



# **Manual for Livestock Keepers** **within Milk Production**

Introduction to milk production methods  
in which animal husbandry, feeding and  
animal health contribute to the farm's  
progress and profits.

## For livestock keepers within milk production

This is a manual about how to take care of cows and calves. It describes the aspects of management and feeding that are important for healthy animals.

It is important to remember that every farm is unique and there are many different ways to achieve this. Always do as you are instructed on the farm where you are working. It is important for both profits and the well-being of the cows that everyone working on the farm looks after the animals in the same way.

Naturally, as a livestock keeper you can always suggest improvements. This can be done at staff meetings, which are usually held a few times a month on most farms.



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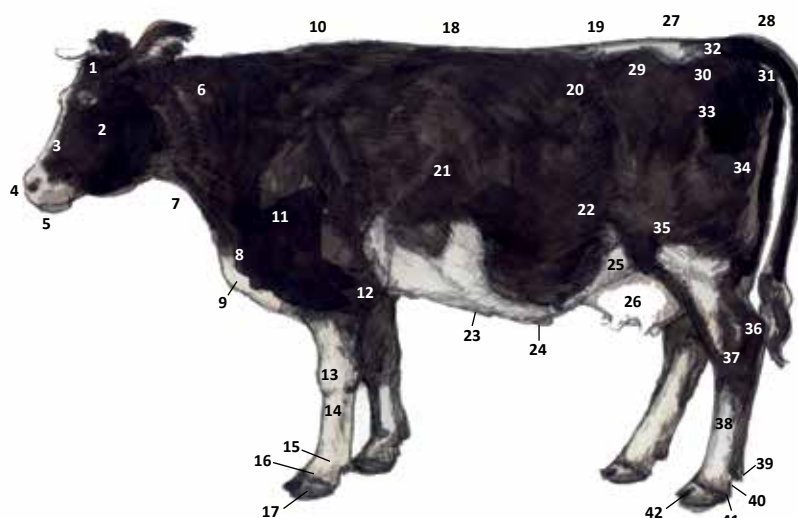
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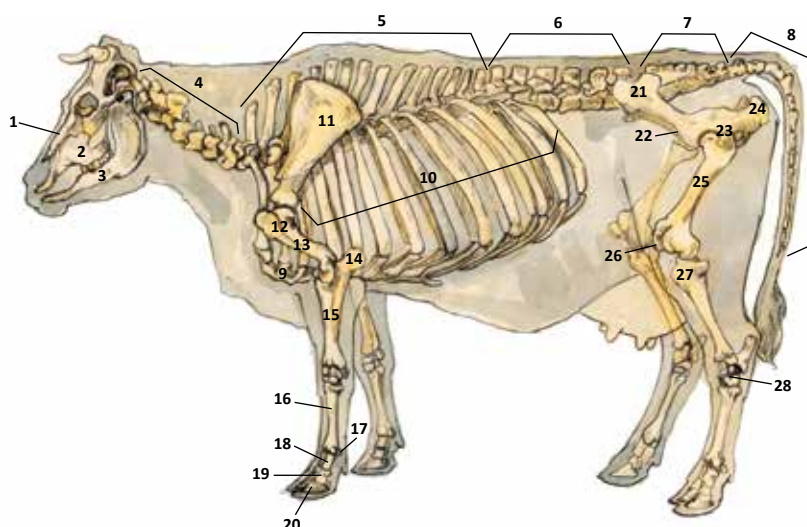
## How the cow functions

### The different parts of the cow

1. Forehead
2. Cheek
3. Bridge of nose
4. Muzzle
5. Chin
6. Upper neck
7. Lower neck
8. Chest
9. Dewlap
10. Withers
11. Point of shoulder
12. Point of elbow
13. Front knee
14. Shank
15. Fetlock
16. Coronet band
17. Hoof
18. Back
19. Hindquarters
20. Thurl
21. Ribcage, Rib
22. Flank
23. Milk veins
24. Navel
25. Flank fold
26. Udder
27. Loin
28. Tailhead
29. Hip bone
30. Thurl
31. Pin bone
32. Hip band/ Ligament
33. Hip joint
34. Thigh
35. Knee
36. Hock
37. Hock joint
38. Shank
39. Dew claw
40. Pastern
41. Heel bulb
42. Hoof cleft



1. Nose bone
2. Upper jaw
3. Lower jaw
4. Cervical vertebrae
5. Thoracic vertebrae
6. Lumbar vertebrae
7. Sacral vertebrae
8. Caudal vertebrae
9. Sternum
10. Rib
11. Shoulder blade
12. Shoulder joint
13. Humerus
14. Elbow
15. Forearm
16. Shank
17. Fetlock joint
18. Long pastern bone
19. Short pastern bone
20. Coffin bone
21. Hip bone
22. Pelvic bone
23. Femoral joint
24. Pin bone
25. Femur
26. Patella
27. Knee joint
28. Hock joint



### A healthy cow

A healthy cow is alert and interested in her surroundings, breathes easily, has shiny eyes, twitching ears and a moist muzzle. If the cow stands still, she spreads her weight evenly on all four legs and if she is in movement, her movements are free and unrestrained. The skin is elastic and has neither scabs nor injuries. Extended skin folds should immediately fall back when they are released.

### Some normal values for healthy animals

|                              | Calf      | Young animal | Cow       |
|------------------------------|-----------|--------------|-----------|
| Normal temperature, °C       | 38.5-39.5 | 38.0-39.5    | 38.0-39.3 |
| Breath frequency, number/min | Up to 50  | 15-35        | 15-35     |

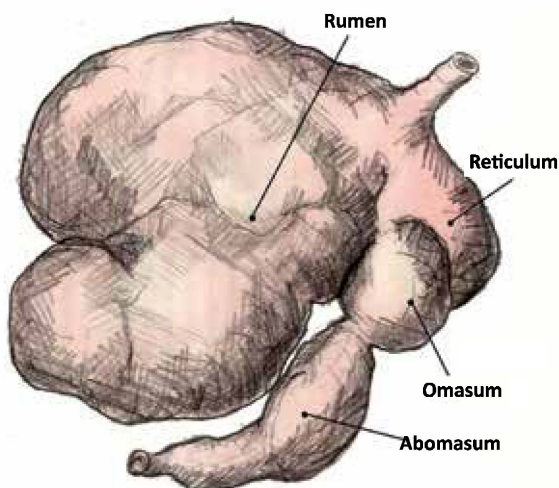
Source: Kvalitetssäkrad Mjölproduktion, Djurhälsa, Svensk Mjök (Swedish Dairy Association), 2007

## Different ways of digesting feed

Our most common farm animals have different ways of digesting feed. Cows, sheep and goats are ruminants, horses are hindgut fermenters and pigs are monogastric just like humans and dogs. Cows, sheep, goats and horses are grass eaters while pigs, dogs and humans are omnivores.

## Stomachs of the cow

Cows and bulls are collectively named cattle. Cattle are ruminants. This means that the cow ruminates the fodder; i.e. it chews it a number of times. The cow eats a lot of fodder at once and then ruminates it. When the cow ruminates she brings up balls of fodder which she then chews and swallows again. The cow also belches up gas which is produced during fodder digestion. When the cow swallows, the fodder goes into one of the cow's pre-stomachs.



In simple terms we say that the cow has four stomachs, but it actually has three pre-stomachs and one proper stomach. The three pre-stomachs are called the reticulum, rumen and omasum. The actual stomach, which is called the abomasum, is where the fodder first arrives after it has gone through all of the pre-stomachs.

## The rumen

The rumen is the most important of the pre-stomachs. It is like a big bag that contains lots of different bacteria, but also protozoa (single-celled animals) and fungi. These micro-organisms help to break down the fodder that the cow eats. They can also break down things that can't be broken down in the abomasum, such as cellulose, a hard-to-digest carbohydrate that exists in grass. Thanks to the bacteria the cow can therefore assimilate nutrients from grass in a much better way.

