11-2024

Managing the beef breeder herd in southern Western Australia

Department of Primary Industries and Regional Development, Western Australia

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DPIRD-183

Kilograms of beef produced per hectare is a significant driver of profit for a beef business. Cow longevity (length of productive life) plays an important role in achieving a profitable business. A balanced approach to genetic selection and nutritional management are essential factors underpinning the efficiency of the breeding herd.

Image 1: Cattle in southern Western Australia

Successful beef businesses target increased kilograms (kg) of beef produced per hectare (ha) at a minimal cost. In addition to feed related expenses, replacement females represent a significant cost for the breeding herd. It is important therefore to ensure they have a reasonably lengthy productive life (longevity).

There are a number of things producers can do to minimise involuntary culling due to things such: failure to conceive, structural soundness issues and death.

Various management strategies for the breeder herd are discussed in the following sessions but it is important they are supported by a sound herd health management plan. Veterinary advice should be sought to develop the plan, including vaccinations; drenching and if required mineral supplementation programs to minimise disease and reproductive losses, as well as to maximise performance.

Productive cycle and herd structure

Pregnancy rates in heifers and first calvers are lower than that of mature cows. Dystocia is also less common in mature cows as they are fully grown. In general, mature cows resume cycling quicker after calving and are more resilient to nutritional pressures, getting pregnant at lower body condition than their younger counterparts (heifers and first calvers).

Research has shown that 4-8 year old cows wean heavier calves than 2-3 year old cows. This is because the younger animals are still growing and prioritise some of their nutrient intake into their own growth rather than for foetal growth or lactation. For these reasons, younger females have a higher nutritional requirement than mature cows. In addition, due to their lower pregnancy rates, a higher number than what is to be retained need to be joined to maintain herd size in self-replacing herds. Despite this, introducing younger animals to the breeding herd is essential to maintain herd age structure and ensure genetic progress.

It is important to remember that the bull only contributes 50% of the genes to their progeny, thus to achieve timely progress in the breeding objectives of the herd, genetic selection pressure of the females is also required. To maximise profitability a large proportion of the breeding herd needs to be made up of mature cows. Hence the importance of managing cows well and setting them up properly from a young age to maximise production longevity.

Some aspects of heifer selection and management will be covered briefly here. Reference to relevant web publications that can assist in managing the breeding herd is provided at the end.

Although cows are known to calve well into their teens, research has shown that reproductive performance tends to start deteriorating at around 10 years of age, because as cows get older they struggle to maintain condition (problems with teeth and feet are not uncommon at this stage); pregnancy rates and weaning weights may start to decline.

Some cows defy this generalisation, but producers must exercise caution so that in the quest for the “last calf” from that exceptional cow they do not end up running out of luck. Beside animal welfare considerations, cull cows also make a significant contribution the state’s beef production. Successful producers have strategies in place to optimise the market value of their cull cows.

A recent published report suggests that in typical southern Australian beef herds 60-70% of the breeding herd are ≤ 6 years old and the maximum age of the cows is between 8-10 years.

By maintaining good records producers can make informed decisions on what is the best age structure for their herd, at what age they should cull their cows (based on productivity) and also be in a better position to make judgement calls at times when either expansion or contraction of the herd are warranted.

As producers are continuously required to match cattle requirements to feed resources, good records will also assist in adjusting both culling and replacement rates to match available feed resources and market signals. These management decisions control the size and structure of the herd. As a general rule in “optimistic” times replacement rates increase, while in “pessimistic” times replacement rates reduce.

Replacement options

Replacement heifers are considered to be the second highest cost of the breeding herd behind feed costs. Depending on a number of factors, a heifer may need to produce up to ten calves to recoup the investment cost of that heifer.

One of the main things that increases this investment is market demand for heifers. For instance, when the beef industry is expanding the opportunity cost of not selling this hiefer increases and therefore more weaned calves per replacement are needed to balance this investment cost.

The number of heifers retained for replacements also depends on their expected pregnancy rates. This to has an impact on this investment cost.

Caution should be exercised when decreasing replacement rates in consecutive years, as it can result in a herd with too many cows in productivity decline. If herd contraction is required over consecutive years alternating strategies of decreasing replacements and increasing culling rates from normal years may be advisable. In addition if the replacement rate is decreased then increased pressure on genetic selection will be required to maintain genetic progress.

There are several factors to consider when determining an optimal herd replacement strategy. Individual attitude to debt and risk play a major role in the decision making process. Some of the main factors to consider when setting replacement rate strategies are - interest rates, cash flow requirements, feed and labour costs, reproductive and culling rates, breeding objectives and market prices. Adequate assessment of these factors in any given year is crucial in determining a replacement rate strategy that optimises financial outcomes.

