

# Management Practices for Increased Reproduction

**Leslie Bergh**

ARC-Animal Production Institute, Private Bag X2, Irene, 0062 South Africa  
Tel. +27 (0)12 672 9145, Cell +27 (0)82 801 2026, E-mail: leslie@arc.agric.za

## INTRODUCTION

There are two basic principles for an increased profit in reproduction management, namely, good record keeping and explicit goals. If these two principles are carried out together with new scientific technology, you will already be on the road to success.

Even though it is generally accepted that good record keeping is the basis of effective management, it is surprising – and disturbing – how many beef cattle farmers keep few, if any, production and reproduction records of their animals.

## GOALS

The aim of a beef cattle herd should be to make optimal use of the natural resources to produce the highest maximum weight as well as high quality slaughter and/or breeding animals, using a suitable production system, in order to ensure the best possible profit per hectare over the long term. In other words this means to produce the optimal number of, and weight of, weaning calves per 100 cows at the lowest possible cost per breeding animal and market them as soon as possible after weaning at the optimum weight and carcass composition.

Efficient management is necessary to achieve this, and good record keeping forms the basis of this because *“If you do not know where you are now, how will you know where you are heading?”*

## MINIMUM PERFORMANCE STANDARDS

In order to set goals, it is necessary to first benchmark your herd's production and reproduction performance against what is accepted as good performance. We all know that it is very difficult to give general guidelines, as the production environments for beef cattle in South Africa varies a lot between various ecological regions and even between farms in the same region. Furthermore, we also know that there are genetic difference between breeds, especially with regard to the growth rate and weight.

In spite of the above mentioned, norms can still be laid down, at least for certain aspects, to benchmark your herd's performance. Below are guidelines which will assist farmers, especially beginners and inexperienced farmers, to evaluate the performance of their herds and set goals for the future.

Calf percentage (calved/mated)		
Heifers		90%
1st calf cows		70%
2nd calf cows		75% Mature
cows	80%	
Average (whole herd)		80%
Heifers age at 1st calving		Max. 36 months

Heifer weight begin mating (24 mths)/expected adult cow weight	65%
Heifer weight end mating/ expected adult cow weight	85%
Heifer weight before calving/ expected adult cow weight	90%
Condition score at mating (1-5 scale)	3.0 – 3.5
Length of breeding season	Max. 90 days
Cow pregnant from AI (AI 1 <sup>st</sup> 1/3 breeding season)	60%
Calf mortality till weaning	Max. 3%
Herd mortalities	Max. 2%
205-day Calf weight/cow weight	45%

The ideal in a beef cattle herd is a weaning percentage (calves weaned/cows and heifers mated) of 90%+ and a 205-day calf weight/cow weight ratio of 45%+.

## INFLUENCE OF REPRODUCTION

Reproduction is the basis of the production chain and it is the single aspect that has the biggest influence on the profitability of a beef cattle operation. Research shows that reproduction is about five times more important than growth and ten times more important than carcass traits. Research has proven that if reproduction rate improves by 10% it will lead to an 8% increase in nett income.

The influence of calving percentage on selection intensity is illustrated in Table 1. For calculation purposes, it is accepted that this is a breeding herd of 100 cows, the mortality is 3-5% per year, all non-pregnant cows are sold after pregnancy tests have been done and a further 10% of the cows will be culled annually on the grounds of age, poor production, etc.

**Table 1: The influence of calving percentage on selection intensity.**

Calving %	Mortalities (3 - 5%)	Heifers available	Heifers pregnant	Culled: Did not calf	Culled: Old and other	Total culled	Surplus or deficit
95	3	46	44	5	10	15	+29
85	3	41	35	15	10	25	+10
80	3	39	31	20	10	30	+1
75	3	36	27	25	10	35	-8
65	3	31	20	35	10	45	-25
55	3	26	14	45	10	55	-41

From Table 1 it is clear that if the calving percentage drops below 80%, the farmer can no longer select efficiently for fertility as he then has to keep cows and/or heifers in his herd that are not pregnant in order to maintain the number of animals in his breeding herd.

In Table 2 the calculation of calving percentage on an annual gross income is illustrated, where the culling percentage of cows stays fixed at 20%. For calculation purposes, it is accepted that this is a breeding herd of 100 cows, bull calves at weaning weighing 230 kg, heifer calves at weaning 210 kg and the weight of culled cows 500 kg. The slaughter percentage for cull cows is taken at 50% and the weaned calves are sold for R12,50/kg live weight and the culled cows for R17.30/kg carcass weight.

