



CATTLE: MILKING and CALVING

Milking

Keeping dairy cows is a decision for milk production. The obtained product needs to be safe for human consumption. But milk is a highly perishable liquid. Because bacteria develop very fast in it and can multiply into millions within a few hours, milk has to be protected from contamination from milking to storage.

The milking place

- Provide clean water.
- Provide a cement floor; it is easier to clean.
- Water must drain easily and away from the shed.
- Provide a clean feed trough and a water trough.
- Clean the milking place after every milking.

Pre-milking

It is not possible to obtain clean milk from a dirty udder. Every milking starts with washing your hands and udder.

- Restrain the cow and wash udder, teats and flanks of the animal with clean and preferably warm water.
- Bring the calf to the cow now if she needs it for stimulation of milk letdown. If necessary, let the calf suckle each teat for a few seconds. Then let someone keep the calf at some distance. Wipe the teats with a clean wet cloth.
- Dry the teats well with a clean dry cloth and apply suitable milking salve on each teat.
- Make the first draw of each teat into a strip cup (see text and picture below) to check for mastitis and other abnormalities. Dispose of the milk in the strip cup.
- Always milk sick animals last to avoid that bacteria from your hands and from milking tools are transmitted to healthy cows (see also box on the next page).

Milking

- Milking must always be done at the same times.
- Milk in a quiet atmosphere. Excited animals will hold their milk back.
- Milking should be complete within 8-10 minutes
- Incomplete milking leads to decreasing milk production. The best way to avoid this: let the calf suckle after milking!
- Use a teat dip for disinfection or let the calf suckle after milking.



Milk handling after milking

- After milking, sieve the milk into clean containers and through a strainer or muslin cloth to remove solid particles that may have fallen inside during milking.
- Disinfect, wash and dry the filter cloth after use.
- When transferring milk between containers, pour the milk instead of scooping as scooping may introduce spoilage bacteria.
- Measure and record the milk volume per cow.
- Cover the milk to avoid contamination.

Storage of milk

- Store the milk in a cool and clean place.
- Never store any chemicals in the same room as milk!
- Deliver the milk to the market as soon as possible. If milk is not cooled for more than 4 hours, bacteria multiply very quickly and the milk goes bad.

Keep dairy cows clean!

Milk inside a healthy cow's udder is free from any bacteria. Contamination happens only outside the udder.

The first step to keep milk clean is keeping the animals clean. The cow's bedding should always be dry and needs to be changed or a new layer added as soon as it is soiled.

Keeping the cattle unit dry and clean also prevents diseases like mastitis and foot problems and reduces infestation with all kinds of bacteria and internal parasites.

This means that you will spend less money on the veterinary!

Use a strip cup

A strip-cup is a small metal or plastic container. A disc of fine gauze or a shiny black plate sits inside. The gauze allows milk to pass through, but flakes and clots are held back. The black plate shows clumps and discolorations as well as other abnormalities in milk. These are typical signs of some kind of infection.



After milking, wash all utensils

- After every milking, first rinse all utensils with cold and clean water.
- Scrub with a brush using hot water mixed with a soap or detergent specially designed to clean and disinfect milk-handling equipment.
- In the end, rinse all utensils with cold water and place them upside down on a rack to dry.
- Store all utensils in a safe, dry, clean and well ventilated place.

Milking of sick animals

- If a cow is infected with mastitis, tuberculosis or brucellosis, these bacteria can pass into the milk.
- People drinking milk from infected animals have a high risk of getting infected themselves. Brucellosis and TB especially take a long time to cure!
- Milk from infected animals must never be consumed, nor sold, nor mixed into the milk of healthy animals, but has to be thrown away.
- Cows with mastitis should be suckled by their calves.

Antibiotics and milking

Also antibiotics are passed into the milk. If a cow has been treated with antibiotics because of an infection, she must be milked as usual. However, the milk may not be consumed or sold before at least seven days have passed after the last dose of antibiotics was given to the animal.

Containers

Containers are a major cause of milk contamination at the farm level. Use seamless containers preferably of aluminium or stainless steel.

Always use clean metal containers when dealing with milk. Milk will deteriorate quickly when the containers used for milking are not washed with hot and clean water and detergents after every use.

