

Management of Replacement Heifers into the Suckler Herd

Summary

- Careful management of replacement beef heifers is required for their successful entry into the breeding herd, especially when targeting calving at two years of age.
- Nutritional management is crucial for heifers to achieve the growth target of at least 60% of mature body weight at service, as well as still meeting their growth requirements and pregnancy needs over their first calving period.
- Fertility management for heifers should involve a six-week mating period, one month before the main herd is mated, allowing heifers longer to recover and start cycling post-calving.
- Bull selection is critical and targeted use of bulls with estimated breeding values (EBVs) for easy calving and low birth weight will reduce the risk of dystocia.

Introduction

The goal of breeding heifer management is to produce a healthy, productive animal that produces a calf annually as part of the herd. This technical note will focus on managing heifers to achieve a target age at first calving of two years and cover the areas of nutrition and target growth rates, selection of replacement heifers, the importance of bull selection and breeding management.



Age at First Calving

Although there are many benefits of calving beef heifers at two years of age, many farmers are still reluctant to try, on the basis that heifers are not mature enough to withstand the rigours of calving and that future fertility will be affected. However, with careful management, there is no reason why heifers from most breeds, cannot calve down at two years and get back in calf timely to maintain a tight subsequent calving interval. The few exceptions are some hill breeds which are slow to mature. There are many advantages to calving heifers at two years of age:

- **They are more productive over their lifetime (producing one more calf during their time in the herd).**
- **Lower rearing costs and quicker payback of rearing costs. Research at the Grange Beef Centre (Teagasc) showed that delaying the age at first calving from 24 to 36 months, resulted in a 50% lower net margin per hectare for spring calving grass-based systems.**
- **Faster genetic progress as high producing dams are identified earlier, resulting in a shorter generation interval.**
- **Less heifers need to be kept as replacements.**
- **Simpler management of youngstock with less groups of different ages and lower stocking rates.**

This is backed up by data from the Irish Cattle Breeding Federation which analysed the performance of 131,077 beef heifers born in 2011 and calving between 23 and 40 months of age. The data in table 1 shows the effect of age at first calving on calving interval, the proportion of heifers calving for a second time and their longevity.

Table 1. The effect of calving age on subsequent calving interval, calving performance and longevity.

Age at 1st calving (months)	Average subsequent calving interval (days)	Heifers calving for a second time (%)	Heifers calving unassisted (%)	Mortality at 1st calving (%)	Reaching 5th parity (%)
23-26	383	82	50	3.2	39
27-30	394	83	53	2.8	20
31-35	392	87	58	2.6	4
36-40	386	86	57	2.0	0

There was no detrimental effect on subsequent calving interval with younger calving heifers. The percentage of heifers calving for a second time, unassisted calvings and mortality at first calving were slightly poorer for the younger calving heifers. However, their longevity in the herd was significantly higher than those calving at over 27 months of age. This data highlights the importance of ensuring heifers are well grown for calving at two years of age, with good nutrition and close attention and labour available at calving time to ensure a positive outcome for both the heifer and calf. Other research confirms that calving heifers younger has no negative effect on cow survival and lifespan in the herd.

Irrespective of age at first calving, heifers will require more assistance compared to cows. The danger with heifers calving at three years of age is they have a higher risk of calving difficulty compared to younger calving heifers. This is because calf size increases as the dam's frame size increases and older calving heifers are more likely to be overconditioned at calving.



Selecting Replacement Heifers

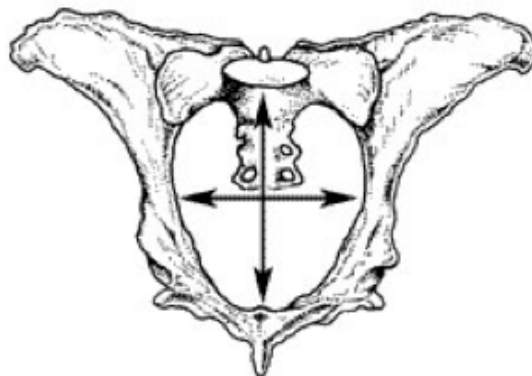
Selection of heifer calves to keep as replacements will depend on a number of factors. Those which have been born early in the calving season will tend to be bigger and heavier at weaning, compared to those born later in the calving season. Ideally replacement heifers should be between seven to eight months of age at weaning at a body condition score of three. These heifers are also more likely to be genetically superior and meet their growth target for serving at 14 to 15 months to become pregnant earlier and ensure calving down at 24 months. Take heifer size in relation to age into consideration so that by selecting the largest heifers, this does not necessarily lead to increasing mature weights of cows over time if that is not desirable.

