

## Breeding seasons for beef cattle in South Africa

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### Introduction

Optimal reproductive performance is of paramount importance for the success of a beef cattle enterprise. Reproductive performance is mainly influenced by:

- Nutritional status;
- Genetic potential; and
- Veterinary aspects (especially venereal diseases).

Breeding season management is a very important tool to optimise the reproductive performance of a breeding herd and the pre-wean growth rate of calves. Breeding (and calving) season management is therefore one of the most important management decisions influencing the profit margin of a beef cattle enterprise.

### Aim of Breeding Season Management

The aim of a breeding season is to get the maximum number of females pregnant in a relatively short period, as cost-effective as possible, for calving during a period most favourable for:

- Re-conception of cows;
- Calf survival; and
- Pre-wean growth of calves.

**The major factor governing the ideal breeding season is nutrition.**

### Optimum breeding season

The optimum breeding season is one that makes optimum use of the cheapest source of high quality feed, namely summer grazing.

The main consequences of a breeding (and calving) season that starts too late, are:

- Calves are born too late and are too small to utilize their dams' high milk production from peak summer pastures. This results in lower weaning weights.
- Calves are born later in the summer season and, because of the higher nutritional level of the cows at that stage, this results in higher birth weights and consequently a higher incidence of distocia.

The main consequences of a breeding (and calving) season that starts too early is:

- Cows calve too early, i.e. too long before adequate summer grazing is available. The result is a loss of too much condition and consequently a lower re-conception rate.

The ideal calving time is  $\pm 6 - 8$  weeks before adequate green grazing can be expected.

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## Disadvantages of breeding throughout the year

The disadvantages of calving through the year will become clear when the advantages of breeding seasons are discussed later. The main disadvantages of through the year calving are:

- The inefficient use of summer pastures and of expensive winter supplements;
- It is difficult to effectively select for fertility;
- Routine management practices cannot be consolidated;
- It complicate feed flow planning; and
- Performance testing and marketing cannot be done effectively.

## Advantages of breeding seasons

The advantages of breeding seasons are:

- The optimal utilization of the peak production period of natural pastures:
  - The best paddocks can be allocated to the breeding herd, resulting in a higher conception rate;
  - Females can be mated at optimum condition and weight, resulting in a higher conception rate;
  - The period of peak nutritional requirements of the cows (6 - 14 weeks post-partum) can be coincided with the peak production of natural pastures, resulting in:
    - Cows maintaining their condition, resulting in a higher conception rate; and
    - Higher weaning weights;
  - Pre-wean growth period of calves coincides with peak production of natural pastures resulting in higher weaning weights;
- The period of low nutritional requirements of cows (after weaning) coincides with the period of low production of natural pastures (winter). Less supplementation is therefore needed during winter;
- Cost-effective strategic supplementation of breeding cows is possible;
- It simplifies feed flow planning;
- It simplifies routine management practices, e.g. dosing, pregnancy diagnosis, calving observation, identification, inoculation, dehorning, castration, weighing, weaning, etc. With single sire mating, breeding groups have to be kept separate for only a short period of the year;
- Calving season(s) can be coordinated with other farming enterprises and activities, e.g. planting, harvesting, etc.;
- Attention can be focused on the breeding herd during the breeding and calving season(s);
- Performance testing can be done more effectively because calf groups are larger and more uniform regarding age variation;
- Marketing can be more effective because:
  - Calf groups are larger and more uniform regarding weight and age;
  - Non-pregnant cows can be marketed before winter in a good condition;
- Selection for fertility is easier and more effective because:
  - Sub or infertile females can easily be identified;
  - Sub or infertile bulls and/or bulls lacking libido can easily be identified;
  - Non-pregnant females can be culled early, i.e. directly after the pregnancy diagnosis; and
  - Early vs. late calving cows can be identified.

## Disadvantages of breeding seasons

The disadvantages of breeding seasons are few:

- The bull requirements are marginally higher than for through the year breeding;
- The bulls have to be kept in separate paddocks, away from the cows, during the non-breeding periods of the year.

**Please note:** The following guidelines and recommendations are applicable to a **summer rainfall region** and should be adapted accordingly for a winter rainfall region.

## Which time of the year?

The primary principle is to choose a time of the year at which the cows reach optimum condition for breeding. This time is usually about three months after the month of the highest rainfall. For a summer breeding season, the best re-conception is achieved if cows calve about one month before to about one month after the first effective rains have fallen. (E.g. if the first effective rains in a specific area usually fall in October, cows should calve from September to November. This implies that the breeding season should be from 15 November to 15 February.

If no breeding seasons exist on a particular farm, the current calving pattern of the herd can be used as a guideline. Determine in which three consecutive months most calves are born and use this to determine the optimum time for a breeding season.

