

FEEDING MANAGEMENT OF DRY COWS/CLOSE UP (Level 3)

Topic	Training & information Content
3.1	Estimating feeding value of fodder & feed on dairy farms
3.2	Sampling feeds & forages/analysis interpretation
3.3	Estimating Dry Matter intake for various breeds/age categories of dairy cattle in the tropics
3.4	Reviewing feed intake, rumen fill, Body Condition Scoring (BCS)
3.5	Life weight estimation of cows
3.6	Rumen fermentation
3.7	Mineral & vitamin requirement, guidelines
3.8	Manure scoring and evaluation
3.9	Guidelines for ration calculations for various breeds, heifers, lactation stage (Rumen8)
3.10	Use of Rumen8 software for ration calculation
3.11	Optimization of ration with Rumen8
3.12	Feeding management guidelines
3.13	Feeding management of dry cows/close-up
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3.16	Scoring locomotion and hoof condition
3.17	Mycotoxin in dairy cattle nutrition
3.18	Heat stress in dairy cattle nutrition
3.19	Monitoring feeding management, using KPIs (based on Rumen8)



1. You will learn about (learning objectives):

- The dry cow and importance of dry period.
- Taking care of a cow during dry period.
- Feeding guidelines of a dry cow: far-off and close-up periods.



2. Background

- Dry cow management is critical to a cow's performance and health in the next lactation.
- Adequate nutrition and appropriate disease prevention to the cow at this time will benefit during the next lactation and ensure:
 - optimal health
 - optimal milk production
 - good reproductive performance
- Therefore, the feeding and management of dry cows is not only important for the well being of the animal but also for economic perspective.



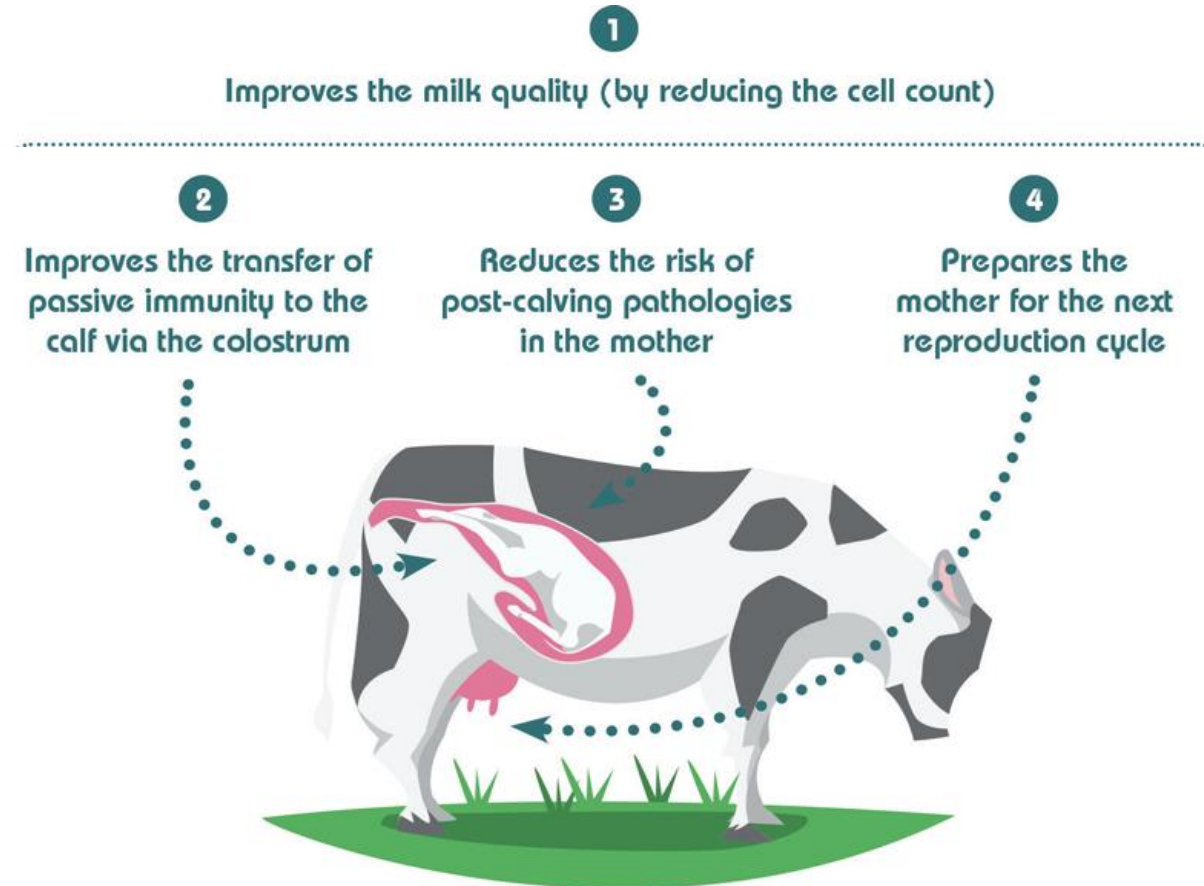
3. Dry cow

- A dry cow refers to one that is at the end of lactation but just before the next lactation. During this period the cow ceases milk production or is 'artificially' dried off using a dry cow therapy.
- This stage is referred to as the dry period and generally lasts for 40 to 65 days.
- When a lactating cow is 7 months pregnant, the farmer should (gradually) stop milking the cow, inducing the dry period for the remaining 2 months of pregnancy.
- Dry period is typically divided into two:
 - i. The far-off and
 - ii. Close-up period.