With regards to the choice between developing own replacements or purchasing them, there are pros and cons associated to both options.

By breeding their own replacement producers not only have a say on their genetic make-up, ensuring it fits their environment and target markets, but also gives the producer better knowledge and control over the heifers background (health status, growth pathway, temperament and fertility). Alternatively purchasing replacement heifers can free-up feed resources for other uses, provide some flexibility for expanding the herd size or changing genetic make-up or altering calving time.

At the end of the day the main factor weighing on the decision on whether to breed or purchase replacement heifers is cost. Unfortunately, a number of factors influencing this cost are uncertain (production performance, season and future market prices) and a risk free decision is never available. Risk can however be reduced by gathering accurate information (good records) and seeking reliable and independent professional advice (from veterinarians, financial institution advisors, and consultants).

Calving cycle and pattern

To sustain herd productivity, beef cows must wean a calf on a yearly basis. If a cow is to maintain a 365 day calving interval she only has about 82 days to conceive after calving (pregnancy is approximately 283 days).

Under ideal circumstances it takes approximately 25-30 days for the uterus to recover after calving and for the cow to resume cycling, leaving only 50-55 days to conceive. Because cows cycle on average every 21 days, this leaves only two opportunities for them to be mated and conceive if a 365 day calving interval is to be achieved. If the cow does not conceive in these 2 cycles, she may conceive later in the joining period. This means that she will have less opportunity to conceive in the following year's joining periods increasing the likelihood of missing the joining season and being culled.

Again nutritional management, sire and dam selection with a focus on fertility and conformation will assist in meeting this calving interval target.

Furthermore, within the calving period it is desirable to have a tight calving pattern with the aim to have about 70% of the cows calving in the first cycle or 21 days, and 95% calving by the end of the second cycle.

A short calving period with a tight calving pattern is desirable because:

- All cows are in a similar physiological condition throughout the year, making it easier and more efficient to match feed supply with animal requirements.
- An even line of calves is produced which may be easier to market.
- There are less calves born late that are lighter at weaning.
- Early born heifer calves are usually heavier at weaning and require less input to reach critical joining weights.
- Labour requirements for calving, calf marking etc. are concentrated into a shorter time frame.
- Cows that calve early have longer to resume cycling before the joining period. This increases their chances of conceiving early and then calving early again in the following years maintaining a 365 day calving pattern.

Heifer and first calvers' management

Achieving a 365 day calving pattern starts with good heifer selection and management. In order for heifers to conceive and calve in the desired time frame they need to be well grown to 60-65% of the mature cow weight with a condition score of three at the start of joining. This is to be met by every individual and is not to be based on the herd average. This will help ensure they have reached puberty and have started cycling. Heifers should preferably have cycled a few times before joining begins as the first cycle has lower fertility.

Heifers to be kept for breeding should be selected at weaning and fed to ensure they reach their target joining weight following a steady growth path.

To improve fertility, heifers born earlier in the calving season should be retained in preference to those born later. Regular weighing between weaning and joining is recommended to make sure they are on track to reach their joining weight.

Supplementary feeding may be required over summer and autumn. Over fat heifers should be avoided as fatty deposits in the udder can reduce future potential milking ability. In times of excess spring feed (depending on time of calving), heifers may be weaned earlier than normal to avoid becoming over fat. Steady weight gain should continue through to calving to ensure future productivity.

Lactating dams with their first calf are generally the most difficult to get back in calf. This is because they are still allocating some of their energy intake to growth, which takes priority over reproduction. It can take lactating first calvers about 20-30 days longer to start cycling than mature cows. For this reason some producers mate heifers 2-3 weeks ahead of the main herd. This may allow them adequate time to resume cycling after calving so that they are able to conceive at the beginning of the cow joining period.

Calving heifers ahead of the herd will also mean there is less time for those heifers to achieve their critical joining weight between weaning and joining. This practise presents a risk of a higher proportion of heifers being mated when they are not yet in their second or third cycles. This could result in very low pregnancy rates and even if they get pregnant it can compromise their future productivity.

If you are considering adopting this practise it is important to give extra attention to heifer nutrition, to ensure critical mating weights are reached. The cost of any extra feed required by the heifers to their reach critical mating weight targets earlier should also be evaluated.

Further information on heifer selection and management can be found on Managing heifers to maximise productivity and profitability in southern Western Australia.

Critical body condition scores throughout the year

Body condition score (BCS) is an indication of the body reserves in an animal.
Condition scoring at calving is a strong determinant of when a cow will resume cycling post calving. Cows should be regularly assessed to ensure they will meet condition score targets for certain times of year.