In general, breeding seasons in drier regions (where the rain usually starts later in the season) should be later than in wetter regions (where the rain usually starts earlier in the season). Table 1 gives a guideline in this regard.

**Table 1** Time of the year guidelines for a three month summer breeding season for some regions in South Africa

Region	Breeding	Calving
Eastern Highveld	Nov - Jan	Aug - Oct
Western Highveld	Dec - Feb	Sept - Nov
High rainfall Bushveld	Jan - Feb	Oct - Dec
Low rainfall Bushveld	Feb - Apr	Nov - Jan

The availability of planted pastures, crop residues, silage, etc. and synchronization with other farm activities (e.g. planting, harvesting, etc.) should be considered in deciding the specific breeding period.

## One or two breeding seasons?

The main advantages of two breeding seasons per annum are:

- Bulls can be used more effectively;
- Cows that skip and which are not culled, can be mated again sooner – they will skip only six months and not a full year; and
- It facilitates the mating of heifers at 18 months of age *vs.* the normal 24 months of age.

The main disadvantages of two breeding seasons per annum are:

- The farmer may be tempted not to cull cows that have skipped, because they can be bred again within six months. This practice will result in a lower reproduction rate;

- Contemporary groups will be smaller, because the annual calf crop will be spread over two seasons; and
- It requires higher management inputs, because all routine management practices need to be done twice per year.

A winter breeding season should only be considered if:

- Sufficient feed of a high quality (e.g. crop residues) is available at low cost during winter; and/or
- Heifers need to be mated at 18 months of age because they become too fat at 24 months of age.

### **Advantages of a summer breeding season**

Except for breeding heifers at 18 months of age (in winter), a summer breeding season usually is better than a winter breeding season, because:

- Cows are normally in a good condition during mid-summer, resulting in higher conception rates;
- The period of the peak nutritional requirements of cows coincides with the peak production period of natural pastures (summer), resulting in higher weaning weights; and
- The period of low nutritional requirements of cows (after weaning) coincides with the low production period of natural pastures (winter), resulting in less supplementation needed during winter.

### **Disadvantages of a summer breeding season**

- The internal and external parasite load is high during the pre-wean phase of calves, resulting in lower weaning weights;
- The growth rate during the period directly after weaning (winter) is low; and
- Summer droughts may result in lower conception rates due to the poor condition of cows in the breeding season.

### **Advantages of a winter breeding season**

- Excess crop residues and hay can be utilized optimally;
- The parasite load is lower during the pre-wean phase of calves, possibly leading to higher weaning weights; and
- The growth rate during the period directly after weaning (summer) is high.

### **Disadvantages of a winter breeding season**

- The cows are normally in a poor condition at breeding, resulting in lower conception rates;
- The period of the peak nutritional requirements of cows does not coincide with the peak production period (summer) of natural pastures; and
- The period of low nutritional requirements of cows (after weaning) does not coincide with the low production period of natural pastures (winter); therefore more supplementation will be needed.

### **How long?**

A breeding season should not be longer than 90 days. Taking 285 days as the average pregnancy period, a cow must conceive within 80 days after calving to calve each year at the same time. [365 minus 285 (Pregnancy) = 80 days]. Therefore, a breeding season of 75 - 80 days is better than 90 days. The ideal is a 65-day (3 oestrus cycles) breeding season for lactating cows and a 45-day (2 cycles) for heifers and dry

cows. To achieve a high conception rate in a short breeding season, aspects such as the nutritional status and condition of the cows should be at an optimum.

### How to start with a breeding season

There are four steps to be followed in the decision process, namely:

- 1<sup>st</sup> step: Decide on one or two breeding seasons per year;
- 2<sup>nd</sup> step: Decide on the best period(s) during the year;
- 3<sup>rd</sup> step: Decide on the implementation strategy, namely gradual or immediate; and
- 4<sup>th</sup> step: Decide on the implementation process.

For **immediate implementation**, the following process is recommended:

- Remove all bulls from the breeding herd at the end of the planned summer breeding season;
- Do pregnancy tests on all cows and heifers 2 - 3 months after the bulls have been removed;
- Cull or sell all the non-pregnant females, OR transfer these females to a winter breeding season;
- If the non-pregnant females were transferred to a winter breeding season, do pregnancy tests again and:
  - Cull all the non-pregnant females; and
  - Transfer the pregnant females to the summer breeding season OR continue with the winter breeding season.