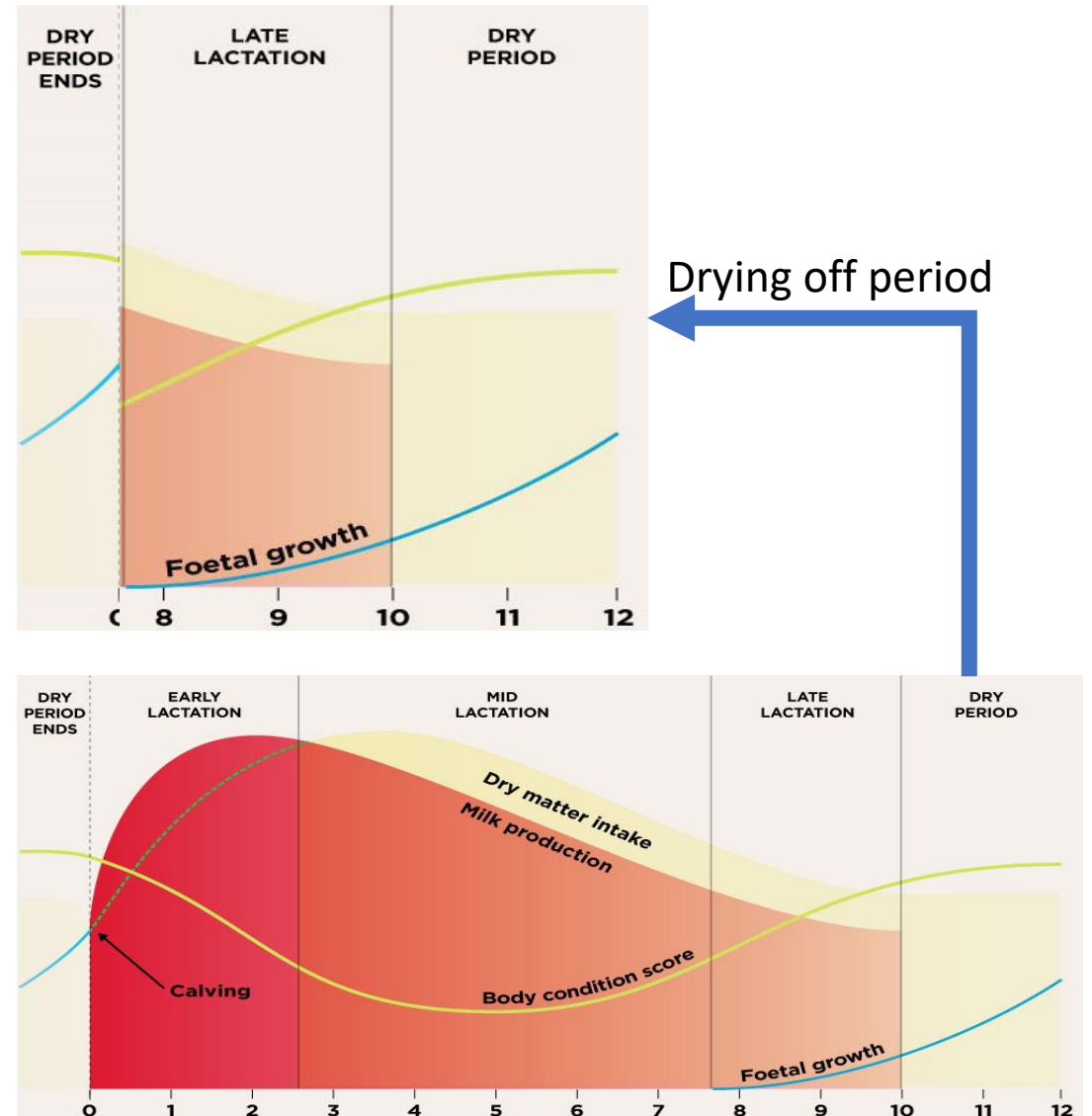
4. Importance of drying a cow

- The main aim of the dry period/drying a cow are to;
 - Prepare the mammary gland for the next lactation and prevent it's infection(s).
 - Promote foetal growth and development, helping the calf to gain weight.
 - Reduce risks of post-calving infection to the mother cow (dam).
 - Prepare the dam for the next reproductive cycle.
 - Prevent/reduce metabolic disorders during post-calving period.



5. Methods of drying off

- The method used to dry off cows could be either abrupt or one of three gradual ways.
 - i. Abrupt dry-off is to suddenly stop milking
 - ii. Gradual dry-off methods aim to reduce milk yield before the final dry-off date.
- The main reason for using gradual dry-off is because lower milk yield at dry-off is often associated with a lower risk of mastitis in the subsequent lactation.



6. Methods of drying off: **Gradual dry-off**

- Gradual dry off method aims to get the cow used to milking only once per day thus holding the milk until this single milking.
- Gradual dry-off is achieved by:
 - i. Gradually reducing the energy density of ration fed.
 - ii. As a guideline, when drying off the animal, at drying off a dairy cow should produce less than 10 liters per day.
 - iii. In addition reduce the number of milking's to once a day compared to twice or thrice a day.

