

Short and sweet dry periods

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Experience in the USA and on some farms in the UK demonstrates significant benefits from shortening the dry period and dispels many of the pre-conceptions around reduced performance/yield in subsequent lactations.

There is always something rather challenging and exciting about questioning established principles.

That is exactly what is happening with the debate about dry cow management with many asking why we dry cows off and what is the ideal length for a dry period?

Misconceptions

Mention shorter dry periods and many veterinarians will argue that subsequent lactation yields will be reduced.

However, much of the older information was biased by cows that had a short dry period due to problems such as abortion, twins and disease.

This subset of animals would have naturally had poorer subsequent lactations, not directly related to the length of the dry period but to the underlying problem producing it.

It was only when forward looking studies were set up to look at this issue again that some good science replaced established agricultural 'folklore'.

Studies set up to deliberately control the length of the dry period in cows before they were dried off showed that shortening the dry period has many advantages. These advantages can be logically considered under the following headings:

- Convenience in dry cow feeding and managing groups.
- Higher fertility in subsequent lactation.
- Better health through improved energy balance, reduction of mobilisation of body fat and ketone production.
- In line with udder physiology.
- Higher total milk production.
- A tool in mastitis control?

This article focuses on the advantages of the relation of the length of the dry period to mammary gland physiology, milk yield and on mastitis control.

Mammary gland physiology

Some textbooks still describe the initial part of the dry period as when the udder secretory cells (mammary epithelial cells) are shed from the basement membrane by defoliation – the 'dropping of leaves' is the analogy being referred to.

This is untrue in cattle. The bovine udder largely stays fully competent with mammary epithelial cells (MECs) during the dry period with a small amount of loss of older cells by apoptosis (programmed cell death) and regeneration of a few new cells.

These small changes may be important as older cells perform less well during lactation and it is the new MECs that have the capability of replicating, replacing dead cells on the basement membrane, to keep up the quota of MEC for secretion.

This means that the cellular structure of the udder is, on the whole, fully maintained throughout the dry period and is capable of milk production with little change to the

secretory cell structure. If studies are designed to randomly allocate different dry periods to cows and then assess the subsequent lactation yield, it looks as if there is a consistent picture emerging:

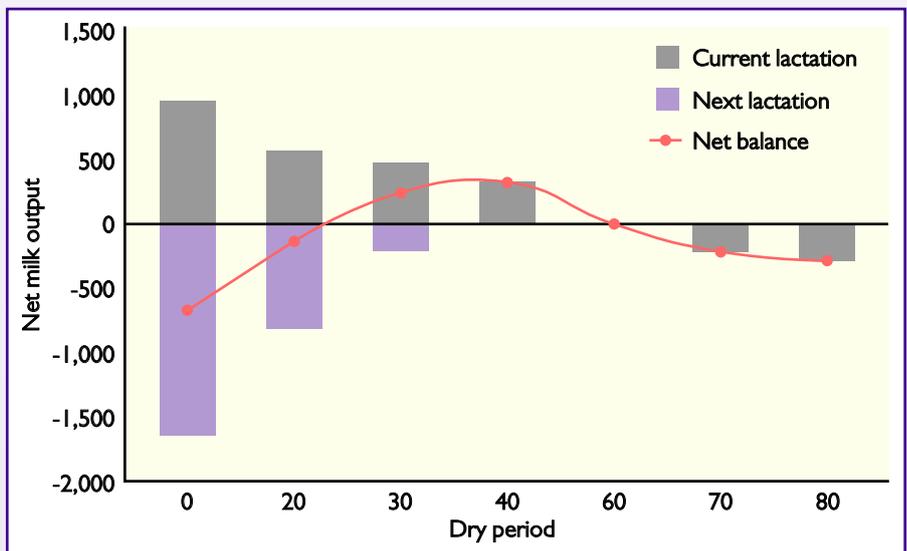
- For dry periods down to 30 days there is little or no change in the subsequent milk production. Some studies show a 3% decrease in yield, but others show no change.
- For cows that have no dry period there is a subsequent reduction in milk yield of around 20-25%. This is a consistent and large effect.

So, why is the subsequent lactation being affected? It seems likely that the small changes that are occurring to the MEC during the dry period could affect the future secretory capability of the gland.

Very short dry periods do not allow full replacement of the older cells by the gland and this may reduce functional secretion in the next lactation. Also, there may not be time for new cells to be formed so there is less ability to replicate new MECs during the subsequent lactation as cells are lost.

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Fig. 1. Milk production and dry period length as compared to a 60 day dry period as a reference point. Calving interval is set at 400 days.



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Shorter dry periods imply longer lactations, and thus, more days in milk. Additionally, shorter dry periods tend to produce improvements in the milk solids being produced so the reduced yield at very few days dry has less economic impact.

This means that even at 30 days dry there are potential economic net gains from milk production despite the appearance of small lactational losses after calving.

The net effect of a 30-40 day dry period can be a gain in yield of 6% overall due to the extra days in milk at the end of lactation (Fig. 1).

