

SELECTION AND MANAGEMENT OF HEIFERS AND FIRST-CALF COWS

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The selection and management of replacement heifers is very important as it is the future cow herd. Incorrect selection decisions and/or poor management of heifers can have large financial implications on the short- and long-term.

The objective of selection and management of heifers can be summarised as follows:

- To make the unproductive life of heifers as short as possible by getting them pregnant at a relatively young age.
- To get a high percentage of heifers (90%+) pregnant within a short (maximum 90 days, but preferably shorter) breeding season.
- To keep calving problems in heifers to the minimum (less than 3%).
- To get first-calf cows pregnant again as soon as possible after calving.
- To wean relatively heavy calves from first-calf cows.

SELECTION

As with bull selection, the basis of the selection of replacement heifers is clear breeding objectives and a well-considered breeding strategy. This applies not only to the stud breeder, but also to ordinary beef cattle farmers. Without clear breeding objectives and a well-considered breeding strategy, it is virtually impossible to do any meaningful selection and one can easily forget to focus on those traits that are truly economically important.

As a heifer has no proven track record in terms of traits such as reproduction, ease of calving and maternal ability, all available information, especially of her mother and, where applicable, also her father and other relatives should be used to make an informed decision at selection. Where available, breeding values (rather than indices) should be used in selection, because a breeding value is a more reliable indication of an animal's genetic merit. The secret is to always use these breeding values in balance with other important traits, especially functional efficiency.

The following selection procedure is recommended for the selection of heifers:

- The **first selection** of heifers usually occurs when they are weaned. The traits that should be considered at this stage are the following:
 - **Pre-wean growth and milk production:** the heifer's weaning index is an evaluation of both her mother's milk production and her own growth rate to weaning. Cull heifers with a low (under 90) weaning index, especially if their mothers have a record of weaning calves with poor weaning indexes and/or poor breeding values for weaning direct (pre-wean growth) and/or weaning maternal (milk production).

- **Ease of calving:** cull heifers whose mothers have a record of difficult calving.
- **Reproduction:** cull heifers whose mothers calved at a high age for the first time and/or whose average inter-calving period (ICP) is long and/or whose reproduction index is low (under 90).
- **Hereditary defects:** cull all heifers with any hereditary defect, like a crooked face, undershot jaw, etcetera.
- **Functional problems:** cull all heifers with severe functional problems, regarding legs (e.g. straight hocks, sagging pasterns), hooves (e.g. outgrowing or deformed hooves), skin and hair coat (e.g. long hair, a lack of skin pigment), etcetera.
- **Frame size:** cull all heifers that are too large.
- **Hormonal imbalances:** cull all heifers that lack femininity or look oxy and/or with underdeveloped genitals (small vulva). All this is evidence that there may be a problem with her female hormones or that there may be a hormonal imbalance.
- **Temperament:** cull all heifers with a bad (wild) temperament.

- The **second selection** of heifers usually occurs just before they are bred (15-24 months of age). The traits which should be evaluated at this stage, are the following:

- **Pre-wean and post-wean growth:** cull heifers with a low (below 90) 12-months and / or 18 months from index. As the 12- and 18-month indexes are calculated on growth from birth, these indices are a function of both the mother's milk production, the calf's growth ability to weaning and post-weaning growth ability up to 12- or 18 months.
- Inspect the heifers again for **hereditary defects, functional problems, frame size, temperament and signs of a hormonal imbalance.**
- **Measure the pelvic opening of the heifers:** in order to identify those heifers that will probably have difficulty to calf normally at an early stage, you can have their pelvic openings measured by a veterinarian and cull those with small pelvic openings before the start of the breeding season. The uterus and birth canal of a heifer that calved easily will recover faster she will come on heat quicker than a heifer which had a difficult calving.

