Managing pre-calving dairy cows: nutrition, housing and parasites

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offers dietary, environmental and disease prevention advice when caring for a dairy herd in the dry period

THE dry period is a crucial time in a dairy cow's production cycle. It has been proven effective dry cow management can minimise calving problems, prevent metabolic conditions in fresh calved cows and improve udder health and subsequent fertility.

The traditional dry period is eight weeks long. It is sometimes separated into two groups – "far off" (cows just dried off) and "close up" (cows within three weeks of calving). The traditional eight-week dry period has been questioned.

Research has suggested an udder is able to repair itself in a low somatic cell count cow within four weeks (Black, 2009); therefore, in low cell count cows, an eight-week dry period is unnecessary.

It is advised a Californian milk test should be used eight weeks before calving if this strategy is to be adopted, so high cell count cows can be dried off and treated appropriately.

A shorter dry period gives extra milk at the end of lactation and prevents the need to run both far off and close up dry cow groups. It has been shown short dry period cows have a reduced peak yield in their subsequent lactation, reducing the metabolic demand and improving fertility.

Whether a herd uses a four or eight-week dry period, the three weeks pre-calving to three weeks post-calving – the transition period – has many challenges for a cow; the stress of calving, a new social group and increased metabolic demands. It requires careful management to maximise production.

Nutrition

Negative energy balance, or "milking off her back", occurs when a cow cannot get sufficient energy from her diet to balance the amount of energy required for milk production. Negative energy balance results in the cow using her own body reserves – that is, fat – to release energy.

Fat is mobilised from the tissues by being broken down into fatty acids. Non-esterified fatty acids (NEFAs) are measurable in the blood and indicate fat mobilisation. The fatty acids are transported to the liver and metabolised to ketones. Excessive ketones in the blood stream can cause ketosis, otherwise known as acetonaemia, fatty liver or slow fever.

Ketones in the blood affect insulin production and can affect the viability of the eggs in the ovary. The first follicles are developing on the ovary up to two weeks pre-calving. A degree of negative energy balance is inevitable around calving.

This, however, can be minimised through effecting transition cow management to ensure adequate dry matter intake post-calving, so reducing the likelihood of ketosis.

The rumen fill in the dry period is directly related to the capacity of the rumen post-calving. To ensure adequate intake post-calving, the dry cow ration needs to provide adequate energy to maintain body condition while maintaining rumen fill. The suggested dry matter (DM) intake of a cow in the dry period is about two per cent of her bodyweight – for a 600kg cow, around 12kg DM/day.

This is sometimes difficult to achieve as appetite is reduced due to the large uterus, taking up a significant amount of space in the abdomen and there is no longer milk production to drive appetite. The energy requirement of the dry period is around 100 megajoules (MJ) metabolisable energy/day.

This equates to a ration having an energy density of 9MJ/kg to10MJ/kg DM. To ensure adequate DM intake, a dry cow requires 90cm of trough space and the feed should be of high quality, palatable and available 24 hours a day.

To maximise intake post-calving, rumen function most be optimal, with a pH of between six and seven to maintain a healthy rumen microbial population.

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A cow standing correctly in a clean sawdust-bedded cubicle.

Good feeding practice, adequate trough space, unrestricting neck rail and frequently presented total mixed ration.

One of the products of fermentation in the rumen is volatile fatty acid (VFA). The rumen must have a good absorptive capacity to remove VFA from the rumen to prevent them contributing to a decrease in pH.

Rumen papillae are small finger-like projections on the wall of the rumen that increase the surface area and their job is to absorb VFAs. A suitable transition diet is crucial for encouraging papillary growth in the dry period. In addition, a transition diet that contains a proportion of the ingredients from the lactating cow ration acclimatises microbes to the lactating diet to come.

Body condition scoring and metabolic profiles can be used to monitor and reduce negative energy balance. Body condition scoring should be carried out 100 days before dry-off, at dry-off, at calving and 60 days post-calving. Cows should be condition score 2.5 to 3 at dry-off and at calving. More important than the score itself is the change in condition score.

