Working towards net zero carbon emissions

Improving fertility in the dairy herd

Farming for a Better Climate

Practical Guide

Fertility is the key driver of profit in the dairy herd and is dependent on genetics, nutrition and health status. Reproductive management is a complex area, involving decisions on genetics (e.g. choosing females for breeding replacements as well as bull selection), managing growth rates for timely breeding of replacement heifers and achieving a high pregnancy rate, which is dependent on good heat detection and conception rates. Key performance indicators (KPI's) for fertility do vary depending on whether the herd is block or all-year-round calving. Some KPI's and targets for all-year-round calving herds are:

- ✓ Age at first calving 22-24 months
- ✓ Heat detection rate >70%
- ✓ Conception rate 50-55%
- ✓ Pregnancy rate (heat detection rate x conception rate) >20%
- ✓ Calving to conception interval 85-95 days
- ✓ Calving interval 365-375 days
- ✓ 100 day in calf rate >65%
- ✓ 200 day not in calf rate <6%

This practical guide looks at ways to maximise fertility in the dairy herd which in turn helps improve annual milk production and reduce carbon footprint.

Age at first calving

The age of first calving can have a big influence on the carbon footprint of a farm. Heifers calving at two years tend to be more productive, with better fertility and produce more milk over their lifetime than older calving heifers. They also tend to have a longer lifespan in the herd and there is a faster rate of genetic improvement in the herd, with lower rearing costs and a quicker payback.

In order to calve at two years, genetics, health and nutrition are key. Healthy calves are likely to have better growth rates and achieve their target weight at weaning and breeding, than those which have a scour or pneumonia episode. The aim is for calves to double their birth weight when weaned at eight weeks.

Heifers should achieve their target weight for breeding (55-60% of mature body weight) at 13-15 months in order to calve down at 22-24 months. Aim for Holstein-Friesian heifers to achieve an average daily liveweight gain of 0.75kg/day from birth until calving.

As heifers are more at risk of calving difficulties due to their immature size, bull selection should take into consideration calving ease, low calf birth weight and short gestation length.

This practical guide is part of a series looking at steps you can consider to reduce emissions whilst maintaining a profitable farm business. For more information, tips and ideas and to read what other farmers have done, visit ***www.farmingforabetterclimate.org****. Find us on* ***Facebook*** *and follow us on* ***Twitter*** *@SACFarm4Climate.*

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Body condition score (BCS)

Body condition scoring is a useful management tool to assess the adequacy of nutrition at different times of the production cycle. Both over and under-condition can cause problems with fertility and the following table details when scoring should be carried out and the target BCS.

Stage of Lactation	BCS Target	Comment
At calving	2.5 – 3.0	Fit not fat
60 days post-calving	2.0 – 2.5	Weight loss inevitable (key is to minimise this)
100 days before dry off	2.5 – 3.0	Regain condition lost in early lactation
At dry off	2.5 – 3.0	Maintain condition until calving

BCS is a key determinant of fertility, with cows that lose more condition in early lactation being more difficult to get in calf. The target is for cows to lose no more than half a condition score unit from calving to breeding. Importantly they should not drop below a BCS of 2.0.

Over conditioned cows at calving are more prone to milk fever, as well as being more at risk of difficult and assisted calvings. This is due to more fat within the pelvic cavity. This can lead to delayed uterine involution, cycling problems and delayed conception. Thin cows lack strength for calving and have poorer colostrum quality and weaker calves. Milk yield is also reduced.

Importance of the transition period

Good fertility starts with managing the dry cow and ensuring she has been dried off at the target BCS for calving. Any nutritional deficiencies, excessive changes in condition or stress during the last three weeks before calving will greatly increase the risk of transition diseases and delays in return to oestrus. Nutritional management strategies must aim to control milk fever, because this disease can cause a cascade of problems, e.g. retained foetal membranes, metritis and ketosis, amongst others. All of these will greatly impact on how quickly cows start cycling after calving and get back in calf. Metabolic profiling is a useful tool to assess nutritional status and identify where improvements in nutrition can be made to benefit calving performance and subsequent fertility.

Heat detection and fertility aids

Getting cows back in calf is highly dependent on heat detection rates; these are easier to improve than conception rates. A number of fertility aids can be employed to help improve heat detection. These range from teaser bulls, tail paint and heat mount detectors to the more sophisticated automated detection systems based on activity monitoring and on-line milk progesterone testing. If fertility aids are not in use, heat detection should take place at least 3x daily for 30 minutes at a time, ideally when cows are at rest to observe bulling behaviour (i.e. 2 hours after morning and afternoon milking, with an early afternoon and even a late evening check as well). Make sure all staff are trained in heat detection, know the key behavioural signs, and record all heat events appropriately. Heat detection aids are not a replacement for visual observation and a combination of the two will give best results. In some cases the use of synchronisation protocols with fixed time artificial insemination may be an option and eliminate the need for heat detection. Consult your vet for further advice.

Identifying fertility problems

Accurate records are essential to manage fertility and to allow early identification of problems. The following should be recorded for each cow:

- ✓ Calving details - date, assisted calving, health events (e.g. transition diseases).
- ✓ Cows selected for cull or not to breed - date of decision not to breed and reason.
- ✓ Expected heat, heat dates, service intervals and any vet treatment.
- ✓ Artificial insemination (AI) - AI date, inseminator, bull information.
- ✓ Pregnancy diagnosis (PD) - date of PD and result, estimated number of weeks pregnant (if not pregnant to most recent insemination), to determine projected dry off and calving dates.

Problem areas to consider if fertility is poor:

- ✓ Transition disease (e.g. milk fever, retained cleansings, ketosis, metritis and displaced abomasum).
- ✓ Difficult last calving.
- ✓ BCS and loss in early lactation.
- ✓ Health status (infectious diseases).
- ✓ Heat detection rate and method of detection.
- ✓ AI timing and technique.
- ✓ Nutrition and mineral balance.

Fertility improvements will drive productivity and reduce carbon footprint. Every day added to a cow's calving interval, postpones her next lactation and is replaced by an extra day at the end of her current lactation, when yield is lower. More milk per cow = less methane per litre.