**Table 2: The influence of calving percentage on the annual gross income of a herd. (Fixed culling percentage of 20%)**

Calving %	Mortalities (3-5%)	Saleable calves	Culled cows	Income – Calves (R)	Income – Culled cows (R)	Total Income (R)
95	3	46 + 26	20	200 500	86 500	287 000
85	3	41 + 21	20	173 000	86 500	259 500
75	3	36 + 16	20	145 500	86 500	232 000
65	3	31 + 11	20	118 000	86 500	204 500
55	3	26 + 6	20	90 500	86 500	177 000

It can be seen from the calculation that if the calving percentage of 55% is increased to 95%, the farmer can earn R110 000 more per year from his herd of 100 animals. In other words, if the herd's calving percentage is 55%, the farmer will lose R110 000 or 38% of his potential gross income per year.

## **REPRODUCTION MANAGEMENT**

The four cornerstones of reproduction management are nutrition, mating management, herd health and selection for fertility. In this article we will concentrate on mating management.

The following four questions form the basis of reproduction management:

- Do the cows come on heat?
- Does mating take place?
- Do the cows become pregnant?
- Do the cows carry to full term?

### **Mating Management**

Mating management begins at breeding seasons that are chosen specifically so that the peak production period of natural pastures can be optimally utilised. If the breeding season is correctly chosen, it will ensure that the female animals will be mated when their condition and weight is ideal.

The benefits of a fixed breeding season are that the peak production of the pastures can be utilised when the cow's and the calf's (before weaning) nutrition requirements are the greatest. When the cows nutritional requirements are low, it coincides with the low production cycle of the pastures, which means that less supplementary feeding is necessary. In this instance one must remember that a cow's peak nutritional requirement is from six to fourteen weeks after calving.

Breeding seasons also simplify the planning of the fodder flow programme, makes the management of routine tasks easier (such as marking, dosing, inoculation, de-horning and weaning of calves) and the calving season can also be intergrated with other tasks, such as harvesting and planting. This makes it easier to give attention to the breeding herd during the mating and calving seasons. Furthermore, the breeding season also facilitates the selection for fertility, because cows that are not pregnant can be summarily culled. Lastly, the breeding season also makes it possible to identify cows that calf late in the season and to cull them if necessary, seeing that the cows that calf late, are usually those that will not become pregnant the next breeding season.

### **Heifers and First Calf Cows**

The management of heifers and especially first calf cows is critical as they must become pregnant and suckle a calf while they are still growing. It is therefore very important that heifers must be managed as a separate group as from the time that they are weaned until the second time they calf. This includes extra attention, the best camps, strategic supplementary feeding and a special health programme. The aim must be to get the heifers pregnant before they are 27 months old so that they will calf before they are 36 months old. The weight, condition and growth rate of heifers are more important indicators than age, in order to determine when the heifers can be mated for the first time. (Refer to the guidelines above). If you expect that heifers will get too heavy and/or fat at 24 months of age, it can be considered to mate them at 18 months of age as long as there is sufficient good quality pastures and/or harvest residues, hay or silage available after calving to ensure that their condition remains optimal for re-conception. If such heifers are allowed to rest for six months before they are mated again (in order that they will then calf in the main calving season), it will ensure a higher re-conception rate.

In order to identify heifers that will calf with difficulty, their pelvis opening can be measured by a veterinarian and those heifers with small measurements can be culled before the breeding season. Only bulls with a relatively low breeding value for birth weight should be used on heifers, to ensure easy calving. Avoid excessive energy supplements in the last three months of pregnancy, as this will lead to large calves and thus to difficult calving. The uterus and birth canal of a heifer that has calved easily will recover quickly and she will come on heat sooner than a heifer that has calved with difficulty.

The breeding season of heifers should, ideally speaking, only be 45 to 65 days, so as to put pressure on fertility. More heifers (up to 50% more) than are required should be mated, so that there will be sufficient pregnant heifers available to replace the non-pregnant cows and cows that must be culled for other reasons. (Refer to Table 1 above).

It can also be considered to mate heifers about 4 to 6 weeks before the main mating season (for cows). This will give them a longer recovery period and can lead to higher re-conception. Once again, this should only be done if there is sufficient good quality pastures and/or harvest residue, hay or silage available after calving. The use of a higher percentage of bulls for the heifers, especially during the first 21 days of the mating season, can also be beneficial. The provision of a stimulation lick 21 days prior to the mating season up until 42 days into the mating season, will also assist in achieving a higher conception figure.