6.1 Gradual dry-off:

By gradually reducing the energy density in the ration

- This approach reduces milk yield by slowing down the rate of glucose transportation to the mammary gland that occurs through feeding.

- Gradually reducing the energy density in the ration can be done in several ways;

- Reducing concentrates from 14 days before dry-off,
- Reducing energy density of the diet 7 days before dry-off. For example, feeding more straw/hay and less other better-quality forage before drying off.

Low energy density forage

Straw



High energy density forage

Baled silage

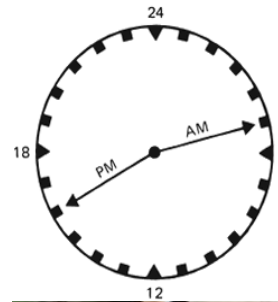


Fresh wilted grass



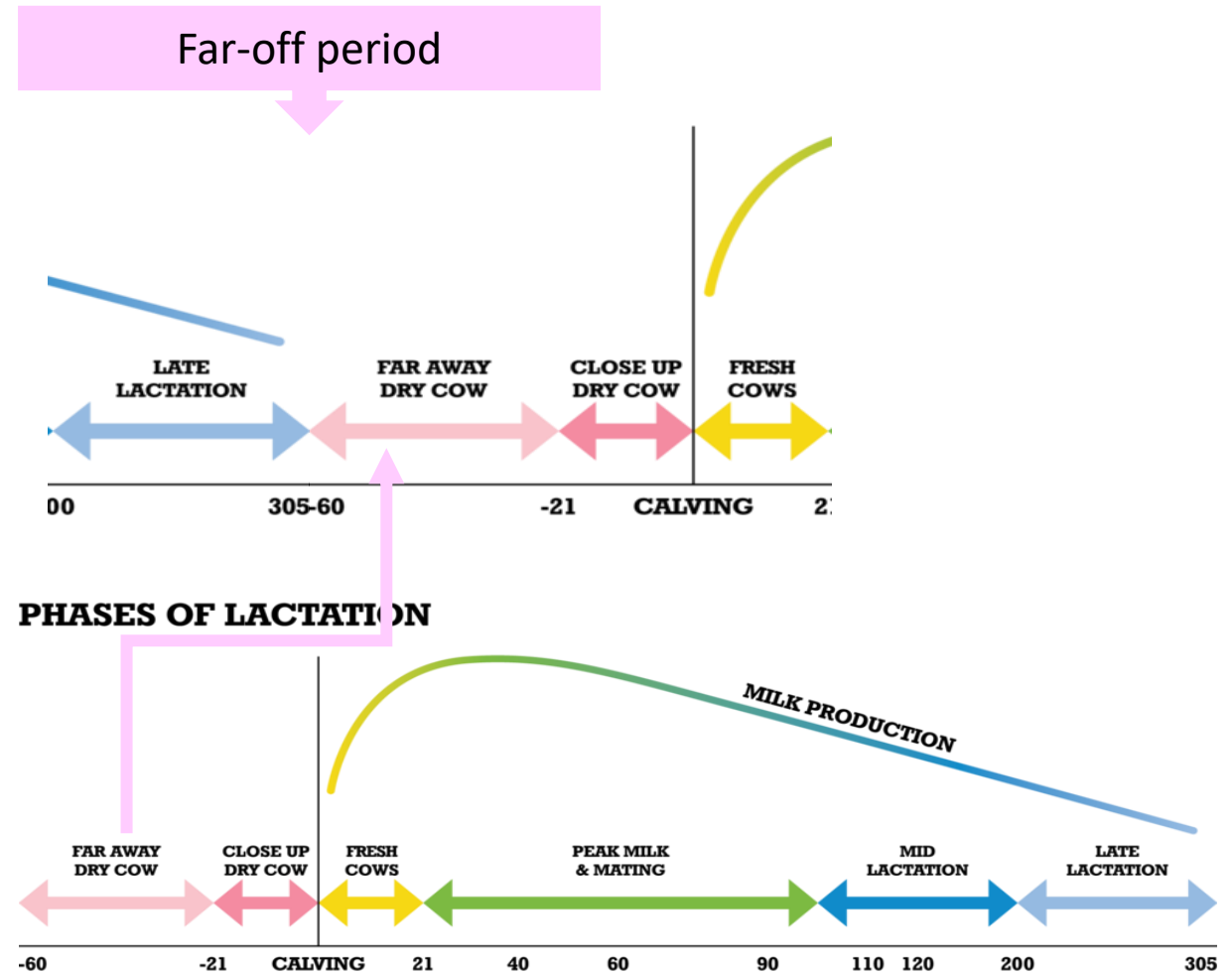
6.2 Gradual dry-off: by Gradual milking

- Gradual milking approach is to reduce milk yield per day before dry-off by reducing the energy density of the ration.
- This results in a decline of milk secretion and stimulates mammary gland involution.
- This goes hand in hand with gradual feeding method.
- The advantage of this gradual dry-off method is a reduced risk of new intramammary infections.
- The result of this method is reduced milk yield, lower intramammary pressure and therefore, reduced risk of leaking milk.