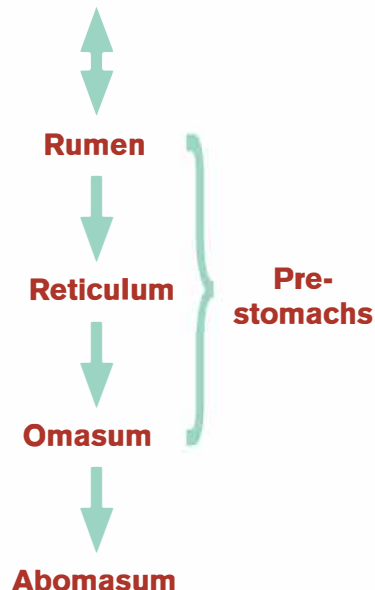
The cow and the bacteria have an exchange with each other; the bacteria receive nutrition and somewhere to grow and the cow receives help with digesting fodder. When the bacteria have broken down the fodder, the cow can assimilate it. Our task is to feed the cow so that the bacteria thrive and work well, then the cow receives a lot of nutrition which she can then use to produce milk. For example, if we give the cow too much concentrated feed at once, the rumen becomes so acidic that some of the bacteria die. A rumen that works well is crucial for the cow's well-being and for her to be able to produce a lot of milk.

## Rumination

By ruminating, the cow grinds the fodder while also chewing the bacteria into the fodder so they get good access to it. In addition, the cow supplies saliva that increases the pH, which helps to create a good environment in the rumen for the bacteria. A cow produces a very large quantity of saliva in one day; more than 200 litres.

A cow regurgitates a ball of ruminate and chews it for 40–45 seconds. Then she swallows it down again. A few seconds later, she brings up a new ball. The entire rumination cycle takes about one minute. Different fodder particles remain in the rumen for different lengths of time. Those that are easily digested move on after a few hours while the more difficult-to-digest particles can remain in the rumen for several days and be ruminated several times.

## Rumination



Too much concentrated feed can produce too high a pH value in the rumen.

## FACTS

### Rumen and reticulum

The rumen and reticulum weigh 30–80 kg and the bacteria and the other micro-organisms comprise around 4–5 kg of the rumen contents. The acidity level in the rumen varies between pH 5.8 and 7, but sometimes when the cow eats concentrated feed it drops temporarily.

It is not good for the cow to have a too low a pH in the rumen, because then the micro-organisms do not thrive. The bacteria in the rumen are mainly anaerobic, which means that they can only live in an oxygen-free environment. In one gramme of rumen content there are around 20,000 billion bacteria.

Cows ruminate for about the same length of time as they eat, usually 7-8 hours a day.

The composition of the fodder affects the milk content. Some rules of thumb:

- A lot of starch gives a lower fat content
- A lot of fat gives...
- A lot of protein gives...

A cow eats for 7–8 hours in a day, divided up into a number of sessions. She ruminates for roughly the same length of time.

## Fodder digestion

When the bacteria break down the fodder, various end products are produced. Some can pass straight through the rumen wall and out into the blood. Others move through the cow's digestive tract and then reach the abomasum, which is similar to our own stomach. The fodder is then broken down even more.

The environment in the abomasum is acidic and the pH is low in order to suit enzymes that can break down proteins. The fodder then moves to the small intestine where the released nutrients can be absorbed into the blood. Anything that has not been broken down continues onwards to the colon.

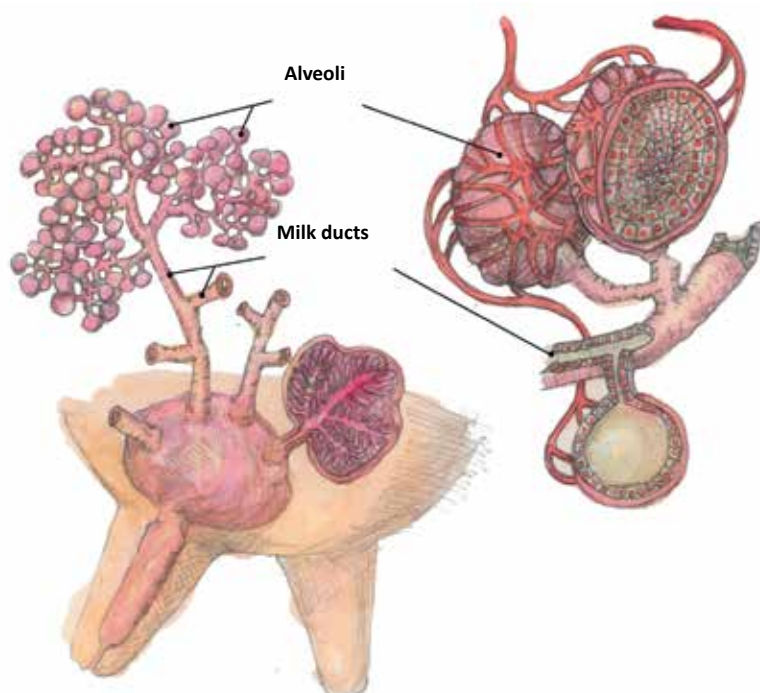
The colon contains bacteria, just like in humans, and these bacteria break down the fodder a bit more. Fluids are absorbed through the colon wall and then the remaining products pass out as manure. All the nutrients that are absorbed are transported by the blood around the body and are used as fuel and building material, including when producing milk.

A large quantity of gas is produced which the cow belches up; 500-1,500 litres per day. The gases mainly consist of carbon dioxide and methane.

## Milk production

When the fodder is digested and the nutrients are absorbed, they are transported by the blood to be used for various purposes. They can be used for the storage of fat, muscle growth or for a growing foetus. However, most of the nutrients absorbed are used to produce milk.

The udder contains special cells that produce milk. The cells that produce milk are found in the udder's alveoli. Nutrients are supplied to the cells from the blood and are used as building blocks for the milk. The composition of the milk is to some extent affected by the cow's maintenance ration of fodder. For example, more starch in the maintenance ration of fodder usually leads to a lower fat content in the milk.





## The newborn calf

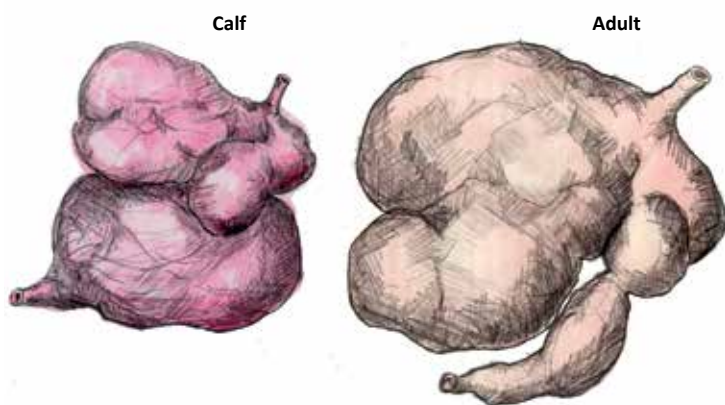
### The calf is born as a monogastric mammal

When a calf is born it is not a fully developed ruminant. To absorb milk, the calf only uses the abomasum. This is made possible by the formation of a groove which leads the milk directly from the oesophagus to the rumen.

In the acidic environment, the milk then curdles with the aid of the enzyme rennet, so that a lump of milk is formed. This lump can then be broken down a bit at a time and portioned out gradually in the intestine so that the calf can make full use of the nutrition it contains.

Pre-stomach function only develops when the calf grows and begins to eat solid food. For this reason, a young calf has difficulty in breaking down coarse fodder. A calf can actually ruminate when it is a few weeks old, but it is not until the age of 6-8 months that it is a proper ruminant which can provide itself with nutrients from coarse fodder.

It takes 6-7 months for the calf to become a proper ruminant.



### Colostrum

The most important thing for a newly-born calf is for it to receive colostrum. The cow's placenta does not allow the passage of antibodies to the foetus in the uterus. This means that the calf is born entirely without immunity to infection. However, colostrum contains large quantities of antibodies that can be essential for the calf to survive. Without colostrum, the calf has no immune system and is in danger of quickly becoming seriously ill. The calf's survival is entirely dependent upon whether it receives colostrum or not.



The calf needs colostrum within 2-4 hours after birth; a first meal of 3-4 litres.

Usually the best colostrum comes from older cows. Use a colostrum-meter to assess the quality of the colostrum.

Good colostrum in the freezer is a calf's life insurance policy!

Use unchopped good quality straw for the bedding.

Make a note of the calving immediately. Tag the calf within 24 hours.

The colostrum should be given as soon as possible, and preferably within 2 hours. It is best if the calf can suckle the colostrum; a feeding bottle can be used for this purpose. Under no circumstances should the first meal be given later than 4-6 hours after birth. It is important to give the colostrum, early since the calf's ability to absorb the antibodies quickly diminishes after birth and almost ceases after 24 hours. It is best if the calf receives 3-4 litres of colostrum during its first feed. Another good guideline is that the calf should receive at least 6 litres of colostrum from the first milking within 12 hours.