For **gradual implementation**, it is recommended to start with a longer season and shorten it each following year by  $\pm 1 - 2$  weeks, until the desired breeding period is reached. The breeding season should be shortened by moving the starting date (not the end date) forward, e.g.:

- 1<sup>st</sup> year: 1 Nov - 28 Feb (4 months)
- 2<sup>nd</sup> year: 15 Nov - 28 Feb (3½ months)
- 3<sup>rd</sup> year: 1 Dec - 28 Feb (3 months)
- 4<sup>th</sup> year: 15 Dec - 28 Feb (2½ months)
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The following process is recommended:

- Remove all bulls from the breeding herd at the end of the planned summer breeding season;
- Do pregnancy tests on all cows and heifers 2 - 3 months after the bulls have been removed;
- Cull or sell all the non-pregnant females.

### Breeding seasons for heifers

The management of heifers and first parity cows is a very critical aspect in order to achieve a high conception rate in a herd. The reason is that these females, while going through pregnancy and lactation, still have to grow. To enable them to do this and to re-conceive, they will require sufficient amounts of high quality feed.

Weight, body condition and growth rate are the primary indicators when deciding when heifers can be mated. These factors are much more important than age. The ideal is to breed heifers as soon as possible after they reached sexual maturity. Sexual maturity is usually reached when a heifer reaches about 60 – 65% of her expected mature weight. For medium frame cows with an average mature weight of 500 kg, the target weight of heifers for breeding is therefore about 300 – 325 kg. The target weight at the end of the summer season (for a summer breeding season) is about 85% of expected mature weight.

If heifers become too heavy and/or too fat to be mated at 24 months of age, mating them at about 18 months of age during a second (winter) breeding season should be considered. This option will put even more stress on these young heifers and should only be considered if sufficient good quality pastures and/or crop residues, hay or silage are available for the heifers during the winter following calving. Insufficient nutrients during this period will certainly result in a low re-conception rate.

It is always a question what to do with the first parity cows that calved during winter at an age of  $\pm 2\frac{1}{2}$  years. There are two options, namely:

- Transfer them to the main breeding season by waiting an extra six months before they are mated again. This gives them additional time to recover before the next breeding season, resulting in a higher re-conception rate; OR
- Mate them immediately to calve again during the winter at an age of  $\pm 3\frac{1}{2}$  years. This practice will eventually lead to two full breeding seasons.

Another management practice to be considered is to start the breeding season of heifers 4 - 6 weeks before the cows' breeding season. Again, this gives them a longer time to recover before the next breeding season, resulting in a higher re-conception rate. It is also advisable to use a higher percentage of bulls when breeding heifers, especially during the first 21 days of the breeding season.

The breeding season of heifers should ideally be 45 - 65 days to put higher pressure on selection for fertility. Higher selection pressure can also be applied by the practice of over-mating. This practice implies that more heifers than needed for replacement are mated, making it possible to retain only the pregnant ones in the breeding herd.

### **Artificial insemination and breeding seasons**

There are three common practices of managing AI in breeding seasons, namely:

- The first option is to AI for the first third of the breeding season, then introduce follow-up bulls for the last two-thirds of the period. With this practice, the target is to get 60+% cows pregnant from AI.
- The second option is to synchronise the cows and/or heifers, AI for one oestrus cycle and then introduce follow-up bulls.
- The third option is to only use AI. This is the highest risk practice and should only be considered if nutrition, management and AI practices are tops.

### **Bull/female ratio guidelines**

Important factors to consider when deciding on the bull/female ratio are:

- The libido of the bull to be used;
- The age and experience of the bull; and
- The environmental conditions during the breeding season, e.g. paddock size, visibility, physical obstructions, poor grazing, long distances to water, dry & hot weather, etc.

The following are general guidelines for different bull ages, but should be adapted considering the above-mentioned factors.

- 2 year old bulls: 20 - 25 cows
- 3 year old bulls: 25 - 30 cows
- 4+ year old bulls: 30 - 40 cows

### **Multiple sires**

When using multiple sire breeding groups, try to use combinations of bulls that will reduce fighting to a minimum. Certain subordinate bulls will, for example, be tolerated by dominant bulls, resulting in less fighting between them.

#### **NOTE:**

Parentage determination is an important factor to consider when follow-up bulls are introduced directly after AI or when multiple sire breeding groups are used.

## **Related aspects to consider**

Other aspects not directly related to breeding seasons, but which should be considered in the quest for high conception rates, are:

- Condition scoring of cows to monitor target conditions (on a 1 - 5 condition score):
  - 2.5 - 3.0 at mating
  - 3.5 at mid-pregnancy
  - 3.0 at calving
- Breeding soundness examining of bulls (physical and semen) before the breeding season starts.
- Animal behaviour monitoring during the breeding season.
- Pregnancy diagnosis of cows.
- Post-partum anoestrus.
- Proper record keeping of all reproduction events and activities.

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