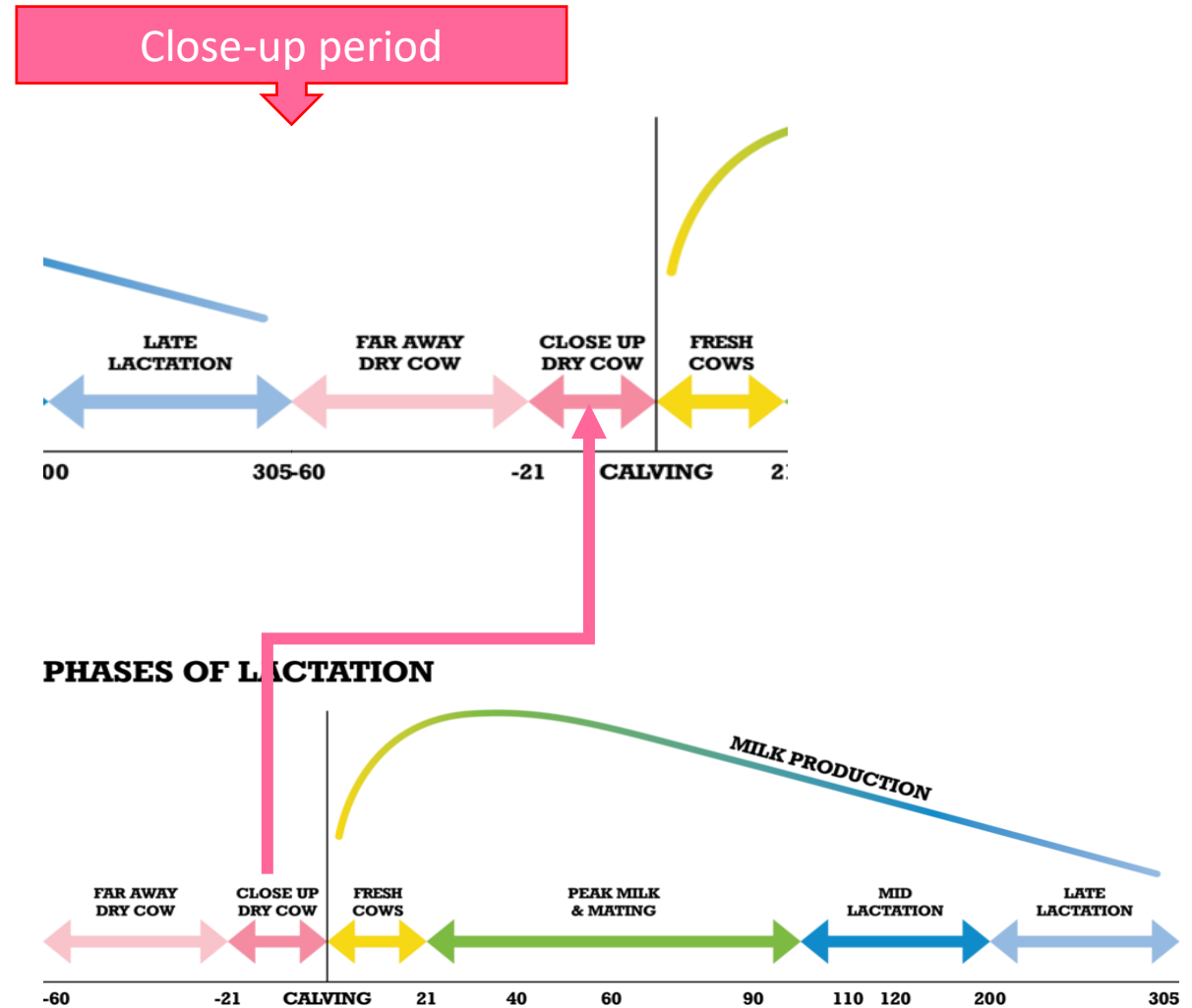
9. Far-off nutrition of dry cows

- Far-off period starts 40-65 days before calving and last approximately half of this time.
- Reduce feed intake by 50-70% for 2-3 days to reduce nutrient supply and reduce milk synthesis.
- Feed to maintain body condition through the dry period after milk synthesis has reduced.
- Rations of far-off cows should contain less energy and adequate amounts of fiber. However, the ration should still contain controlled amounts of both energy and fiber to ensure adequate feed intake after calving.