The dry period is not the time to alter condition score. There should be no more than 0.5 of a condition score change during the dry period. Cows that become too fat have decreased intakes; cows that lose condition have already started to mobilise fat pre-calving.

Reliable metabolic profiling involves blood sampling a minimum of six early lactation cows (40 to 120 days in milk), six dry cows and six past-peak mid-lactation cows (120 to 200 days in milk). During the dry period, NEFA levels should be low, as little fat mobilisation should occur. NEFA levels will increase just prior to, and up to, three weeks post-calving due to a degree of fat mobilisation.

Excessively high NEFA levels during this period, or greater than three weeks post-calving, indicate significant negative energy balance and poor transition cow management.

Beta hydroxyl-butyrate (BHB) is a ketone that increases during excessive fat mobilisation and ketone production; above a certain level, cows show signs of clinical ketosis.

Minerals

A huge demand exists at calving for calcium. It is required for muscle contractions during calving, milk production and for a calf's skeletal development. Enough calcium exists in a cow's body for her needs – it just needs to be available when required.

Generally speaking, low calcium diets should be fed pre-calving. This allows the cow to train her system to source calcium from her own reserves via hormonal regulation and mobilisation of calcium, rather than relying on supplementation.

Magnesium is different – little storage of magnesium exists in a cow and she is reliant on daily magnesium supplementation. The pathways involved in calcium homeostasis require magnesium, so the two are interlinked.

Dietary cation-anion difference (DCAD) diets are used on some units. This involves acidifying the blood to mobilise calcium. The urine pH is used to monitor DCAD diets and specific nutritional advice is required for DCAD to work effectively; it can easily make problems worse if not managed properly.

Selenium, vitamin E, iodine and copper are all essential trace elements. Selenium and vitamin E help maintain a healthy immune system during the potentially stressful transition period.

Calcium, magnesium and trace elements can be monitored through blood sampling incorporated into routine metabolic profiling.

Udder health

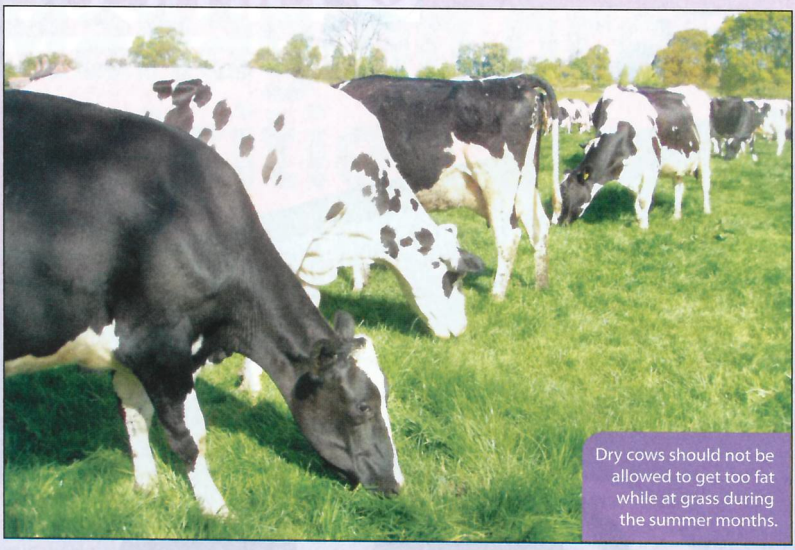
During the dry period, mammary secretions and local antibody production are able to kill residing bacterial infections. Intramammary antibiotics used during the dry period achieve greater cure rates against *Streptococcus uberis* and *Staphylococcus aureus* than antimicrobial treatments used during lactation. However, new infections can also occur during the dry period, which may not become apparent until early lactation.

A clean environment is essential to reduce new infections from environmental pathogens. Good nutritional management is required to ensure the cows are healthy and have a strong immune system to cope with challenges from environmental bacteria.

Lameness

The hormones that cause slackening of the ligaments allowing a cow to calve also affect the ligaments that support the pedal bone in the foot. This temporary weakness around calving can predispose the cows to claw horn disorders, such as sole ulcers.