If the calf cannot suck, you may need to tube feed it. Tube feeding involves inserting a tube down into the abomasum of the calf via the oesophagus and allowing the colostrum to run down into the stomach of the calf. Have someone show you how to tube feed before you try it yourself.

The colostrum from different cows contains different amounts of antibodies. As a rule, a heifer that has calved has lower quality colostrum than an older cow. To assess the quality of the colostrum, you can use a colostrometer. Ask whether there is one on the farm. It is useful to have good colostrum in the freezer for use in the case of problems during the course of calving. Colostrum that is to be frozen should ideally be tested with a colostrometer. Colostrum can be stored in a freezer for 6 months. The colostrum should be thawed slowly and not in water hotter than 50°C, to ensure that the antibodies are not destroyed. It is best to freeze colostrum in flat packages of about 1 litre which thaw more quickly.

Some cows carry infectious mastitis bacteria. When such a cow calves, it is recommended not to give the calf any colostrum from its mother, especially if it is a heifer calf.

Even if the cow and the calf are together on the first day, it is rare for the calf to be able to suckle sufficient colostrum itself from the cow's teats. It may look like the calf is suckling on the teats, but sometimes it has still received too little. It is your responsibility to ensure that the calf receives sufficient colostrum. It is easiest to feed the calf with the quantity of colostrum stated above.

## Environment

The calf should be fed in a clean, dry and draught-free place. A clean single calf box with plenty of bedding is best. The best bedding for a calving box is good quality, unchopped straw, but the bedding used varies between farms. It is most important that the box is dry and clean and that it is cleaned between different cows. Allow the cow to lick the calf clean and dry; this is good for both the cow and the calf.

On some farms, the calves are kept outdoors in sheds. Before the calf is moved out to a shed it should be dry; this is particularly important during the winter. During the first few days, the calf should preferably have a blanket to protect it from cold and draughts. It should also ideally have received at least 6 litres of colostrum before you move it to the shed.

## Tagging

In order to be able to distinguish the calves from one another, each calf is fitted with ear tags. On the ear tag you can read the number of the calf, but also which herd the calf was born into. Do this as soon as possible, and always within 24 hours. On some farms, calves have a large tag on one ear and a small one on the other. It is sensible to the small tag at once and then to wait a week before fitting the large one. All calvings should be logged and reported. Immediately record when the cow has calved and what calf the cow has produced.





## Calves from 0-2 months

### Feed

A calf needs 3-4 litres of whole milk, two to three times a day. Calves can also be fed with milk substitutes, but bear in mind that the energy content is usually lower in these products and the rations therefore need to be higher if the calf is going to grow and be healthy.



The milk can be given in a normal bucket, a so-called teat bucket or via a calf feeder. A calf feeder allows several calves in one box to share a number of teats. Sometimes the calf feeder is transponder-controlled, which means that the calves have a box attached around the neck throat which controls how much milk they receive each day.

In some calf feeders, the calves receive powdered milk; in others they receive whole milk. There are also feeders where the calves have unrestricted access to milk; the milk in these systems is often acidified.

Regardless of how the calf receives its milk, it is important that buckets and teats are clean. Teat buckets should be taken apart and the valves – where otherwise milk residues collect – should be cleaned. The teats wear out and must be replaced over time. It is recommended that the same calf

always gets milk from the same bucket, as this reduces the risk of infection spreading. If you divide the calves into groups, you can ensure that the same buckets are always used for the same box.

In addition to milk, the calf needs clean water, concentrated feed and coarse fodder. There are special concentrated calf feeds adapted to the calf's nutritional needs. For optimal rumen development, it is best for the calves to be given small portions of concentrated calf feed during their first weeks of life. Dry silage and hay are suitable coarse fodder for small calves. Give the calves clean water and concentrated feed every day. Some farms give calves a mixture of coarse fodder and concentrated feed. If the calves do not eat all of the mixture, the remainder should be taken away every day and they should be fed with an entirely fresh mixture. Dry silage and hay can be left for several days before it is replaced with new fodder.

### Environment

Calves need to have a dry area of bedding on which to lie. Straw bedding is usually used for calves. Ensure that where the calves lie is clean, dry and draught-free.

### Batch rearing

Calves are sometimes kept in groups. For the calves to be healthy in group housing, it is recommended to rear them in batches. This means that a group of calves are reared in one box



The calf needs 3-4 litres of milk, 2-3 times a day.



Wash carefully so that both buckets and teats are clean.

Taster portions of concentrated calf feed and access to dry silage or hay stimulates the development of the calf's rumen.

Clean, dry and draught-free – then the calf is comfortable.

Wash the boxes between the different batches.

and all of them are moved there at the same time. It is also important that the age distribution does not exceed 3-4 weeks during the milk period. All calves should be moved from the box at the same time and the box should be washed before the next group of calves is moved into the box. By washing between the batches, the transfer of infections is interrupted.

## Vaccination

Calves can be vaccinated against ringworm, a fungal disease that exists in many herds and can also be transferred to humans. Every calf should receive two injections with an interval of 10-14 days. The first injection should be given as soon as possible, and always in the first week of life. The vaccination should be recorded. The calves are injected in the neck and the vaccination itself can be given by the vet, staff from the livestock association or a trained member of staff on the farm.

## Dehorning

Dehorn before 8 weeks of age.

Before the calf reaches 8 weeks of age, it should be dehorned. This is done by burning away the horn ring so that the calf does not get any horns. The calf is given anaesthetic before the operation. The operation is carried out by a vet or staff from the livestock association.

## Weaning

During weaning, the milk ration is gradually reduced.

When calves are around 8-12 weeks old, they are no longer given milk; this is called weaning. It is important that by this time the calf is used to eating solid food in the form of concentrated feed and coarse fodder. Otherwise it will lose weight and sometimes even become sick. It is therefore best to reduce the milk ration from when the calf is approximately 1 month old so that the calf gets used to eating more concentrated feed. A good rule is to wean calves when they consume 1 kg of concentrated feed a day and weigh more than 90 kg. The stated weight corresponds to approximately 100 cm in chest circumference.

## Illnesses

### Diarrhoea

A rehydrant counteracts dehydration.

Diarrhoea is a common illness among newborn calves. Calves usually have slightly lighter and stickier excrement than adult cattle, since they drink a lot of milk. If a calf becomes lethargic and gets diarrhoea it should be given a rehydrant. Diarrhoea means that the calf can become dehydrated and this in itself can be life threatening so rehydration is very important. You cannot give just water; the liquid must be salt-balanced. There are various preparations available that you can mix with water. The calf should continue drinking at least half of its milk ration; it is not adversely affected by this and the milk is required so that the calf does not suffer from malnutrition.

### Cough

If any of the calves are coughing, report it immediately.

Calves can also suffer from coughs which can be caused by various pathogens. A calf may need to be treated with antibiotics to recover, so if you notice a calf coughing you should tell your employer. Also check whether the calf has a fever.

## Calves from 2-6 months

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The calf no longer receives milk. Pay attention to whether all the calves are eating so that they do not lose weight.

These calves should have concentrated feed, coarse fodder, mineral food and salt. Like all animals they need clean water.

They like a dry surface with bedding to lie on. The lying surface can be an entire area or a cubicle.

Clean water for all animals.

## Young animal 6 months to calving

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### Feed

The calf now grows into a fine heifer who then calves and becomes a good, healthy dairy cow. To succeed in this, the heifer needs sufficient amounts of feed of the correct composition. A heifer grows quickly and thus needs protein. If the maintenance ration of fodder contains too little protein she just gets fat. A fat heifer does not become as good a dairy cow as one with normal body composition. Ask your employer if there is a calculated maintenance ration of fodder for the heifers. If there is one you should feed the heifer according to this. If there isn't one, it is recommended that the employer calculates one for their heifers. Of course, clean water is important. Heifers also need mineral food and salt. They can receive salt either directly in their feed or by licking salt blocks.

Heifers need their own maintenance ration of fodder.

### Heat and pregnancy

When the heifer reaches 14-15 months it is time to inseminate her so that she becomes pregnant. Ensuring that heifers become pregnant is important work. It is these heifers who will become the new cows. To see whether any heifers are in heat you must look at them carefully. It is best to look at them when they have not just been fed. When they have just received fodder they usually only like to eat and do not show signs of heat. Some farms have activity meters, which make it easier to find animals in heat. Read more about activity meters, the heat cycle and signs of heat under the heading "Heat and insemination".