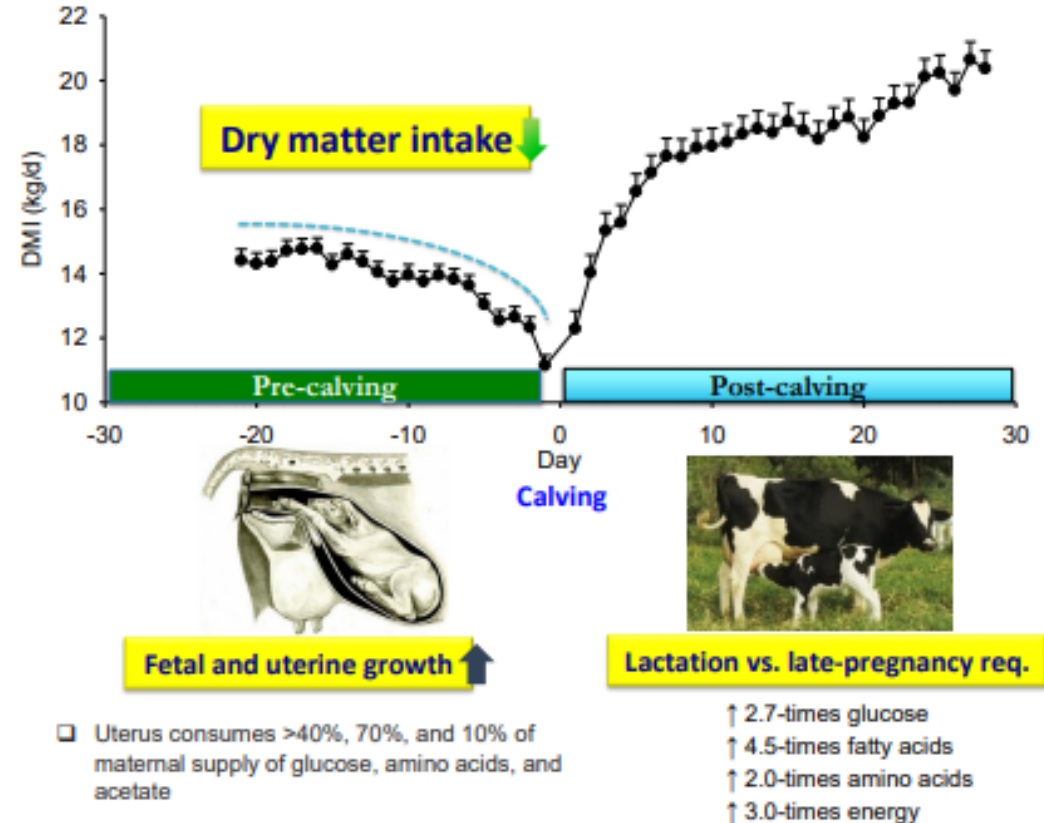
10. Close-up nutrition of dry cows

- Close-up dry off period is the last 3 weeks before calving.
- It is also known as steaming up period prior to calving.
- Rations of close-up cows should contain more metabolizable protein and energy than diets of far-off dry cows.
- The rations can also contain forages that are lower in potassium, such as maize silage. The lower potassium level helps to prevent milk fever after calving.



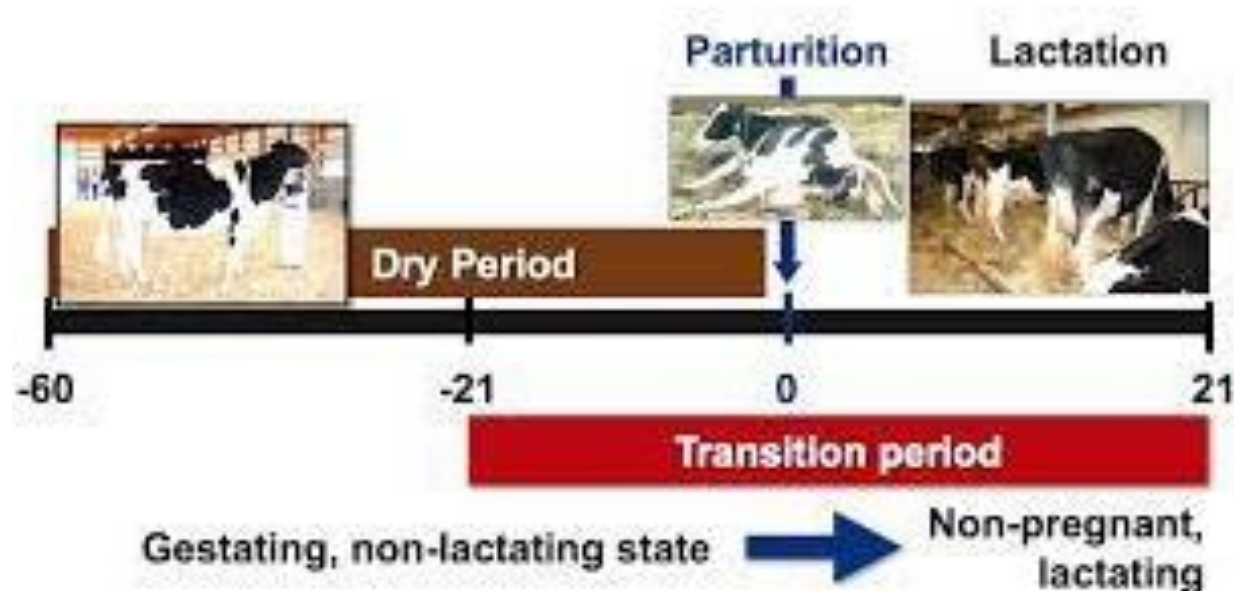
10.1 Dry matter intake at Close-up nutrition of dry cows

- Just before calving, close-up dry cows often decrease their feed intake compared to far-off dry cows.
- During this period the ration fed is slightly higher in energy and other nutrients to satisfy cows' total nutrient requirements.
- Feed bunk space is important in boosting feed intake.