This is economically very attractive, especially when milk quota are not in place, such

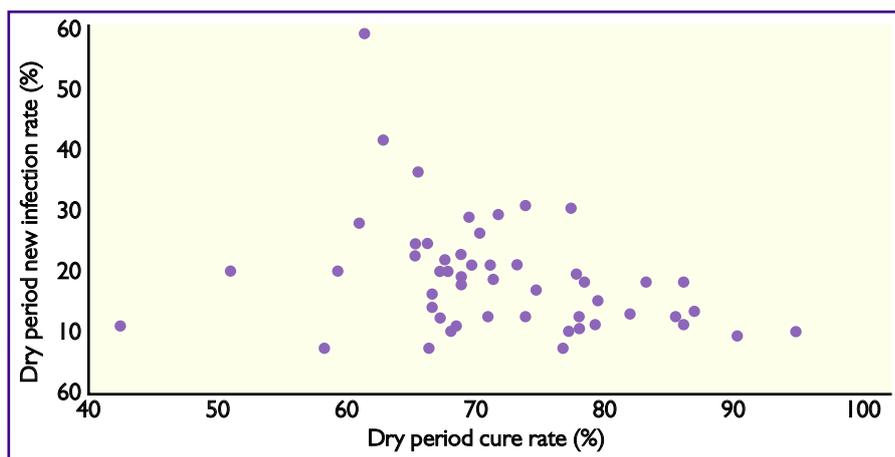


Fig. 2. The correlation of dry period cure rate to dry period new infection rate (Bradley and Green, 2006).

as in the USA or when they start to disappear, which is the current reality in the EU.

Mastitis control

The dry period can be shortened for economic and/or production reasons as described above, however, another reason to shorten dry periods is an improvement of mastitis control. If dry periods are shortened for this reason, there are some issues that need to be considered:

- The time necessary to establish a cure.
- The risk of new infection at either end of the dry period.
- The withdrawal period of any antibiotic dry cow therapy (DCT) used.

Enough time for a cure

Both natural mechanisms and dry cow antibiotics must have long enough to act on any infection left from the previous lactation. But how long is long enough?

Cure rates from a DCT product with a withholding period of 36 days, perfectly fitting to the shorter dry periods, are proven to be high. Therefore, long dry periods (for example, 60 days) do not seem necessary to reach a high cure.

The risk of new infections

The aim for dry cow mastitis control is to both cure existing infection from the mammary gland if it is present and to prevent new infection occurring.

Research has shown that the cure rate of dry cow products are likely to be very high except where established staphylococcal infection is present.

However, traditionally, we have judged the cure by comparing the results of cell count

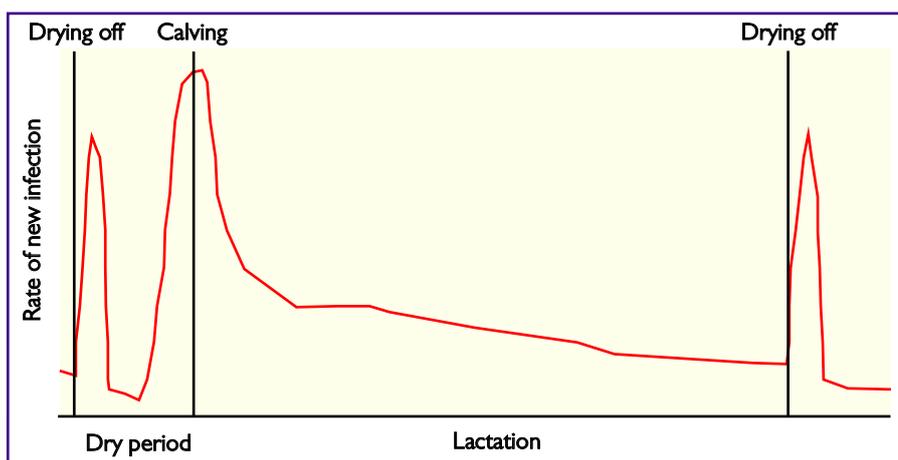


Fig. 3. Frequency of new IMIs during the lactation cycle.

or bacteriology at drying off to results at the subsequent calving.

Although this is often presented as a rough estimate for dry cow performance, it cannot measure what is probably the most important factor – the dynamics of eliminating and gaining new intramammary infections (IMIs) during the dry period (Fig. 2).

During the lactation cycle the periods of highest frequency of new IMIs are shortly after dry off and around calving (Fig. 3).

In the dry period the udder is 10 times as likely to become infected with new organisms when compared to the lactation period, so there is the potential for a lot of new IMIs coming in.

In fact, the level of new IMIs during the dry period is much more likely to determine the overall balance of infection over the dry period, than is the cure rate from previous infections in the preceding lactation.

If the length of the dry period determines the overall risk of new IMIs, then shortening the dry period is likely to have a beneficial effect on mastitis status. This is exactly what researchers at Washington State and the University of Idaho have recently found. They presented a study showing the number of new infections were reduced in dry periods less than 45 days.

On top of that, shorter dry periods result in higher antibiotic concentrations during the important risk period, just before calving, compared with long dry periods where the active ingredients often fall too low towards the end of the period, resulting in new IMIs. So, shorter dry periods can be used as a tool to improve udder health.

Withdrawal period

We could either adapt our dry periods to the withdrawal period of a dry cow product but in fact, we should choose products to suit the withdrawals and dry period lengths we want to achieve.

If we want to adopt shorter dry periods we should use a dry cow treatment with a corresponding shorter withholding period.

Conclusion

Shortening the dry period could simplify dry cow management, improve total milk production and improve fertility and health in the subsequent lactation. We do not need a long dry period from an udder physiology point of view.

To reach a high cure rate with dry cow treatment, long dry periods do not seem necessary and shortening them can improve udder health by reducing new intramammary infections.

If shorter dry periods are adopted on farm, we should carefully select the products that suit the dry cow period length we want to achieve. ■