Be observant of signs of heat.

### Environment

Just like calves, it is best for a heifer to have a dry floor surface with bedding to lie on. On some farms the heifers go into fully slatted boxes, which means that they both eat and lie on a slatted floor. If, once the heifer has calved, she must learn to lie down in a cubicle, this may be difficult for her as we have taught her to lie on a slatted floor. It is best for the heifer if she has the same system as a heifer that she will have as an adult cow. If she will have a cubicle as an adult, it is best if she can do this while growing up too. The reason why slatted boxes used to be used is that it is labour efficient. The animals tread down the manure and no straw is needed.

Let the heifers get used to the dairy cows, but not later than 3-4 weeks before calving.

## Before calving

When there are around 3 weeks left before calving, it is recommended that the heifer begins to taste the same fodder that the cows eat. The bacteria in the rumen then change so that they can break down the fodder that the heifer will eat when she has calved. It is also useful if the heifer has tried being among the cows before she calves, so that she has a place in the herd and knows where fodder, water and lying places can be found. She should spend 2-3 weeks among the cows sometime during her pregnancy, but never later than around 3-4 weeks before the estimated time of calving. Cattle are herd animals and it is appropriate to settle in 2-5 heifers at a time so the smaller ones do not get stressed by the older cows.





## Caring for cows

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### A cow's year in brief

**Day 1, Calving:** The heifer calves and milk production starts. She is now a cow. Now her first lactation begins and she is called a first-calver.

**Day 40, Observation period:** Now it is time to check to see whether she appears to have started her heat cycle.

**Dag 40–60, Treatment period:** Cows that are not in heat are normally examined by a vet or inseminator and treated if necessary.

**Dag 60–90, Insemination:** The cow is inseminated. If she becomes pregnant she will then calve in intervals of approximately one year.

**Day 300, Drying off:** If you stop milking the cow, she will stop producing milk. The udder should rest so that the cow can produce a lot of milk again after the next calving.

**Day 365, Calving:** The cow calves again and now starts the second lactation. The cow begins to produce milk again. She has now become a second-calver.

## Calving

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### Environment

When a cow or a heifer is about to calve, she wants to do it away from the group. A clean single calving box with plenty of bedding is therefore best. Good bedding in a calving box is good quality, unchopped straw, but the bedding used varies between farms. It is most important that the box is dry and clean and that it is cleaned between different cows. The straw should be of good hygienic quality. If a cow calves among the milking cows and there are automatic manure scrapers at work, there is a risk that the calf will be dragged by the scraper to the culvert. Cows that are likely to calve should therefore never walk in aisles where there are automatic scrapers.



Automatic manure scrapers are dangerous for calves, so it is best that calving takes place in a calving box.



## Calving process

The cow fills the udder before calving; this takes different lengths of time for different cows. Some cows have taut udders for a long time, while others fill up quickly in just a few days. If milk begins to flow, it usually means that calving is fairly close. She becomes uneasy and stands shifting from side to side. The actual calving takes different lengths of time for different cows. As a rule, this is easier for cows than it is for heifers. It can take from just 30 minutes to many, many hours.

Usually the cow manages to calve on her own, but sometimes she will need help to get the calf out. The majority of cows are born with the forelegs and head first, but those that are born with the back legs first do occur and this is also a normal delivery position. If the calf is born with the back legs first, the cow may need a little more help in getting the calf out than one born with the forelegs and head first.

When the calf has been born, most cows get up and begin licking the calf dry. This is good for both the cow and calf. Within an hour, the calf will be up on its legs trying to suckle. The afterbirth hangs out from the cow and is usually released after a while. The afterbirth consists of the placenta and the foetal membranes. If the calf is suckling or you are milking the cow, more of the hormone oxytocin is released from the pituitary gland, helping the uterus to contract and expel the afterbirth.

The cow is often rather exhausted and thirsty after calving, and offering her water in a bucket is recommended. The water should ideally be lukewarm and you can allow the cow to drink as much as she wants.

Some cows guard their calves and do not want you or anyone else to come between them and their calf. You then need to pay extra attention to make sure that you don't get butted.

## Twins

As a rule, cows give birth to one calf at a time, but twins are not entirely unusual and triplets can occur too. Twin calves are often born slightly too early and are smaller than other calves. If you have a cow that has a small calf before the estimated time, this can indicate twins. Examine the cow if you suspect twins.

## Freemartins

In 90% of cases, a heifer calf that is a twin of a bull calf will be sterile. During the foetal stage, the bull calf's hormones affect the heifer calf so that she does not develop normally. These heifers are called freemartins. This phenomenon only occurs in cattle and not in other animals or humans. These heifers can have many different deformities and sometimes entirely lack a uterus.

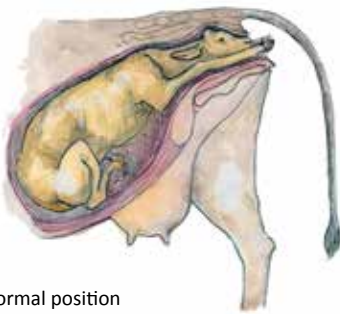
## Problems that can arise during calving

As with all illnesses, it is always better to call the vet too often than too little. In particular if you feel unsure, calling and asking the vet for advice is recommended. If there is anyone else on the farm, always ask them for advice first. For some problems, you need a number of people, for example if a cow must be rolled. Ask the vet when you call how many people are needed so you have time to call for help before the vet comes.

## Difficult calving/incorrect position

Usually the cow manages to calve on her own, but sometimes she will need help to get the calf out. There are special chains that are attached to the calf's legs to assist in pulling the calf out. There should be a maximum of two people pulling, and no mechanical aids should be used without a vet being present.

### Examples of birth position



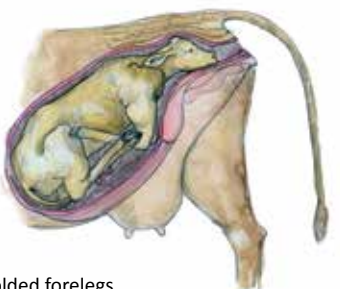
Normal position



Breech presentation



Folded head



Folded forelegs



Before you begin helping a cow by pulling the calf out, you must know that the calf is not in an incorrect position. If the calf is in an incorrect position this must be corrected before you pull the calf out, otherwise you could injure the calf or cow. If you are unsure, you should consult with your work colleagues or call the vet. It can be hard to correct an incorrect position and sometimes special equipment is required. It is also important that you pull in the correct way. Pull when the cow pushes and just keep still between contractions. It is actually the cow that pushes out the calf; we are only helping to ensure that the calf does not move backwards between contractions. It is also important that you pull in the right direction, diagonally downwards and not up against the back of the cow. Have someone show you how to do this before you do it yourself. Pulling alternately on the front legs is also useful.

If you need to assist:

- Pull diagonally downwards
- Pull when the cow is pushing
- Ideally pull alternately on the front hooves
- Have someone experienced show you and give you tips

## Calving paralysis/paresis

After calving, some cows suffer from calving paralysis or paresis. They get cold ears and across the groin. They stop eating and cannot get up. If this happens, the cow needs veterinary care. The vet gives her calcium in the blood and maybe also under the skin. Sometimes several treatments are needed. It is usually older cows, i.e. third-calvers and older, who are affected. Fat cows also have a greater risk of being affected than others.

Calcium sticks are available that can be given to the cow straight into the rumen using a device that is inserted down the throat. Have someone show you how to do this. There are also calcium pastes available that you put into the cow's mouth. You should only give these to cows that are still standing up. If the cow has lain down and does not get up, you should call the vet.

An adjusted maintenance ration of fodder reduces the risk of calving paralysis/paresis

There are now special mineral foods available that are given during the dry period to reduce the risk of calving paralysis. The maintenance ration of fodder has significance in how easily cows are affected by calving paralysis. It is better for the cow to eat a maintenance ration of fodder that consists of a limited amount of silage and unrestricted access to straw than to give the same maintenance ration of fodder as the cows who are milking receive. A high ration of calcium in the maintenance ration of fodder during the height of pregnancy increases the risk of calving paralysis.

## Retained afterbirth

Usually the cow releases the afterbirth within 12 hours but sometimes it does not loosen after calving. As long as the cow does not display any symptoms of illness such as fever, you can wait. The afterbirth then usually comes out by itself after 3-12 days. If the cow gets fever or if she stops eating, call the vet. If you have many cows with retained afterbirth, you may need to review the feeding regime during the dry period.