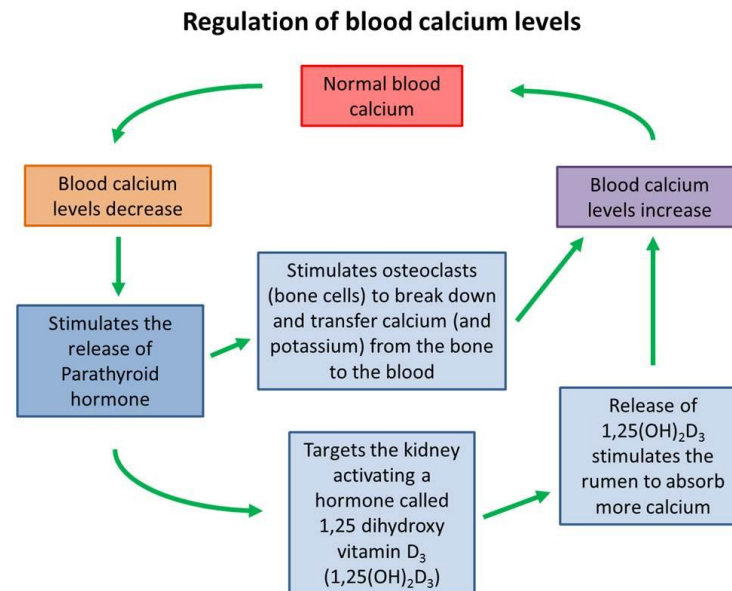
10.2 Rumen adaptation to close-up period

- The close-up cows should be fed a ration with ingredients that are similar to the ones that will be fed during their next lactating period (transition period).
 - This will allow the rumen microorganisms time to adapt to the new diet.
 - It will also stimulate the development of rumen papillae which absorbs volatile fatty acids (VFA) produced by rumen microorganisms.
- All these management practices will make ketosis and acidosis less likely to occur after calving.



11. Metabolic disorders: Milk fever/hypocalcaemia

- Milk fever is a metabolic disorder (see module metabolic disorders) caused by insufficient calcium, which commonly occur after calving.
- This means the cow has lower levels of calcium in the blood.
- When cows calve down, calcium is needed in sufficient amounts for increased milk production and to support muscle contraction.
- The traditional way of preventing milk fever has been to limit calcium intake during the dry period.



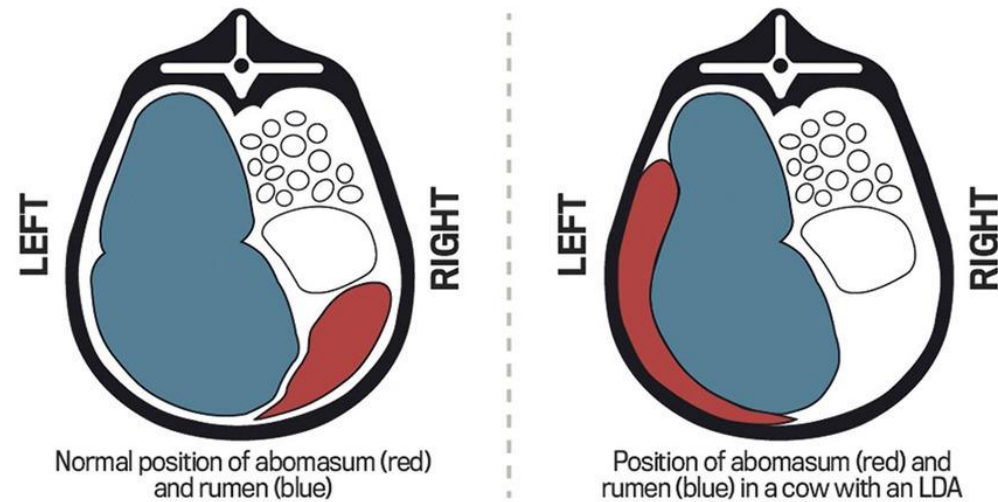
11.1 Milk fever/hypocalcaemia Cont'd...

- Dry cows on high calcium rations have their metabolism geared towards reducing calcium absorption from their bones and increasing excretion of excess dietary calcium.
- Lower the potassium levels to help prevent milk fever after calving.
- By using low potassium forages and adding the appropriate amount of anionic salts to the close-up ration, incidence of clinical and subclinical milk fever can be reduced.