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- o **Selection by the breeders' society:** where inspection is done by a breeders' society, it usually takes place at this point in time.
- The **third selection** of heifers occurs when pregnancy diagnosis is made. At this point, all heifers that are not pregnant should be culled. If more pregnant females remain than needed for replacement and/or building the herd, it can be considered to also cull the heifers that became pregnant late in the breeding season and will calve late in the calving season, because it is usually those cows which will not get pregnant the next year.
- The **fourth selection** of heifers (in actual fact first-calf cows) is when they have calved. Cull all first-calf cows that had difficult calvings, considering of course that there were no other factors (such as overfeeding shortly before calving or the use of a bull that gives large calves at birth) that could have caused it.
- The **final selection** (of first-calf cows) takes place when their calves are weaned. Cull all first-calf cows whose calves have a low (under 90) weaning index. Also cull also first-calf cows with a low (under 90) cow efficiency index. The cow efficiency evaluates the weaning weight (adjusted for age to 205 days) of a cow's calf, compared to the cow's metabolic or maintenance weight (weight to the power 0.75) at calving (or at weaning if not recorded at calving). E.g. a cow of 500kg weaning a 250kg calf is more effective than a cow of 600kg with a calf weaning the same weight.

The ARC's National Beef Recording and Improvement Scheme has a report, the so-called Breeding Herd Selection Report, with all the important data needed to select cows and heifers. This includes all the reproduction criteria, indexes, breeding values, approval ratios and awards. Poor performers in respect of each trait are marked with a red circle around them in order to easily identify them. This report is a valuable and extremely user-friendly tool to evaluate the breeding herd and identify problem animals. (By the way, the Breeding Herd Selection Report is also available in the farm management software programme, BeefPro).

MANAGEMENT

Due to the high cost of rearing a heifer until after first calving, farmers cannot afford to lose young cows at this critical stage of their reproductive lives. As mentioned above, management practices in heifers and first-calf cows should aim to get heifers to calve early and easily and to get first-calf cows quickly pregnant again, as these aspects are the most common problems that farmers experience regarding the reproduction management of their herds.

The primary objective of heifer management is to get the maximum number of heifers pregnant as early and as cost-effective as possible in a relatively short period, for calving during a period of the year which is most favourable for re-conception, calf survival and pre-wean growth of the calves. Heifers should, in general, be pregnant before they are 27 months old, so they will calve before they are 36 months old.

The weight, condition and growth rate of heifers are more important indicators than age to determine when the heifers can be bred for the first time. This should, of course, fit into your herd's breeding season(s), to ensure that the cheapest source of high quality feed, namely good summer grazing (in a summer rainfall area) is optimally utilized.

The following management practices are recommended to ensure that heifers calve early and easily and that first-calf cows will get pregnant again soon and wean a decent calf:

GENERAL:

- **Ensure that the heifers fit into the production environment.** Guard especially against large frame heifers (that will become large frame cows) where the availability of food is limited. As first-calf cows are still growing and suckling their calves, their nutritional needs are very high and their reproduction will suffer if they lost a lot of condition.
- **Manage heifers and first-calf cows separately.** It is very important that heifers are managed as a separate group or groups from weaning until they calve for the second time. This includes that more attention be given to them, that they get the best camps, that they get strategic supplementation when needed and that a special health program is followed.

BREEDING:

- **Get heifers at 65% of expected mature weight at breeding.** If the average mature cow weighs 500kg, the heifers should weigh around 325kg at the beginning of the breeding season. The heifers should be 80 – 85% of their expected mature weight before calving.
- **Use a short breeding season.** The breeding season of heifers should ideally be only 45 – 65 days. The primary advantage of a short breeding and calving season is to apply selection pressure on fertility. It also ensure better supervision during the calving period.
- **Breed the heifers 4 to 6 weeks before the cows' breeding season begins.** By breeding heifers earlier than the cows, it gives them a longer postpartum recovery period which should lead to higher re-conception rate. This practice should only be considered if the heifers have adequate nutrition before calving and after calving until sufficient grass is available, otherwise they will lose too much condition which can cause lower re-conception. It is important that their calves be weaned 4 – 6 weeks earlier than the rest of the cows' calves, otherwise they may still lose too much condition.
- **Breed heifers at 18 – 21 months of age if they get too heavy and/or too fat to be bred at 24 – 27 months of age.** This practice should only be considered if sufficient good quality pasture and/or crop residues, hay or silage is available after calving to ensure that their condition remains optimal for re-conception. If these first-calf cows are then rested for six months before they are bred again (to then calve in the main calving season), it will ensure higher re-conception. The maximum reduction of the unproductive life of heifers can be obtained by breeding heifers at 12 – 15 months of age, but this practice should only be considered if the nutritional status and management in a herd is at a very high level.