Replacement heifers should come from the best cows and be bred to bulls with strong maternal traits with the highest positive EBVs for calving ease direct and calving ease maternal/daughters. These heifers are then more likely to have the correct skeletal frame (pelvic area) and muscularity to easily push out a calf.

Also consider the dam's calving performance, udder conformation and teat placement as well as temperament. Did they produce heavy calves or have a difficult calving? Are they too large or too small? Do they meet the herd's goal of what a sound breeding cow is and have the ideal phenotype?

Pre-breeding vet checks about 45 days before mating are useful to examine the reproductive tract for any problems and identify freemartins or heifers with abnormal or small pelvic areas, so as not to breed from them. At the same time pelvic measurements can be carried out to identify heifers that have narrow pelvic areas, which might increase their chances of calving difficulties (see figures 1 and 2 below). At the same time, it is important not to select heifers with the largest pelvic measurements for breeding as this runs the risk of increasing mature cow size over time.

Figure 1. Vertical and horizontal measurements taken to determine pelvic area



Source: <https://www.thebeefsite.com/articles/903/pelvic-measurements-and-calving-difficulty/>

Figure 2. The Rice Pelvimeter for taking pelvic measurements



Breeding Management

Heifers which calve as two-year olds can take longer to start cycling after their first calving and often become pregnant late or may not even conceive. Ensuring heifers are well grown throughout the rearing period, calve at the correct body condition score and are well fed both pre- and post-calving so that they lose no more than 0.5 condition score, will all help to ensure good fertility after their first calving.

Plan to breed replacement heifers so that they calve down four weeks before the main herd and within the first six weeks of the planned calving period. This allows longer time post-calving to resume oestrus cycles and still have at least three opportunities to be bred in a 9–10-week service period. It also allows more time and labour to be available to help deal with any problems at calving before the main herd starts calving. Ideally heifers should start cycling before the breeding season starts. Heifers that have had two cycles before the bulls are introduced have been shown to have improved conception rates (by up to 30%) compared to heifers bred on their first oestrus cycle (Byerley et al, 1987).

The service period for replacement heifers should be shorter than for cows, with the bulls in for six weeks. This should lead to a more compact calving as cows. Heifers that do not hold after a six-week breeding period should not be retained as they are less fertile and are more likely to calve later in future calving seasons. Ideally pregnancy diagnosis should take place between five to eight weeks after the bulls have been removed to identify heifers not in calf. These are the subfertile heifers which can be fattened or sold, avoiding the cost of carrying an open heifer. Calving dates can be predicted if heifers are scanned before three months of gestation. This allows heifers to be grouped accordingly and rations to be tailored depending on calving date. Plan to mate more heifers than will be required as replacements. This means that the most fertile heifers (those that conceive in a six-week breeding period) can be kept for replacements while the remainder can be sold.

Bull Selection

The priority for bull selection is to use an easy calving bull with the highest positive EBV for calving ease direct, so that the size and shape of the calf will allow it to be born easier. Bulls with a low calf birth weight and short gestation length EBV can help to reduce the risk of calving difficulties. It is also worth considering maternal calving ease figures to give an indication of how easily a bull's daughters will calve.

Also consider a bull's EBVs for 200-day growth and 200-day milk to get an indication of their progeny's potential for growth in the first 200 days as well as their potential to produce milk to feed the calf. However, care must be taken not to place too much emphasis on growth so that mature cow weight does not increase over time, as this can lead to higher maintenance costs. Also, cows that produce more milk may do so at the expense of condition and fertility.

Use of bulls with strong maternal traits (high calving ease direct and calving ease maternal/daughters) should be used on a proportion of the herd from which replacement heifers are produced from. This may require specifically selecting the best breeding cows to breed replacements from.

Nutritional Management from Weaning to Service

Inadequate liveweight at mating is usually associated with barren heifers and poor conception rates. This is because liveweight, and not age, is the critical factor influencing the onset of oestrus. Also, heifers that reach puberty earlier generally tend to have a shorter interval between calving and onset of first heat post-calving. The aim is for heifers to reach at least 60% of their mature body weight for mating at 14 to 15 months of age. Depending on breed, heifers need to achieve a target daily liveweight gain of 1.1–1.3kg/day up to weaning. Between weaning and service target growth rate should be between 0.7–0.8kg/day.

