight production a specific feed resource, usually native or improved pasture, is capable of sustaining. In a large study of factors affecting the reproductive performance of commercial beef breeding herds in northern Australia (McGowan *et al.* 2014a) farmers/managers were asked estimate average annual growth of yearling steers if they grazed the pastures grazed by the heifers and cows enrolled in the study. Mean annual steer growth varied from 100 to 200kg associated with large differences in soil fertility and vegetation type. One easily measured estimate of live-weight production from breeding herds/management groups is weaner production (kg/cow = total weight of calves weaned / the number of cows retained for calving and then mating in the next year). McGowan *et al.* (2014a) demonstrated that commercial weaner production was on average equivalent to annual estimated steer growth. Research is currently being conducted in northern Australia to further investigate whether routine grazing of a sample of representative yearling steers in each paddock grazed by cows and heifers can be used to estimate the expected average weaner production from these paddocks. Clearly, because of the often marked variation in seasonal weather conditions this approach will need to be conducted over at least three years to obtain a reasonable estimate of average weaner production.

Beef farmers often aim to achieve a certain average weaning weight which may not take into account the feed resource(s) they have available for their cattle. For example, if the annual estimated growth of steers in a particular situation is 100kg and the average weight of calves weaned is 200kg, where does the additional 100kg come from? Clearly, it has to come from mobilisation of fat and protein reserves from the heifer or cows that produced these calves. In this low annual growth environment, these cows may lose 100kg during lactation (2 body condition scores - 1-5 scale), and as a consequence are unlikely to reconceive and have an increased risk of mortality. The farmer may then be forced into supplementary feeding to prevent cow mortalities; but then the question must be, 'is this intervention likely to be profitable'?

Farmers often want to know what level of production they should be aiming for. Although benchmarking herd or management group production causes angst amongst some economists, this is entirely valid if referenced against a measure of what the specific feed resource is capable of producing. An example of this approach is provided in Table 1.

Table 1: Annual weaner production from management groups of cows in northern Australia against estimated annual average steer growth (McGowan *et al.* 2014a)

Mean annual steer growth (kg)*	No. of herds	Weaner production (kg/cow)		
		25th percentile	Median	75th percentile
200	33	164.0	191.0	240.0
180	33	160.7	194.6	220.1
170	29	134.9	163.0	182.6
100	59	74.0	93.3	112.4

*Estimated growth of steers grazing same pasture as cows

What are the major drivers of live weight production of a breeding herd

The concept of live weight production (McGowan *et al.* 2014a) is that over a one-year production cycle, a cow's production, if she remains alive, is the sum of her live weight change, and the weight of any weaned calf. The business makes money by selling the annual live weight produced either directly, or after transfer to another sector of the herd for value adding. This is equivalent to how any business measures productivity.

McGowan *et al.* (2014a) demonstrated that no single performance measure of a population of commercial beef breeding herds in northern Australia was predictive of annual live weight production. However, this is not surprising since no measure of fertility takes into account heifer/cow mortality or annual change in live weight. Using annual live weight production as a primary measure of "how a herd is going" encourages a more holistic approach to herd management. However, regardless of whether beef breeding herds are control mated or mated continuously, key drivers of live weight production are the percentage of lactating cows pregnant within 4 months of calving (estimates the proportion of cows likely to wean a calf in consecutive years), the annual total percentage of pregnant cows, the percentage of foetal and calf loss between confirmed pregnancy and weaning, average weight of weaned calves, live weight change of heifers/cows and percentage heifer/cow mortality.

Developing management strategies to increase live weight production and reduce cost of production

It does not matter whether you are consulting to breeding herds of 5 cows or 150,000 cows, the critical influence of nutrition on reproductive performance is the same. Too often undue emphasis is placed on investigating infectious diseases and trace element deficiencies rather than focussing on body condition of heifers and cows in the last trimester of pregnancy and first 3 months of lactation. The major factors affecting the percentage of cows becoming pregnant within 4 months of calving and percentage of pregnant females failing to wean a calf in tropical rangelands typical of northern Australia have been described by McGowan *et al.* (2014b) and Fordyce *et al.* (2014b), and in many cases are remarkably similar to those identified as being important in more intensive temperate beef breeding regions of the world. The overall approach we recommend is after defining the likely factors affecting production and performance implement 'best practice' management strategies which are summarised as:

Manage the feed-base

You cannot make something from nothing. Cattle can only achieve net live weight production if energy and protein intake is above that required for maintenance. Beef breeding businesses are built on ready access to productive, palatable, nutritious pastures and good quality water. The principles of 'best practice' grazing management must be understood and implemented.

Key management practices

- Budgeting available feed to meet short and medium term cattle requirements
- Good grazing management to allow pasture recovery, eg, rotational grazing, or in tropical rangelands deliberate withholding of grazing of selected paddocks over the wet season
- Limit grazing distance from water to <2.5 km where possible
- Active pasture development and rehabilitation
- Fencing to control overutilization of preferred land types including riparian zones
- Use supplements that augment sound basic management. For example feeding supplemental phosphorous to late-pregnant heifers and first-lactation cows where risk of phosphorous deficiency is high. If good grazing management and lactation management practices are implemented then feeding of nitrogen supplements during the dry season in arid tropical rangelands may only be necessary during periods of severe drought.