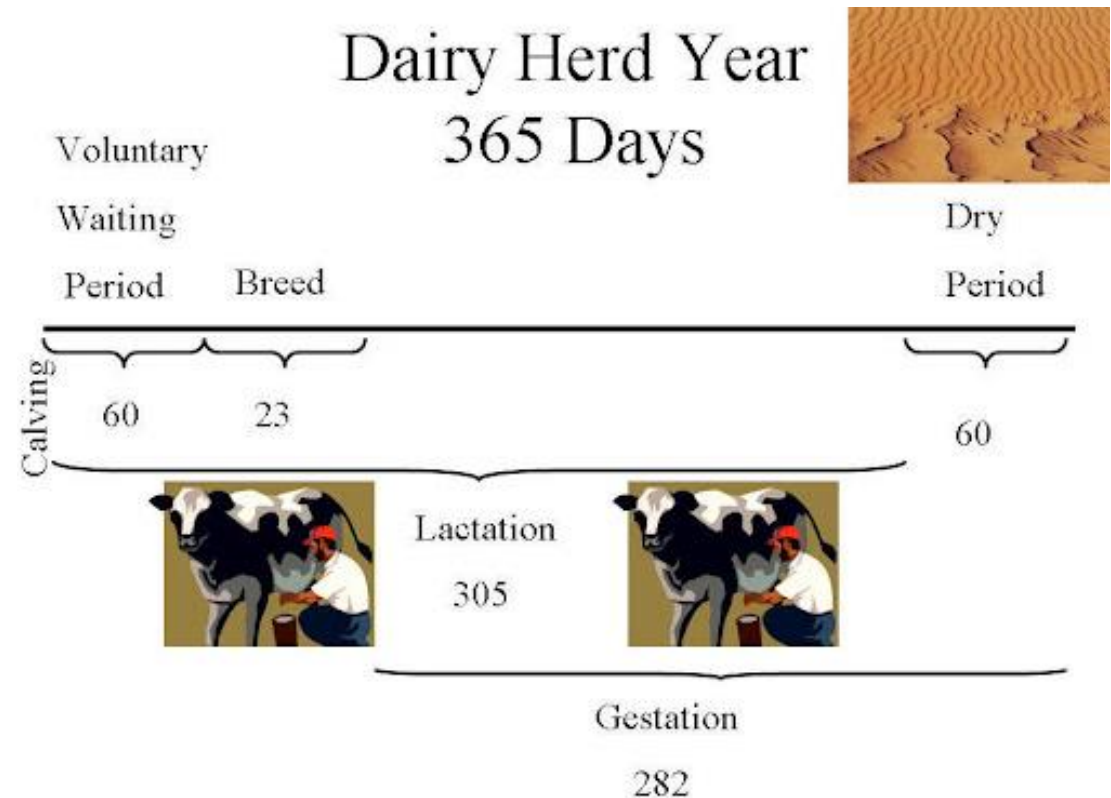
12. Displaced abomasum and Acidosis

- Both displaced abomasum and acidosis (see module metabolic disorders) can be prevented by implementing a good management strategy during the cow's close-up period.
- For example, feeding long fiber to stimulate cud chewing/rumination and properly balanced diets can help avoid the metabolic disorders. Adding chopped straws to the diet may help also prevent these problems.
- Sub-clinical milk fever (hypocalcemia) can cause an increased incidence of displaced abomasum.



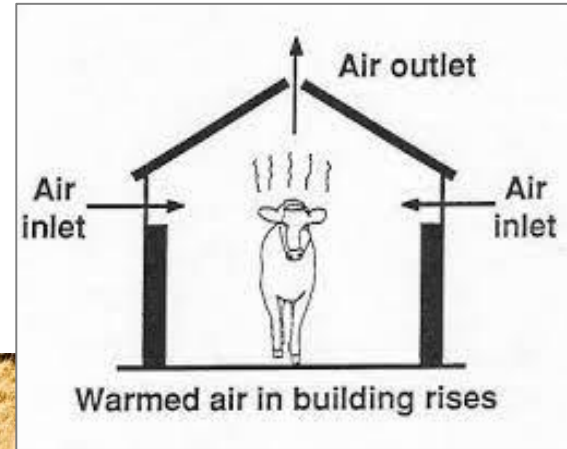
13. Length of dry period

- Dry periods typically last 60 days and involve both a far-off and a close-up period.
- The close-up period begins three weeks before expected calving.
- Research has found that if no dry period is provided for a cow, she will produce 25 to 30% less milk the next lactation.
- However, some producers have recently begun shifting to using shorter dry periods of 40 to 42 days.



14. Minimizing heat stress in dry cows

- Dry cows are highly prone to heat stress.
- Ways of preventing heat stress should be provided; e.g. cooling under shades, ventilations and where possible fans.
- Heat stress reduces the amount of mammary tissue that can be developed for more milk production.
- Therefore, a cow that is heat-stressed during her dry period will have a reduced capacity for producing milk in her following lactation.



15. Minimizing social, environmental and metabolic stress for close-up cow

- Stress can affect feed intake, immune function, and overall health and productivity of cows around calving time.
- Social stress can be minimized by having as few as possible, moves of pens or regrouping of cows. This ensures that social hierarchy of the cows is not disturbed and reduce bullying.
- Adding multiple cows to a group at once is preferable to adding individual cows.