Mature weight is not reached until five to six years of age and the target weights for the 1st, 2nd and 3rd breeding years are shown in table 2. If heifers do conceive but are not at their weight target at first mating, they are less likely to become pregnant at their second mating due to higher nutritional requirements to grow, lactate, maintain body condition and possibly support another pregnancy. However, well-grown heifers should be able to achieve pregnancy rates of 85%.

Table 2. Heifer mating target body weight as a percentage of mature weight

Mature cow weight (kg)	First mating 60%	Second mating 85%	Third mating 95%
500	300	425	475
600	360	510	570
700	420	595	665
800	480	680	760

During the winter period, forage must be analysed so that the correct level of supplementary feeding can be provided to achieve target weight gains and meet protein requirements. During the grazing season, heifers should have access to the best quality grazing. Regular weighing of heifers throughout the rearing period is important to ensure that they are on track to achieve target weights for age. Consistent, steady weight gain is desired post-weaning and avoid heifers getting too fat. Weight gain at spring grass can easily be in excess of 1kg/day under good conditions and grass availability. Bear this in mind for autumn calving heifers and ensure they do not gain too much condition in the run up to calving.



Nutritional Management from Service to Calving

It is important to maintain heifers on the same plane of nutrition for six weeks post-service and avoid any changes to the diet to maximise embryo survival. From post-service to calving, heifers should be fed to maintain their condition but to avoid putting on excess condition, with the goal of calving down in body condition score of 3 for spring calving heifers and 2.5 to 3 for autumn calving heifers. The target is for heifers to reach a minimum 80% of mature body weight at first calving.

Replacement heifers should be managed separately from the main herd in the run up to calving as they have higher requirements for protein and energy as they are still growing. They also tend to produce less colostrum and of lower quality, again justification for feeding them a higher energy dense, higher protein ration than cows to maximise colostrum quality and quantity. Underfeeding protein in the last few weeks before calving can reduce the level of immunoglobulins (antibodies) in colostrum, leading to calves receiving insufficient immunity.

Bear in mind that dry matter intake could be as much as 20% lower in first calving heifers than mature cows. If feed space is restricted, it is likely to be the heifers that suffer the most. They should be housed and fed separately from the main herd and it is worth grouping them with any with thin cows, 2nd calvers and those carrying twins that would benefit from better quality nutrition.

Management of Heifers Post-calving

The effect of feed intake post-calving on milk yield is significantly greater than intake pre-calving. Energy requirements for lactation are about 30% higher compared to the pre-calving period and if energy is lacking, milk yield will be depressed and heifers will lose weight. They must also be fed to support continued growth. If heifers are calving as two-year olds they should be fed as well as possible post-calving to minimise weight loss, support good milk production and protect future fertility. Breeds producing more milk will take longer to start cycling after calving compared to those producing less milk. Allow for at least 0.5kg liveweight gain when rationing heifers post-calving.

Heifers are more likely to lose condition post-calving compared to mature cows. Consider creep feeding their calves earlier to take the pressure off the dam for milk. Earlier weaning is also a useful management strategy if heifers are struggling for condition, allowing them more time to regain weight before their second calving.

Conclusions

There are many important aspects to consider for successful management of breeding heifers and their longevity in the suckler herd. Nutrition and achieving the correct body condition score for service and calving are crucial, as are selecting the right heifers and bulls to breed from. It goes without saying that health status is also important and ensuring heifers are vaccinated against the most common diseases that can cause infertility. A targeted approach involving the vet and nutritionist in heifer management will help ensure success in this area.

Reference

Byerley, D.J, Staigmiller, R. B. Berardinelli, J. G. and Short. R.E. 1987.
Pregnancy rates of beef heifers bred either on pubertal or third oestrus. *Journal of Animal Science*, 65: 645–650.

Authors

Lorna MacPherson
SAC Consulting, Thainstone Agricultural Centre, Inverurie, Aberdeenshire, AB51 5WU / Tel: 01467 625385

Karen Stewart
SAC Consulting, 77 North Street, Forfar, Angus, DD8 3BL / Tel: 01307 464033

Acknowledgement

The work undertaken in the preparation of this Technical Note was funded by the Knowledge Transfer and Innovation Fund (KTIF) from the Scottish Government as part of the project Feeding for Fertility in the Suckler Herd (KTIF/O24/2019).