Maximising the cow's lying times reduces ⇨ page 14



Dry cows should not be allowed to get too fat while at grass during the summer months.

⇨ **continued from page 12**

the pressure on the feet and reduces the risk of lameness in early lactation. Straw yards or dry grass pastures are preferred to cubicles to encourage heavy in-calf cows to lie and rest unrestricted.

Cows that are lame at drying off will have reduced DM intake, which predisposes them to metabolic problems and reduced performance in the subsequent lactation. Any lame cows at drying off should be treated promptly.

Liver fluke

It is important to first identify the risk of liver fluke to the herd before treating cattle unnecessarily. Bulk tank testing can be used to assess antibody levels to fluke infection.

This is a crude indication to liver fluke infection as, once a cow has been exposed to liver fluke, the antibodies can be detected for a considerable period of time; a high antibody level in the bulk tank is not necessarily due to recent fluke infection.

Abattoir feedback on liver rejections is free and useful information that can reveal early fluke infection within the herd. Individual or pooled fluke worm egg counts can be used once the fluke have matured (fluke have to be 9 to 12 weeks before they shed eggs).

A newly developed test – the coproantigen test – can detect fluke infection from a faeces sample two to three weeks earlier than fluke egg counts. If fluke infection has been identified in the herd, a control programme should be established.

Only two products are licensed for use in milking animals – albendazole and oxyclozanide – which have withdrawal periods of 60 and 72 hours, respectively. Triclabendazole can be used in milking animals, but not within 48 hours of calving, and milk can only enter the bulk tank 48 hours after calving.

If a cow calves earlier than 48 days after treatment, milk can only be taken for human consumption 50 days after treatment.

The control programme should include not only selecting the most appropriate product for treatment, but also grazing management, minimising pasture contamination, treating effectively and monitoring for resistance.

Rumen fluke

Generally mature rumen fluke don't cause clinical disease. Rumen fluke has been attributed to causing ill thrift and profuse diarrhoea in youngstock, where there is a large number of immature rumen fluke in the intestine.

Rumen fluke eggs are detected in the faeces by the same method as a liver fluke egg count. The clinical significance of rumen fluke is still under debate; oxyclozanide is the only flukicide with activity against adult and immature rumen fluke.

Gastrointestinal parasites

Youngstock gain immunity to gastrointestinal parasites from exposure to nematodes in their first grazing season. It has long been advocated adult cows are, therefore, immune to gut parasites and healthy milking cows do not require a routine anthelmintic treatment.

More recent studies have suggested grazing dairy cattle are likely to be infected with gastrointestinal parasites, which can be at a subclinical level (Control of Worms Sustainably, 2014). Trials have suggested worming dairy cows at calving can improve intake and increase milk yield by up to 1kg/day.

Bulk tank testing can be used as a tool to indicate the level of infection with *Ostertagia* in a herd.

Where youngstock have limited exposure to pasture, or in first lactation animals, anthelmintic treatment pre-calving may be justified. This decision should be part of a farm-specific parasite control programme detailing methods of effective anthelmintic usage and monitoring for resistance.

Effective management of housing, nutrition and parasite control in the dairy herd during the transition period is essential for ensuring a productive, trouble-free lactation and optimising subsequent fertility.

References

Black H (2009). Why dry cow management matters, Agriculture and Horticulture Development Board Dairy, http://tinyurl.com/jyzuh7n

Control of Worms Sustainably (2014). Control of parasitic gastroenteritis in cattle, http://tinyurl.com/zoxv2tb

LEE-ANNE OLIVER graduated from the University of Edinburgh Royal (Dick) School of Veterinary Studies in 2007. Having worked in predominantly farm animal practice for five years, she joined SAC Consulting Veterinary Services in 2013 as a veterinary investigation officer. In mid-2014, Lee-Anne returned to farm animal practice at Scott Mitchell Associates in Northumberland, where she is now a partner and achieved advanced practitioner status in cattle health and production in January 2016.