## Uterine prolapse

This is a rather unusual condition that involves the womb slipping out of place through the vagina with contractions. This is an acute situation for the cow and a vet must be called out as soon as possible to help to get the uterus back in again. If this is not done, the cow can bleed to death. Try to protect the uterus, for example with a clean sheet or some other clean cloth, and call the vet.

## Uterine inversion

The uterus can twist in the cervix, and as a result the calf cannot come out. To help the cow with this, the vet must be called. If you have a cow that seems to want to calve but nothing happens for a long time and her vagina looks lopsided, this may be uterine inversion. The condition usually occurs when the cows have large foetuses or are kept on hilly pasture during the height of pregnancy. A contributory cause is a flaccid uterus as a result of the early stages of calving paralysis.

## Feeding

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Feeding is intended to provide the bacteria in the cow's rumen with nutrients so that they thrive and break down the fodder. As previously mentioned, the cow is a ruminant and in order for her rumen to function correctly, she must receive the right composition of different types of feed.

### Types of feed

The types of feed are usually divided into coarse fodder and concentrated feed.

**Coarse fodder:** Silage, straw, whole crop cereals and peas, hay and pasture.

**Concentrated feed:** Corn, peas, beans, rape, soya, complete feed, concentrates and other raw material mixes that are purchased from fodder firms.

"HP-massa" (pressed sugar beet pulp), beet pulp and silage maize fall somewhere between coarse fodder and concentrated feed.

The cow needs to eat coarse fodder to obtain a correct environment in the rumen, and she needs concentrated feed to be able to produce large quantities of milk. Cows are actually intended to produce as much milk as their calf drinks, around 10-12 litres a day. Over the years, humans have changed the cow so that she can now produce over 50 litres per day. This places entirely different demands on feeding.

### Feeding strategies

Feeding strategies are usually divided into three groups.

**Full feeds:** All concentrated feeds are given in a mixture together with coarse fodder in the feeding trough.

**Mixed feed:** Some concentrated feed is mixed with coarse fodder and fed into the feeding trough. The rest is given in concentration feed stations.

**Separate feeding:** No concentrated feed is mixed with the coarse feed. The coarse fodder is given in the feeding trough and the concentrated feed is given in concentrated feed stations. If the cows are tied, the concentrated feed is usually given with computer-controlled feeders which provide an individual ration to each cow.

A cow should have access to coarse fodder with good nutritional content. If the coarse fodder is mixed with concentrated feed, the cow should have free access to the mixture. Concentrated feed can be mixed wholly, partially or not at all with the coarse fodder. If the cow is fed concentrated feed separately, it is sensible to give the cows coarse fodder first and concentrated feed afterwards. The concentrated feed should be divided up into four rations per day, otherwise there is a risk that there will be too much concentrated feed at once, which leads to the cow's rumen becoming too acidic for the bacteria.

For the cows to want to eat a lot and be healthy, the feed must not only have good nutritional content but also be sufficiently hygienic. There must not be any mildew in the feed. For example, if you feed cows with mildewy silage, they can get udder inflammation more easily.

Ensure that the feeding trough is cleaned at least once a day so that no old feed remains. Old feed can easily begin to get mildewy and then the cows can more easily fall ill. Everything that comes into contact with the feed, such as mixers, feeders and so on must be clean. There should be no fodder left anywhere that can remain and go bad.



Never feed mildewy fodder.

## Water

Water is a cheap feedstuff. Cows must have free access to clean water. If the cow does not drink as much as she needs, she will not produce as much milk she would otherwise have been able to. Water bowls and troughs must be clean. Water troughs should be cleaned daily, and water bowls about twice a week. You should take care to ensure that there are no deposits remaining anywhere. If the surface feels slimy, it has formed a bacterial film equivalent to approximately 1 million bacteria per cm<sup>2</sup> which indicates that cleaning has been neglected.

A cow that produces a lot of milk drinks up to 150 litres of water a day. She prefers to drink large quantities at a time, 10-15 litres a minute. For the cow to do this, the water bowl that the cow drinks from must also give just over 10 litres per minute. If this is not the case, there is a risk that the cow will not drink enough. This results in reduced milk production. Cows drink more water if it is not ice cold but instead slightly more tepid. On some farms, the cows' drinking water is heated a little by using the heat that is produced when the milk is chilled in the milk tank.

## Feeding illnesses

As with all illnesses, it is always better to call the vet too often than too little. In particular if you feel unsure, calling and asking the vet for advice is recommended. If there is someone else on the farm, always ask them for advice first. If several cows suffer from the same illness, you should review the maintenance ration of fodder, as this may be unbalanced. Either the employer can do this him/herself or he/she can ask the help of an expert from the livestock association. As with problems relating to calving, several people may be needed when the vet is present. Ask the vet how many people are required, and try to arrange it so that they are available on the farm when the vet arrives.

### Acetonaemia (Ketosis)

Ketosis means that the cow has ended up in a negative energy balance. She is unable to eat as much as she needs and she begins to draw on her body reserves in the form of fat, which leads to acetone-like substances forming in the blood and the cow feeling rather poorly. Cows with ketosis smell of acetone, both from the air they exhale and from their milk. They do not want to eat concentrated feed. Their excrement becomes flaky and dry. You can try to give the cow a propylene glycol preparation; various of these are available to buy. This raises the cow's blood sugar and means that she stops breaking down fat. In more severe cases of ketosis, a vet may need to be called.

### Abomasum displacement

If the cow is fed with too little or too finely-chopped coarse fodder at the same time as a lot of concentrated feed, she may suffer from abomasum displacement. The abomasum moves from its original place down below the rumen to either the left or right side. Abomasum displacement can be a complication of ketosis, and abomasum displacement can also result in ketosis as a complication. A vet can locate the abomasum, roll the cow and sew the abomasum into its correct place. When the abomasum displacement has been remedied, the cow should be fed coarse fodder for a few days and then you can carefully begin giving her concentrated feed.

### Grass tetany

The cow gets severe cramps due to rumen disturbance, which leads to a lack of magnesium. Grass tetany is most common in the early summer when the cow has access to only thin pasture. The vet gives the cow magnesium and calcium straight into the blood. In order to avoid this condition, you can ensure that the cows receive a magnesium-rich mineral food and are released on less thin pasture.



Clean water bowls and water troughs daily.



Does the cow and/or milk smell of acetone? This is a sign that the cow has ketosis.

Thin pasture increases the risk of bloat.

## Bloat

Large quantities of gas are produced in the cow's rumen, which the cow normally belches up. If for any reason the cow is unable to belch, she gets bloat. One reason the gas is not released is that foam has formed in the rumen, trapping the gas. This is in turn common on pasture with a lot of legumes (alfalfa, red and white clover) since these contain saponins. It may also occur if the cow receives large quantities of finely-crushed concentrated feed and too little coarse feed. Finally, bloat can be caused by something getting stuck in the oesophagus. Since the gas cannot come out the rumen swells up and expands. The rumen is on the left side, and if a cow gets bloat, she will first look swollen on her left side. If the cow gets worse, she will also swell up on the right side. Severe bloat can develop into a life-threatening condition since the swollen rumen presses the lungs together so that the cow ultimately suffocates.

To release the gas in the foam in the rumen, give the cow a mixture of 0.5 litres of edible oil and 0.5 litres of milk. You should also position the cow with her forelegs higher. In individual cases, the rumen may have to be punctured so that the gas comes out. Always call a vet if this occurs, but act quickly! If the reason for the bloat is thin pasture it is recommended that the other animals are moved from the pasture, otherwise you can expect more cases of bloat. Feed the cows indoors so that they are not so hungry when they go out to pasture, thereby reducing the risk of them being affected.

## Hardware disease

Sharp objects in the fodder can perforate the reticulum.

The inside of the cow's mouth is covered with backward-directed, pointed papillae. This allows the cow to be a very efficient grazer. But there is a disadvantage; the cow cannot spit anything out once it is inside her mouth. For example, if there is fencing wire, nails or other sharp objects in fodder, this is inevitably swallowed and as a result of gravity eventually ends up in the reticulum. When the pre-stomachs continue to work the sharp object is easily fed into the wall of the reticulum, where it punctures a hole in the reticulum. In some cases it may even perforate the chest cavity, since the reticulum lies against the dividing wall between the chest and abdominal cavity.

A cow that has hardware disease stops eating, stands with a curved back and has a moderate fever of around 39.3°C. If you suspect hardware disease, a vet should be called to make a diagnosis. Often cows with hardware disease are given a magnet that attracts the sharp object – providing it is magnetic – and prevents it from perforating the wall of the reticulum. This is done using a special device. On some farms, the cows are fed magnets as a preventative measure.