Manage lactation

Cows have amazing capacity to meet their energy, protein and macro-mineral requirements from available pasture and mobilisation of their own body tissue reserves. However, where cattle draw down on their body tissue reserves (eg, during lactation) this must be followed by a period of re-alimentation in preparation for the next reproductive cycle. Thus the timing of weaning is critical because cows must have sufficient access to pasture of adequate quality to replenish body tissue reserves prior to the next calving event.

Key practices

- Manage weaning to conserve body condition of cows in preference to achieving high live weight weaners, ie, the decision on timing of weaning should be made on the basis of cow body condition, not an average weaning weight target.
- Use pregnancy diagnosis and foetal aging to segregate cattle for different nutritional management and efficient weaning. It is particularly important that heifers are managed as a discrete group until they are confirmed pregnant after calving for the first time. Also in continuously-mated herds identification of heifers and cows likely to calve at a time when pasture quality and quantity is very limited is critical to minimising cow and calf mortalities.
- Wherever possible mating should be controlled to ensure heifers and cows calve close to the time when the likelihood of significant improvement in seasonal pasture quantity and quality is high. Alternatively in continuously-mated herds use foetal aging to segregate cows into approximately 3-month calving periods which can be matched with feed available, handling and husbandry.

Manage cattle health & stress

This primarily involves implementation of evidence-based control strategies to prevent infectious causes of heifer/cow death (eg, clostridial diseases including botulism, babesiosis), clinical illness (eg, bovine ephemeral fever), subclinical disease (eg, external/internal parasites), and infectious causes of embryonic, foetal and calf loss (campylobacteriosis, trichomoniasis, bovine viral diarrhoea virus). Also breeding females and their offspring may be exposed to a wide range of environmental stressors which can severely impact on both survival risk of the calf and the dam.

Key practices

- A risk-based approach to control of infectious diseases should be used involving assessment of the immune status of the dams including determination of whether the herd or management group is endemically infected, and risk of introduction of infection.
- Provide protection from environmental extremes (floods, blizzards, heat wave), especially for young calves and their dams
- Where possible, avoid handling calves less than one month of age

Manage breeding

Bull fertility and genetics have a profound effect on business outcomes and herd productivity. Frequently the 'low hanging fruit' in a beef breeding business is the bull percentage used. In a study of bull selection and management McGowan *et al.* (2014a) found that approximately three quarters of farmers or managers used above the recommended 2-2.5% bulls. Bull costs per calf born are an important cost eg, if the average cost of replacement bulls is \$4,000 and bulls are mated at 2% versus 4% then the annual costs per calf assuming a weaning rate of 80% are \$14 and \$27, respectively.

Key practices

- establish a genetic improvement program to achieve long-term increases in fertility as well as improvements in traits such as carcass quality, and in harsh environments, adaptive traits
- Select replacement bulls that have passed a breeding soundness evaluation. Select physically-sound bulls with at least average scrotal circumference for breed and live weight, and greater than 70% normal sperm.
- Replacement bulls should be introduced to the farm at least 4 months prior to use. They should be vaccinated against known causes of death, illness and reproductive loss.
- Mate at no more than 2.5% sound bulls.
- Select bulls from dams that have weaned a calf from their first two mating opportunities.
- Bulls should be managed to ensure they maintain satisfactory body condition (at least BCS 2.5 - 1-5 scale). Treatments to control external and internal parasites are recommended as bulls generally carry higher burdens of both.
- Herd bulls should undergo at least a general physical examination and detailed examination of the external genitalia annually prior to mating and bulls should be considered for culling when they reach 8-9 years of age.

Initiating adoption of management changes – how successful have we been?

In preparing this paper we are very conscious that David Mossman, Basil Lowman and Keith Entwistle beautifully described the approach to improving reproductive performance in a series of publications in the '70's and '80's. However, adoption by farmers and managers of many of their recommendations has been disappointingly slow; eg, McGowan *et al.* (2014a) reported that in northern Australia only about a quarter of farmers/managers routinely used a breeding soundness examination including microscopic examination of semen to select replacement bulls. As veterinary advisors to beef breeding herds we have to accept that in many cases we have failed to effectively communicate how and why producers should adopt recognised 'best practice' recommendations. In some cases we focus only on the potential positive benefits of our recommended changes to management without equally acknowledging the potential negative outcomes. A good example of this is where a farmer adopts your recommendation on lactation management which results in a significant increase in the proportion of the herd becoming pregnant within 4 months of calving and thus contributing a weaned calf each year. If the farmer does not adjust his/her culling and selling strategies then there is a significant risk of overgrazing and degradation of the pasture. Further, too often we assume that the terms we use are universally understood by farmers yet there is clear evidence that in many cases there is considerable confusion amongst farmers, advisors and veterinarians; eg, the definition of weaning rate is highly variable.

Take home messages

- Understand what live weight production your client's beef breeding herd's feed resource is capable of sustainably supporting.
- Measure the actual production and performance of each breeding management group or herd you consult to.
- Understand the key drivers of live weight production from beef breeding herds.
- Understand how to cost effectively control the major factors affecting these drivers of live weight production

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