Recommended condition scores (scale 1-5) at calving are:

- condition score 2.5–3 for mature cows
- condition score 3–3.5 for late calving mature cows
- condition score 3 for heifers

BCS of cows should be assessed at weaning time so that there is enough time to improve condition scores before calving, if required. Also, for those cows calving in lower than recommended BCS the resumption of cycling can be quicker if high quality feed is made available. The resumption of cycling is however likely to still take longer than if they had calved at adequate BCS. It is more efficient (particularly if using supplementary feed) to increase body condition scores between weaning and calving – when the cow is not lactating.

During lactation the cow has high demands for energy which may be hard to meet through pasture supply alone, especially if this coincides with a shortage of feed, as frequently occurs during winter for autumn calving herds; supplementary feeding is often required.

Supplementation may also be required if the break of the season is delayed or water logging and low temperatures are lengthy causing decreased pasture growth. Even with supplementary feeding a loss of condition sometimes still occurs.

Estimating Breeding Values (EBVs) for milk can also be used to assist with efficiency. It provides an estimation of the genetic milking ability and is reflected in pre-weaning calf growth. Cows with high Milk EBV values tend to prioritise nutrient intake towards lactation, rather than maintaining cow body condition. To avoid a negative effect on fertility, caution should be exercised in choosing high Milk EBV values for herds in areas were lengthy and or marked nutrient restriction are frequent. Average Milk EBV values are recommended under these conditions to minimise supplementary feeding requirements.

For mature cows that have calved in adequate BCS, allowing a controlled loss of condition is acceptable; as long as it is managed correctly and doesn't fall low enough to affect fertility and welfare standards (sudden or severe restriction must be avoided). Managers should limit this loss of condition post calving by supplying high quality and adequate quantity of feed to animals which have calved, with priority being allocated to first calvers.

If supplements are to be fed at any point in time it is recommended that young and mature cows are fed separately to avoid bullying and also to facilitate BCS monitoring.

More information on how to assess BCS and timeline targets are provided on: Condition Scoring of Beef Cattle, plus a paddock guide to assessing body condition score is available from the Angus Australia website.

Although BCS is a useful tool it is a result of past nutritional status. A more accurate assessment of whether or not feed supply is meeting current animal demands can be done by measuring the value of feed on offer and comparing it to current animal requirements. When considering nutritional requirements, it is important to provide access to good clean water as limiting water availability can negatively affect feed intake, and functions such as lactation and digestion.

An animal's requirements may vary according to class and production level (see Table 1) and can be increased in situations of extreme temperature and where animals have to walk a long way for feed or water.

Table 1: Energy in megajoules per day (MJ/day) and dietary protein concentration requirements for different classes of beef cattle (Source: Adapted from Meat and Livestock Australia's More Beef from Pastures Manual)

Breeder Cows	350kg	400kg	450kg	500kg	550kg	Protein required (%)
Dry Cow	48	52	57	61	66	6
Pregnant, last three months	60	65	69	74	78	6
Lactating cow and calf, 0-3 months	74	80	85	90	95	10-11
Lactating cow and 150kg calf (using DSE ratings in PROGRAZE)	111	118	125	133	140	10-11

Growing cattle	150kg	200kg	300kg	400kg	500kg	Protein required
Maintenance	22	26	35	45	55	8
Gaining 0.5kg/day	37	44	57	71	82	10-12
Gaining 1.0kg/day	50	59	76	93	108	13

Time of calving

Feed requirements for the cattle herd and pasture supply fluctuate throughout the year. Feed requirements for the breeder herd are highest when animals are lactating. Calving dates can be altered to match peak feed supply with peak feed demand, resulting in a more productive and efficient operation with lower supplementary feed requirements.

When selecting the time of calving for your business the overall strategic business plan should be considered. Factors such as target markets, labour availability, climatic constraints and the requirements of other enterprises on farm throughout the year should be taken into account.

Meat and Livestock Australia's (MLA) feed demand calculator can be accessed in the Internet and used to identify when feed gaps and feed surpluses occur on your farm and allow you to see how these may alter if the time of calving is changed.

Previous research by the department compared the productivity of early (March - April) and late (June-July) calving herds in the agricultural regions of WA. Later calving herds had reduced supplementary feed requirements, although weaning weights tend to be lower. For more information on this, see: The effects of time of calving on herd productivity in the agricultural region of WA

Dystocia

Dystocia can increase time from calving to first oestrus. The main cause of dystocia is calves being too big for the female pelvic opening. It is much more common in heifers than mature cows.