To prevent cows getting hardware disease, ensure that no metal objects get into the feed. These may occur due to hayfields and pastures along roads containing metal objects. Aluminium cans that are thrown onto pasture land are particularly troublesome because they are usually broken into many small pieces and are not magnetic.

## Miscellaneous care and supervision of cows

### Heat and insemination

Cows usually calve at intervals of 12-14 months. In order for this to take place, the cow is inseminated or mounted by a bull when she has produced milk for approximately 3 months. In a herd there are always cows that will not be inseminated again which are replaced by calving heifers. This can be due to a variety of reasons, but the most common are low production, that they do not take to the calf or have a high cell count. It is important for all livestock keepers to know which cows are to be inseminated in the herd in order to be able to act when these particular cows show that they are in heat.

Check the list of animals which are to be inseminated and be observant of signs of heat.

### Signs of heat

Signs of heat are that the animal mounts other animals, stands still when others are mounting her, shows increased interest in staff, has red labia and discharge from the vagina. It may be that she does not have time to eat when she is in heat. She may also produce milk with slightly more difficulty than usual.

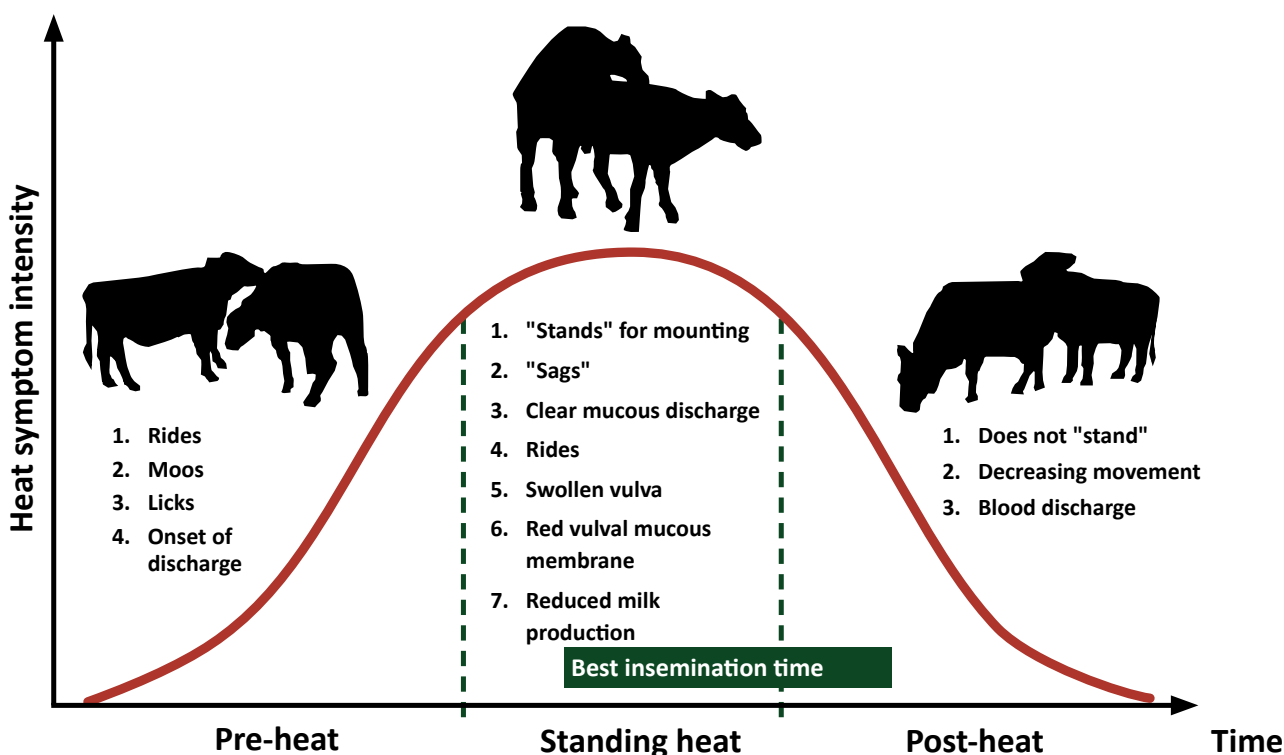
Heat is divided into three phases, pre-heat, standing heat and post-heat.

When the cow or heifer is in heat she should be inseminated. There is great variation between cows as to how long they are in heat. On average, cows are in standing heat for 18 hours. The best time for insemination is at the end of standing heat. Heifers in general have slightly shorter heats than cows.

The insemination itself should be done by someone who knows how to do it. You must have completed a training course in order to be able to do this. There are usually one or two people on the farm who have this knowledge, or you can call the livestock association and their staff will come out and inseminate the cow or heifer.



Standing heat usually lasts for 18 hours.



The heat cycle lasts three weeks.  
The animal can be examined for pregnancy after 40 days.



The receiver registers the movements of animals equipped with a neckband for activity measurement.

Drying off is done two months before calving, preferably in a separate group.

A few days after the cow or the heifer has been in heat, there is often a discharge of blood. This occurs regardless of whether she became pregnant or not when she was inseminated. The heat cycle for cattle is 21 days or 3 weeks. If the heat comes back after 3 weeks, she did not become pregnant and you should then try again to inseminate her and hope for better luck.

If she becomes pregnant, she shows no more heat and no more blood discharge. She will be pregnant for around 9 months. To be sure that the cow/heifer is pregnant, a pregnancy examination is usually performed. This can be done from around 40 days after she is inseminated. It is generally staff from the livestock association who do this. They feel the uterus through the intestinal wall; a rectal examination. If it turns out that she is not pregnant, a decision should be made as to whether to attempt again to get her pregnant, or if she should be sent to the slaughterhouse when she no longer produces as much milk. Some cows need to be inseminated several times before they become pregnant.

## Activity meters

Many farms have activity meters which measure how much the animals move. They have a box either around their neck or leg which sends information to a computer about how much the cow has moved. A cow or heifer in heat moves more than usual and this is picked up by the activity meter. High activity can therefore mean that she is in heat.

## Drying off

When the cow has around 2 months left until calving, she should be dried off. She will not produce any milk during these two months. The udder should rest in order to be able to produce well after the next calving. The best way to dry off a cow is to move her to another group of animals, give her a limited ration of silage and unrestricted access to straw. She should not receive concentrated feed when she is being dried off. Of course she must have free access to clean water. Milk her in the morning, then skip her in the evening and the whole of the following day. Milk her again in the morning of day 3 and then take a break from milking for at least a day and a half. Try to milk her as seldom as possible. Most cows dry off in a period of a week. When cows that produce around 30 litres of milk a day and more are to be dried off, you must be a little careful to ensure that they don't get mastitis.

### Milking during drying off

| Milk prod. kg | Day in drying off |    |      |           |    |    |      |    |      |           |      |           |
|---------------|-------------------|----|------|-----------|----|----|------|----|------|-----------|------|-----------|
|               | 1                 |    | 2    |           | 3  |    | 4    |    | 5    |           | 6    |           |
|               | mo                | ev | mo   | ev        | mo | ev | mo   | ev | mo   | ev        | mo   | ev        |
| >25           | x                 | x  | Milk | x         | x  | x  | Milk | x  | x    | x         | Milk | Dried off |
| 15-25         | x                 | x  | Milk | x         | x  | x  | x    | x  | Milk | Dried off |      |           |
| <15           | x                 | x  | Milk | Dried off |    |    |      |    |      |           |      |           |



## Dry period

The period from drying off until calving is called the dry period. The cow is then called a dry cow. The cow should now only eat and be healthy. You should ideally feed her a limited ration of silage, but provide unrestricted access to straw. It is not intended that the cow should get fat during the dry period; she should be in the same condition when she is calving as when she stopped producing milk. She can also receive a special mineral feed, which is intended to prepare her before calving. To ensure a different maintenance ration of fodder to the milking cows, dry cows need to go into their own group. On some farms the dry cows are tied.

Having dry cows in their own group provides an opportunity to adjust their maintenance ration of fodder.