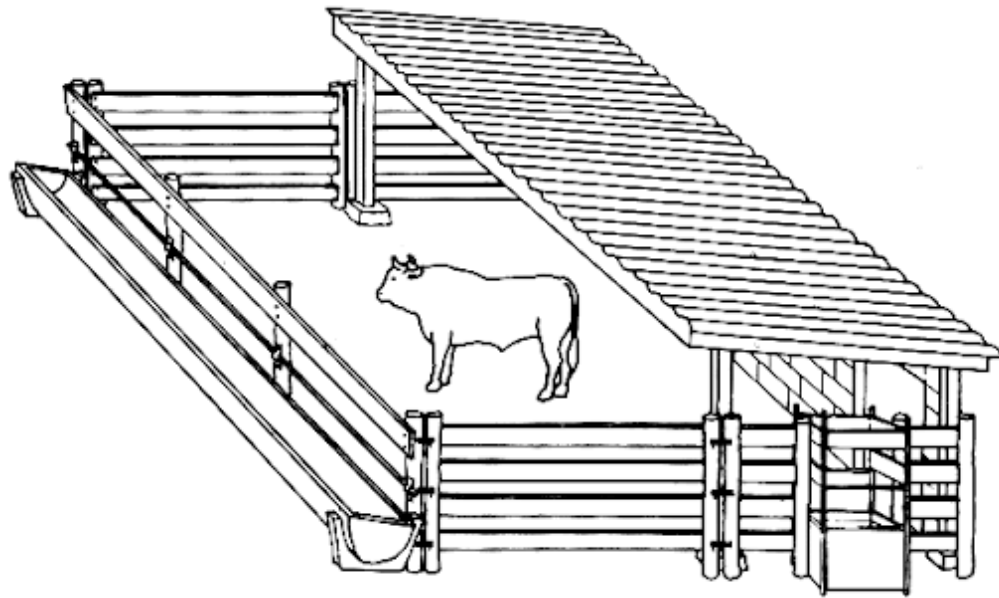
Add multiple cows to a group at once



Individual cows added, suggesting stress











15.1 Minimizing social, environmental and metabolic stress for close-up cow Cont'd...

- Social and metabolic stress can be reduced by providing 75-80 centimeters of feed bunk space per cow.
- This is to ensure adequate dry matter intake and reduce competition for feed.
- The minimum space in a free stall is 9 to 12 square meters per cow ensure adequate comfort and resting time.



16. Body condition score (BCS) of a dry cow

- Dry cows off in good condition score of 3.0 to 3.5 is important to maintain until calving.
- Dry cows should not gain or lose more than 0.50 of BCS during this period.
- Fattening cows in the dry period can lead to health problems, including displaced abomasum, udder oedema and ketosis at calving.
- However, if cows are already over conditioned at drying off, they should not lose weight during the dry period or they may be subject to fatty liver and ketosis.

Body Condition Score	Vertebrae at the middle of the back	Rear view (cross-section) of the hook bones	Side view of the line between the hook and pinbones	Cavity between tailhead and pinbone	
				Rear view	Angled view
3 Frame and covering well balanced					
4 Frame not as visible as covering					

17. Recommended feeds in the dry cow ration

- Dry cow ration should be based on forages, including good quality long-stemmed hay. This will maintain rumen function, rumen muscle tone and aid in healing the rumen wall lining.
- Ensure the diet is balanced. Keep an eye on excess protein (high nitrogen forages), calcium (lucerne) and potassium (molasses) in the dry cow diet.
- Minimize concentrate level in the total ration but use enough for adequate energy and protein supply.
- Do not feed rumen buffers such as sodium bicarbonate. They will increase the sodium content of the diet and increase the risk of milk fever and retained placenta.



18. Nutrient recommendations for dry cow diet

- For dry cows, dry matter intake (DMI) needs to be 1.8-2% of its body weight.

DMI = 1.8-2% of animal live weight

- For example, a 500 kg cow will require 9-10 kg dry matter (DM) per day.
- A balanced diet helps avoid complications. For example, cows fed a low energy diet tend to have a higher incidence of retained placentas.



19. Dry mater intake estimate for a dry cow

- In the far-off period DMI can be estimated using the formula below:

$$\text{DMI (kg/day)} = (\text{liveweight} \times (100/\text{NDF}\%)) / 100$$

- In the close-up period DMI can be estimated 0.8% NDF intake as a percentage of live weight.

$$\text{DMI (kg/day)} = (\text{liveweight} \times (80/\text{NDF}\%)) / 100$$

- The NDF equation does not predict the maximum NDF intake of cows but the maximum NDF intake that can be digested and passed per day while optimizing milk production.



20. Formulating diets: Recommended target nutrient levels for dry cow ration

- To maintain a balanced diet for a cow, aim for:
 - Neutral detergent fibre (NDF) content of about 50%-60% (80% of the NDF should come from forage)
 - Starch content of 10-15%
 - Sugar content of 0-4%
 - Crude protein content of about 10-13%. Heifers will benefit from a higher crude protein ration of 15%).



21. Importance of daily mineral intake

- Low **phosphorus** intake can increase the risk of milk fever, downer cow syndrome, retained placenta and anoestrus after calving.
- Alternatively, limit salt intake to 30 g/cow/day to minimize oedema (build-up of fluid) in the naval and udder area.
- Difficult to measure and control is the micro element Selenium. Reduction of Selenium in the ration however, is known to reduce incidence of retained placenta(0.30 ppm in the ration).



22. Dry cow's health

- The close-up period is the best time to prevent the most common disorders that affect fresh cows.
- Following the dry therapy process is important to help reduce mastitis cases for fresh cows.
- The transition period is when the cow's immunity is at its lowest.
- The environment provided to the cows to calve should be clean to decrease the probability of clinical and subclinical mastitis during the fresh period.



23. Take home messages/Summary

1. Following the correct drying off methods such as, gradual drying off, and/or dry cow therapy will:
 - Help protect cows from pathogens during the dry period and prevent mastitis in the following lactation.
2. Meeting the nutritional requirements of dry cows depending on stage and length of the dry period will:
 - help prevent transition cow disorders and ensure maximum milk production in the following lactation.
 - prevent the negative effects of heat stress and minimizing regrouping and pen moves will minimize social stress of dry cows.