- **Breed more heifers than is necessary for replacement.** Up to 50% more heifers than required for replacement should be bred so that there are enough pregnant heifers available to replace all non-pregnant cows and cows that need to be culled for other reasons.
- **Consider synchronisation of heifers.** The aim with synchronisation is to get heifers pregnant as early as possible during a short breeding season. Synchronisation is a fairly common practice in AI, but also has advantages with natural breeding.
- **Use proven ease-of-calving bulls on heifers.** Difficult calving extends the postpartum recovery period leading to poorer re-conception. Therefore, use only bulls with a relatively low breeding value for birth weight on heifers to ensure easy calving.
- **Use a higher ratio of bulls on heifers.** Using a higher ratio of bulls (15 – 20 heifers per bull) on heifers – especially during the first 21 days of the breeding season – will ensure that heifers on heat will receive more attention and assist to get a higher conception rate early in the breeding season.
- **Expose heifers and first-calf cows to teaser bulls.** The exposure of heifers and first-calf cows to teaser or sterile bulls or androgenised cows for at least 9 days before the start of the breeding season will encourage them to start ovulating and assist to get them pregnant early in the breeding season.
- **Avoid excessive energy supplementation in the last trimester of pregnancy.** If necessary, additional energy can be given during the last 50 days of pregnancy to ensure that the heifers' condition score is 3 – 3 ½ at calving. Be careful, as excessive energy supplements in the last three months of pregnancy can lead to large calves, calving difficulty, a longer recover period for the birth channel and consequently an extended period to re-conception. Be especially careful not to over-winter heifers on maize fields where the cobs were not picked up, because it can increase birth weights and heifers can become too fat, resulting in difficult calvings.
- **Provide ionophores to cows after calving to improve the utilization of feed.** Several studies have shown that feeding ionophores after calving will increase feed costs by only about 12c/dag, but that it shortens the postpartum interval by an average of 18 days, provided that sufficient energy is available.

OTHER MANAGEMENT PRACTICES:

- **Provide timely assistance with difficult calving if assistance is needed.** After a heifer has been in calving for 1 ½ hours in stage 2 (hooves visible) of calving, each additional 30-minute delay in assistance will lead to an additional six days in the interval until she gets pregnant again.
- **Consider creep feeding for first-calf cows' calves, especially if the pasture is poor.** This will increase the calves' weaning weights and help the cows to maintain condition, leading to better re-conception.
- **Wean calves early during droughts or feed shortages.** Early weaning of calves (up to 40 days earlier) is, according to research, one of the best methods to improve the reproduction rate of first-calf cows, since it will prevent these cows from losing too much condition.

FEEDING:

- **The condition of heifers at mating and at calving is critical.** On a 1 – 5 point scale (1 = very lean; 5 = very fat) heifers must be 2.5 – 3.0 at breeding and 3.0 – 3.5 at calving. If necessary, the feeding level of the first-calf cows should be increased after calving to maintain their body condition.
- **Provide first-calf cows with the best nutrition available.** Providing the best available nutrition (whether pasture, hay or crop residues and a lick) to first-calf cows after calving is critical for their high nutritional needs and to prevent them from losing condition.
- **Supplements (in the form of licks) must be balanced with respect to protein, energy, minerals and trace elements.** The lick must be adjusted according to the season, the quantity and quality of the grazing and the condition of the heifers.
- **Provide a stimulation lick 21 days before the start of the breeding season.** The provision of a stimulation lick 21 days before the start of the breeding season up to 42 days in the breeding season will help to achieve a high conception rate.

CONCLUSION

The selection and management of heifers and first-calf cows is critical for a high reproduction rate, high weaning weights and low calf mortalities in a beef cattle herd.



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