## Starting up before calving

Three weeks before calving, the cow should be introduced to the feed she will eat when she has calved. The reason for this is that the bacteria in the rumen need time to adapt. The cow should ideally not have unrestricted access to the current silage. She should receive a limited ration and the rest of her diet should be straw. If the farm has a feed mix for the milking cows, it is a good idea to give her a little of this and then supplement with straw. She also needs to get used to the taste of the concentrated feed. Three weeks before calving begins, give her a little concentrated feed. She should perhaps receive only 0.5 kg per day. Then step up the ration so it reaches a maximum of 3-4 kg when she calves. Once she has calved, the concentrated feed ration should be increased.

Starting up: Three weeks before calving

## Bedding

The cows' cubicle should have bedding. There are different kinds of bedding. The most common are cutter shavings, raw shavings, chopped straw and peat. It is recommended that the bedding is replaced over 48 hours, otherwise bacteria will begin growing in the bedding no matter what it is.



## Condition

A cow should not be too fat or too thin. In the first months after calving, it is easy for her to lose condition as she is producing milk. Then once milk production reduces she regains better condition. It is important to make sure the cow does not get too fat before drying off. She should be slightly round when she is dried off and she should have the same condition when she calves. There is a greater risk that she will be affected by problems when calving if she is too fat. Nor is it good if she is too thin when she is dried off; instead her condition should be corrected during the latter part of lactation. Just the right condition at calving is 3.5 on the scale shown below.



2.0



2.5



3-3.5



4.0



4.5

## Looking at cows/cow signals

Practice and use your eye for animals.

It is important to be able to detect cows who are not healthy. The earlier you see that a cow is not feeling well, the easier it is to be able to remedy the problem and get her healthy again.

A healthy cow eats well and has a well-filled rumen. The rumen is on the left side of the cow. It is possible to see from outside whether the rumen is filled.

If she does not have a filled rumen you should think about why she doesn't. Why hasn't she eaten recently? This can depend on different illnesses, such as mastitis, lameness, ketosis and so on, but it can also be due to there being insufficient feed in the feeding trough. If there is fodder in the feeding trough, maybe it is not appetising for some reason. Or if there are too few places at the feeding trough, the low-ranked cows cannot eat. If a cow is not eating, something is wrong, and you need to find out what the problem is. The cow's condition indicates how well the cow has eaten over a few weeks, while how full the rumen is indicates how well she has eaten in recent days. Access to water can also affect rumen filling.

The cow needs to lie down 12-14 hours a day.

When a cow has eaten, she lies down and ruminates. A good sign is that a large part of the herd is ruminating after feeding. A cow should be given the opportunity to lie down for a total of 12-14 hours a day, since she is resting and ruminating. When the cow is lying down, the blood supply to the udder is greater than if she is standing. She produces more milk if she lies down for a sufficient amount of time. Another important effect is that the cow has an opportunity to take the weight off her hooves. If there are many cows standing up in a cubicle, it could mean that it is too crowded in the cubicle so that they have difficulty in lying down.

Does the animal have any injuries? If so, from what?

If the cows have injuries anywhere on the body, these could have been received from the fittings. This could either be at the feeding trough or in the cubicle. For example, larger cows will show that a neck barrier is too low as they get a lump on their neck.

## Moving animals

Work calmly – moving animals must take the time required.



Ensure that staff can get out of the way when driving the animals and are not in danger of being crushed or overrun.

When you move animals, you should work calmly. Animals that are stressed can do unforeseen things. You should ideally move the animals in groups if they are used to walking in groups. Put up fences so that the animals can easily see where they are going and so that they cannot go the wrong way. Ensure there is light where the animals are to walk. Animals do not like to walk towards darkness. Also ensure



Make it easy for the animals to choose the right way. Make sure that the floor is not slippery where the animals must walk. Sprinkle with sand if required.

that the surface underfoot is not slippery. It is important to appreciate that you never know in advance how long it will take to move animals. Sometimes they move very quickly and sometimes it takes a long time. Some animals are more hesitant in new environments and need more time. Do not allow this to stress you, but instead allow the animals to take the time they need.

## Clipping cows

Cows become long-haired and need clipping. Long-haired cows get dirty more easily and it is more difficult to keep a long-haired udder clean. Heifers in particular can become long-haired. They should ideally be clipped before they calve. The most important parts are the rear half of the cow and the udder. A cow that is producing milk produces so much heat that she is happiest when clipped otherwise she becomes sweaty. Cows are clipped with special scissors that are electrically powered. Ensure that the cutting edges of the scissors are sharp, otherwise they will cause pain to the cow. Most cows enjoy being clipped, but heifers that are clipped for the first time may find it a little exciting. Continue clipping depending on hair growth for the entire indoor season.



A clipped udder gets less dirty and is easier to keep clean.

## Hoof trimming

Cows' hooves grow constantly. If you let them grow, they get so long that the hooves become painful and the cows don't want to walk or stand. They can also develop other problems with their hooves. You should therefore trim the cows' hooves at least twice a year. A hoof trimmer does this, but staff on the farm are involved and drive the cows to the trimming crush. The trimming crush is like a cage that the cow goes into where the hoof trimmer can lift up one or two of the cow's legs at a time for trimming. It is important not to stress the animal during this process, just as in any other handling.



Hoof care, both planned and follow-up as needed, is important for the animals to be healthy, move well and be able to eat as they should. Sometimes treatment of hoof diseases is also required.



## Udder health

The condition of a cow's udder says a lot about how healthy the cow is. If the employer participates in Kokontrollen (Cow Control) then milk samples are taken once a month. Then the quantity of milk, fat content, protein content, cell count and urea of each individual cow is checked. By taking milk samples every month you can get a good idea of which cows have good udder health, i.e. a low cell count, and which cows are not as healthy. A cow that has poor udder health produces less milk than a cow with good udder health, so you should always aim to have as many cows as possible with completely healthy udders.

## Udder inflammation/mastitis

If the cow gets an acute clinical inflammation of the udder, the milk has a different consistency and colour. It becomes lumpy and may also become watery. Often the cow gets fever too. The cause is a bacterial infection in the udder. To find out what type of bacteria has caused the infection, take the vet a milk sample. This is done to ensure the correct antibiotics are given so that the cow returns to good health. There are many reasons for bacteria to enter the udder, but if the cow lies on a dirty surface before the teat ducts have had time to close there is a significant risk of bacteria entering the teat duct. The same thing can happen if the cow has an injury to a teat; she may, for example, have had a teat trodden on, by herself or by another cow. She could also have lain down in a cubicle where another cow had lain down and leaked milk.

There is a more chronic variant of mastitis, in which the cow is not acutely sick but instead has a constantly raised cell count. It is not usually possible to treat the cow and return her to health if she has chronic mastitis. Some people try to treat such cows during the dry period, which can be successful. However, it is usually the case that cows who get premature chronic mastitis are sent to the slaughterhouse. They also contribute to an increased risk of infection in the herd, so it is sensible to have few cows with chronic mastitis.



Massage is one part of the treatment for udder inflammation.

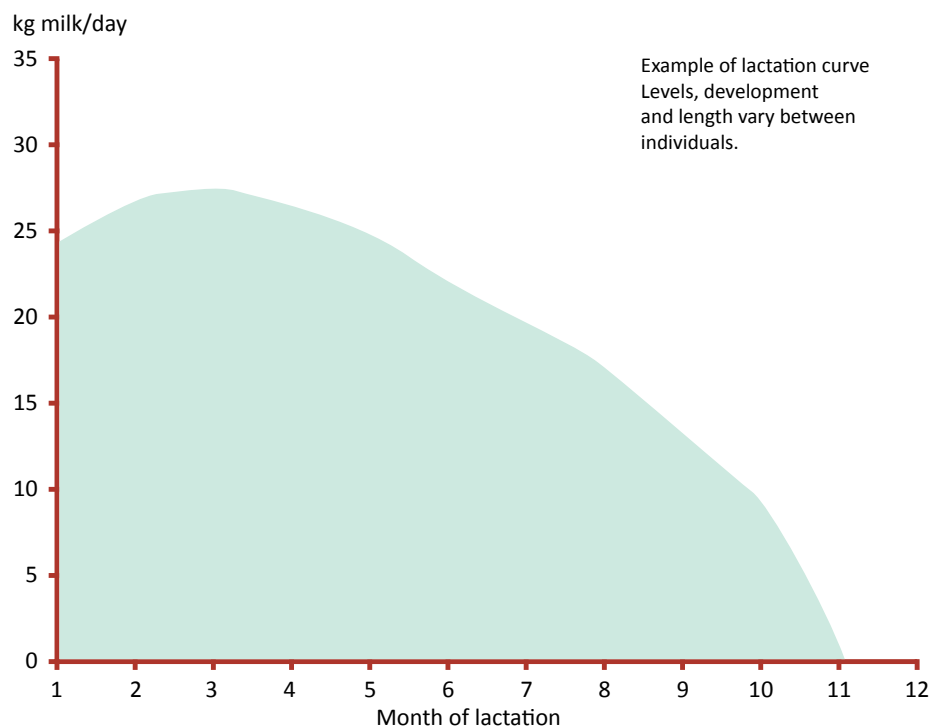


## Milking

More detailed information about how milking should be carried out and the procedures that should be used is available in the film *Milk Right*, which can be ordered via Växa Sverige. The film is aimed at livestock keepers and is available in Swedish, English, Polish, Lithuanian, Russian and Estonian.