Dystocia can be reduced by ensuring:

- heifers are well grown and have met their critical joining weight
- bulls are suitable – assess bull shape visually and closely assess Calving Ease and Birth Weight EBV's for heifer bulls
- nutrition pre calving is appropriate. Over fat animals can have more calving difficulties and animals in poor condition or which are deficient in some minerals may have weak muscle contractions reducing their ability to deliver a calf.

The use of genetics

Although nutrition is the main factor influencing breeder fertility, it can also be improved by means of genetic selection, using bulls with good EBV's for fertility traits. In order to obtain faster and higher genetic improvement selection should also be apply to females. Fertility traits EBVs are:

- Days to Calving
- Gestation Length
- Scrotal Size
- Calving Ease.

Fertility traits should be considered as part of a balanced breeding program with other production traits also considered. Comprehensive material on the definition and uses of EBVs can be found on: A basic guide to Breeplan EBVs.

Weaning

Lactating places a significant energy demand on the cow. If the cow's body condition score is falling and feed resources are low, such as during a poor season, calves can be weaned early as it may be more efficient to feed the calf directly then to feed the cow to sustain lactation to feed the calf.

Earlier weaning allows the pregnant cow extra time to resume body condition score before the next calving, which in turn helps ensure she will resume cycling and get in calf early in the next joining period. However, careful planning and risk assessment is essential before any additional practice like earlier weaning or creep feeding is undertaken. What pasture quality (digestibility, crude protein and fibre content) and quantity (kg green dry matter/hectare) is available now and over the next 12 weeks.

Creep feeding allows calves unrestricted access to additional feed while they are still suckling the cow. Calves gain access to the feed supplement e.g. calf pellets or a small areas high-quality pasture/crop through a 'creep', which is an opening large enough for calves to pass through but too small for the cows. This allows calves to meet market specification at a young age, even in adverse seasonal conditions. Creep feeding can be used to wean calves earlier, causing minimal setback. Calves become accustomed to grazing away from their mothers in an adjoining paddock. At weaning time, the creep is closed off, leaving calves on one side of the fence and the cows on the other.

Additional costs are incurred in creep feeding and/or earlier weaning of calves. When pasture is expected to hay-off 1 to 2 months earlier before normal weaning, the pasture mass is likely to be below 2000 kg DM/ha and pasture quality is rapidly declining. The impact of weaning calves earlier than normal in adverse seasons will result in a significant number of calves with a reduced weight affecting their profitability. This is where the potential role for creep feeding calves may be economical. Some creep fed calves can be sold straight off the cows, leaving fewer surplus stock to be carried over for future finishing. This relieves the stocking pressure in early summer when feed is short. Also, the cows will have extra time to increase their body condition score before December.

The younger the age of the calves at weaning, the higher the quality of feed post weaning they require. They should graze legume dominate pasture with a green Feed-On-Offer at least 1500 kg/ha DM or legume forage crop or fed calf pellets. Free access to good quality water in all these instances is also essential. Veterinary advice should be sought to address immunisation and any other required treatment like drench for worms. Careful planning is required before feeding commences.

Most calves are weaned between six and nine months old. The best feed available should be prioritised for the weaners.

Weaning is a key learning time for the animal. How animals are treated during this period can alter their lifelong behaviour. Many studies have shown that yard weaning results in quieter more productive animals, especially if they are to go into feedlots. It aligns with best practice husbandry and supports production and welfare.

Yard weaning gets the animal used to confinement, using water and feed troughs, and human interaction. Animals which have had good socialisation with humans during weaning tend to cause fewer problems in the future and experience less stress when they are yarded or handled. Quietly walking through the weaning yard, a couple of times a day can be enough to socialise cattle with humans.

Yard weaning often results in calves from different groups intermingling, which can help stimulate the immune system as they are exposed to a different population of microbes than the one their bodies are used to. To promote this, a stock density around 4 m2/head for 180-260 kg calves is ideal (5-6 m2/head for heavier weaners). This can better prepare them to respond to future microbe challenges.

High levels of dust should be avoided where possible to avoid pink eye. Other vaccination procedures may be administered whilst in the yards in accordance with a herd health plan (your local veterinarian can assist with this).

Good quality feed e.g. calf pellets and unlimited access to clean water should be provided to yard weaned calves so weight loss is minimised. Shy feeders should be removed and fed separately. Adequate feeding space assists in decreasing incidence of shy feeders.

Cattle should be yarded for at least 5-7 days (10-14 days are required under certain quality assurances programs) before being turned out onto legume dominate pasture with a Feed-On-Offer of 2000 kg DM /ha. Pastures should be prepared and set aside in advance and where possible managed to ensure a low worm burden. Pastures from Space is a useful resource for determining available Feed on Offer.

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Last updated November 2024

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