A managerial practice that can also be considered is to place a mock bull in with the heifers nine days before the intact bull is introduced. The presence of the mock bull will stimulate the heifers to ovulate.

### **Bull-cow ratio**

The bull-cow ratio must be adapted carefully to circumstances, to avoid losses due to fertile cows not being mated. Important aspects to keep in mind are the bull's libido, his age and the environmental conditions where he must work. A bull will serve fewer cows in a large buched camp, where visibility is bad and he has to walk kilometers to drink water, than he would in a small camp with a group of cows and where there are cultivated pastures and water on hand. A general guideline, as far as age is concerned, is that a 2 year old bull will serve approximately 20 – 25 cows, a 3 year old bull approximately 25 – 30 and a 4+ year old bull approximately 30 – 40, taking the environmental conditions, as mentioned above, into account.

### **Single bull vs multi bull matings**

With single-sire matings (one bull with a group of cows) the risk of low conception rates are much higher if the bull is infertile or has a weak libido. Multi-sire matings (a few bulls together with a group of cows) can, to some extent, compensate for individual bulls that are infertile or have a weak libido. However, if the dominant bull is infertile or subfertile, he will cover most of the cows and it may still result in low conception rates. Low fertile bulls with good libido may also lead to low conception rates due to exhaustion of their semen reserves.

Where multi-sire matings are done, it is important to make use of bulls that are least likely to fight to ensure that precious time and energy is not wasted and also to limit injuries. Put for example two younger bulls with an older (dominant) bull. Certain subordinate bulls will also be tolerated by dominant bulls.

### **AI**

As far as AI is concerned, there are three options:

- The most common option is to AI for the first third of the breeding season and then to use followup bulls for the rest of the season. If this option is used, the aim should be to have about 60% of cows and/or heifers pregnant via AI.
- The second option is to synchronise cows and/or heifers and AI them once, then use followup bulls for the rest of the breeding season.
- The third option is to only use AI. This option is the most risky and should only be considered if the animals' nutrition, management and AI practices are of a very high standard.

### **Other aspects**

Breeding ability tests, where the physical condition of the bull, the quality and quantity of semen he produces and venereal diseases are checked, must obviously be done early so that – if there is a problem – a plan can be made before the breeding season begins.

Other aspects that are essential for a good reproduction management programme are pregnancy tests, good supervision of female animals – especially heifers – during the calving season, meticulous record keeping of the reproduction activities, for example mating lists and AI records, pregnancy records, calving records and – where possible – when each cow was on heat and which bull serviced her. Reproduction records that should be recorded on mating groups and herd level, are pregnancy percentages and calving percentages. A good beef management computer programme, such as the ARC's BeefPro™ programme, can naturally be a very useful aid in this respect, as it makes provision for recording, processing and reporting of all the reproduction records. For more information, please visit [www.beefpro.net](http://www.beefpro.net).

### **Selection for fertility**

The farmer who is serious about the reproduction performance of his herd, will definitely give attention to the reproduction indicators of his cows such as age at first calving, inter-calving periods, reproduction index and days since last calving (which will early indicate those coes that will skip).

The first thing that a farmer must look at when selecting a bull to improve fertility, is the bull's mother. If she has a poor reproduction record, such a bull must be avoided. Then look at the scrotum circumference of the bull, as this will determine the quality and quantity semen he will produce. Furthermore, attention should be given to the secondary gender traits such as masculinity.

Heifers should be mated at a young age and for a short period, to increase the selection pressure on fertility. All those cows and heifers that did not become pregnant, and preferably also those that calved late in the season, must be culled.

The ARC's National Beef Recording and Improvement Scheme has a report available, the so called Breeding Herd Selection Report, which contains all the important data necessary to select cows and heifers, such as all the reproduction yardsticks, indexes, breeding values, approval ratios and awards. Bad achievers with regard to each trait are marked with a red circle to make it easy to identify them. This report is a valuable and extremely user friendly aid to evaluate the breeding herd and to identify poor performers. (By the way, this report is also available in BeefPro).

**For further information, contact Mr. Leslie Bergh at 012-672 9145 or 082 801 2026 or e-mail [leslie@arc.agric.za](mailto:leslie@arc.agric.za).**