## Lactation curve

When a cow calves, milk production starts. In other words, lactation begins. Lactation is numbered according to how many calvings the cow has had. A cow that has calved three times is in her third lactation, a cow that has calved four times is in her fourth lactation and so on. Milk production is greatest at the beginning of the lactation, when the cow can produce over 50 kg of milk per day. This requires that the cow receives good, nutritious feed. Later the milk yield reduces until drying off, when the cow stops producing milk.



## Milking technique and procedures

To ensure that dairy cows have healthy udders that produce a lot of milk, good procedures and correct milking techniques are important. The best for udder health is that the udder is emptied of as much milk as possible at every milking. This is also good for the farm's profitability, since more milk from each cow can be delivered to the dairy and the costs of poor udder health are reduced.

To ensure the cow has a good release of milk, i.e. that the udder is emptied of as much milk as possible, a milking procedure is required that resembles the calf's suckling. When the calf suckles the cow, it first "butts" against the udder with its nose while it looks for the teats. When the cow feels this, nerve signals are sent to the brain to say that it is time for milking. When the brain receives this signal, the hormone oxytocin is secreted from the pituitary gland (a gland in the brain). The oxytocin is transported by the blood back to the udder and affects the muscles around the milk alveoli so that they squeeze together the milk alveoli and push out the milk. The whole of this process takes around 60 seconds, so a correct preliminary treatment of the udder should take around 60 seconds. It is important that the same procedure is carried out at each milking so



that the cow recognises the treatment and doesn't become stressed, because then the release of milk declines.

## Before the milking machine is put on

Before the milking machine is put onto the udder, a **preliminary treatment** is performed. This should be done as follows to achieve successful milking.

1. Clean the teats with a warm, damp cloth; this is called **teat contact** and should take around 15 seconds. When you do this you should also "butt" the udder a little, just as the calf does when it bumps its nose against the udder before it begins suckling. The teat contact starts the secretion of oxytocin and prepares the cow for milking. Also check the teats and teat ducts to make sure there are no injuries.
2. Check the milk by milking 3-4 sprays from each teat into a control vessel. Check the milk to ensure that there is no flocculation present and that the milk does not look different in any way.
3. Wait a little longer before the milking assembly is put on so that 60 seconds passes from when the first teat contact is made until the machine is put on. Cows that have calved more than six months previously or are milked three times a day have less milk in the udder and need more stimulation to ensure the udder is emptied in the correct manner; for these cows you can increase the duration of teat contact to at least 20 seconds.



Sound milking routines form the basis for good udder health and good milk quality.

## During milking

The pulsations of the vacuum mimic the calf's suckling and ensures that the oxytocin continues to be released. For good udder health, it is important to have a milk facility that functions properly, with the correct vacuum and which handles the udder and teats carefully. The milk facility must therefore be maintained in the correct manner and serviced at regular intervals.

## After milking

After the milking machine has been removed, the udder should be felt through to ensure that it is empty of milk and feels soft. Then the teats should either be dipped or sprayed with protective, softening or disinfectant agent.

## Hygiene during milking

To prevent infections spreading and impairing milk quality, it is important to maintain good levels of hygiene during milking. The person who milks should wash his/her hands and keep them as clean as possible during the entire milking. Plastic gloves are useful, but it is important to bear in mind that gloves can also get dirty and must therefore be kept as clean as possible. Avoid spraying water under or next to the cows, so as to avoid the risk of splashing manure or milk from cows with udder health problems onto healthy cows. Cows with udder infections should be milked last to prevent the spread of infections between cows.

Surfaces in both the milk cubicle and the milking room should be cleaned after every milking and should be allowed to dry for a few hours before they are used again in order to reduce the risk of infection and hygiene problems.

## Milk quality

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Milk that is sent to the dairy is checked for a number of points. The following are analysed

- Fat content
- Protein content
- Urea
- Cell count
- Bacteria count
- Spores

### Fat content, protein content and urea

The fat content, protein count and urea are affected by the maintenance ration of fodder the cows receive and it can be useful to change the maintenance ration of fodder so that these parameters are correct. The fat and protein content also depend on the cow's genes. A higher fat and protein content in the milk means that the farm receives more money for the milk. High urea in the milk indicates that the cow is fed with too much protein. Levels of urea that are too high can lead to problems with getting the cow pregnant. Urea has no impact on the milk price, but it is unnecessary to feed the cow with too much protein as this is often something that the farm has to buy in.

### Cell count, bacteria count, spore count

If the cell count, bacteria count or spore content are too high, your employer may receive a deduction from the milk price and will therefore not be paid so well for the milk. Different dairies have different limits for cell count, bacteria and spores. It is thus important that the milk is of good quality. This is something that everyone who works on the farm can contribute to. We will now review what these three different parameters mean.

#### Cell count

The cell count indicates how many white blood cells there are in the milk. White blood cells are the body's defence. If the cow's udder has an inflammation, many white blood cells will be collected there in order to try to make the cow healthy. If there is a high cell count in the milk, this therefore indicates that the cow is not fully healthy.

A high blood cell count in the milk that is transferred to the dairy can result from the feed or water not being good, so that many cows have reacted to it with a high cell count. It may also indicate a few cows with udder problems so that there is a very high cell count in their milk.

It is very important to be attentive as to whether the milk looks normal when you are milking. Milk containing flocculation should not be delivered to the dairy. If a cow has flocculation in the milk, the cow could have mastitis. Check whether she has eaten and whether she has a fever.

#### Bacteria count

A raised bacteria count in the milk delivered to the dairy is often due to a fault in the milking facility. The washing temperature when the tank was washed or when the milking facility was washed may have been too low. The detergent may not be coming through or may have run out. Another problem may be that the milk has not been properly chilled. If you have a cow with acute mastitis, she can have raised the bacteria count in the milk, but this is more unusual.

High urea content in the milk indicates that there is too much protein in the feed.

Milk with flocculation must not end up in the tank.

Inspect the washing equipment regularly.



## Spores

The spores that are analysed in milk are clostridia and *Bacillus cereus*. These are bacteria that produce spores. They spoil the milk and mean that the milk is not such a good raw material for the dairy. Clostridium spores are produced in silage where it has been stored with soil and the silage process has not functioned correctly. The spores come out from the cow with the manure. In this way they end up on the teats, and when you later milk the cow the spores get into the milking machine. *Bacillus cereus* is a soil bacterium that ends up on the udder when the cow grazes. To reduce the risk of spores, it is important that the teats are clean when the milking machine is put on. The teats should be cleaned with both wet and dry paper. If the teats are dry and chapped, the spores stick more easily, so ensure that the teats are soft and smooth.



Clean the teats properly before milking.

## Grazing

During the summer, cows in Sweden must go out to pasture, according to the law. To be considered to be out at pasture, the cows should be out grazing every day and should have access to the pasture enclosure for at least six hours a day during the pasture period.

The length of the pasture period is determined by the region in which the farm is located, from two months in the north of Sweden to four months in the southern parts of the country. The pasture period can be continuous or divided into shorter periods, but if a divided pasture period is used a pasture plan must be drawn up to meet legislative requirements.

For organic farms linked to KRAV, the cows must have access to pasture for at least 12.5 hours a day during the pasture period both before and after the actual pasture period.



## Suggestions for further reading

Kosignaler, Jan Hulsen

Naturbrukets husdjur Part 1 and Part 2, Josefine Lärn-Nilsson et al.  
Ed. Åsa Wennström

Mjölkkor, Christer Bergsten et al.  
Ed. Agneta Engström and Britt-Marie Jafner

Husdjur – ursprung, biologi och avel, Göran Björnhag et al.  
Ed. Göran Björnhag

Bete – Praktiska lösningar och management, Svensk Mjölk.  
Ed. Jeanette Belin



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