Plastic jerry cans are problematic when used for milk storage and transport. Because of their small opening, it is impossible to clean them properly. Continued use of the same jerry can for milk storage and transport leads to accumulation of bacteria which cannot be washed out as the milk fat sticks to the plastic. When a container has a bad smell even after washing, it must not be used for milk storage.

Feeding the dairy cow

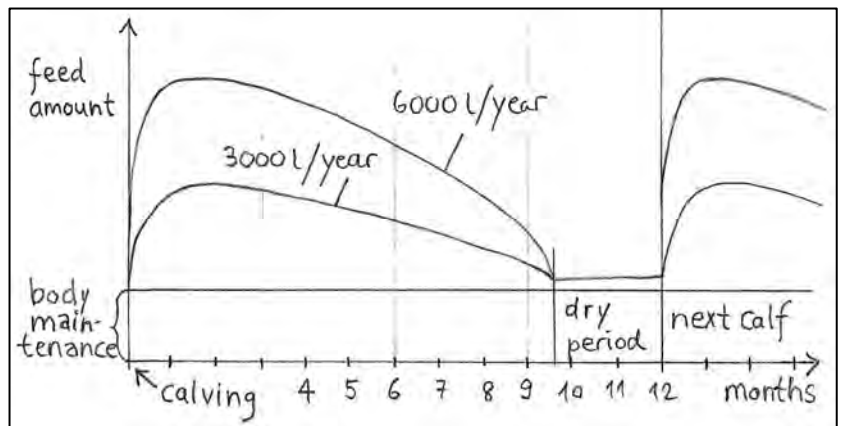
General rules for fodder production and feeding of cattle have been outlined in the leaflets No 11, 12 and 15. But the milk production of a dairy cow shows a typical development over time. Every dairy farmer should be familiar with it. After calving, milk production rises very steeply with a peak during the second month. Then milk production declines slowly until the cow is dried off. In each of these periods the dairy cow needs to be fed differently.

Feed requirements between two calvings

The upper line corresponds to a cow with high milk production, the lower line to a cow which produces about half this amount of milk.

The straight line marks the constant amount of feed intake which is necessary just for body maintenance of the cow. You can see that at the peak of milk production, the high yielding dairy cow will eat up to four times the amount of feeds that she would need just to sustain herself!

You can also see that after calving a cow's feed requirement increases from the lowest to the highest level within a very short time.



Feeding during early lactation

During the first three months, milk production is at its peak. Immediately after calving, a high yielding dairy cow is not able to eat enough fodder for her rather unnaturally high milk production. She therefore mobilizes her body reserves and loses weight until she has become used to eating large amounts of fodder. Ketosis, and milk fever due to sudden high calcium requirements, are therefore common diseases of dairy breeds during early lactation.

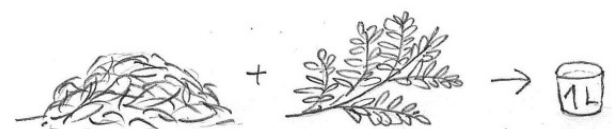
In this phase it is important to provide as many nutrients as possible in a concentrated manner - to all cows. Young quality roughage rich in energy and proteins, mineral salts, concentrates and constant access to water are a must. If a cow is not fed according to her requirement in this phase, her milk production will also be low later in the lactation, even if you improve the feed supply after some time.

Feed the cow with leguminous forages such as lucerne, desmodium, calliandra or leucaena. Mix them with grass at a ratio of one part fresh legumes to three parts fresh grass (or one part fresh legumes to one part hay).

Concentrates may be given at a high rate during these first three months (up to 6 kg per day). It is recommended

to feed concentrates only during this time, and during the last two to three weeks before calving. Remember to always feed concentrates mixed with roughage and in several rates distributed over the whole day. Do not feed more than 2 kg of concentrates at once.

How much milk can you get from different feeds?



For every additional liter of milk, a cow needs 2 to 2.5 kg of good fresh grass and 0.5 to 0.75 kg of fresh legume fodder. This corresponds to 0.5 kg of good hay and 0.5 to 0.75 kg of fresh legumes in the dry season.



One liter of milk should also be obtained from half a kilogram of a good dairy concentrate.



Remember: for every liter of milk, your cow needs about 1.5 liters of clean water.

Feeding during mid to late lactation

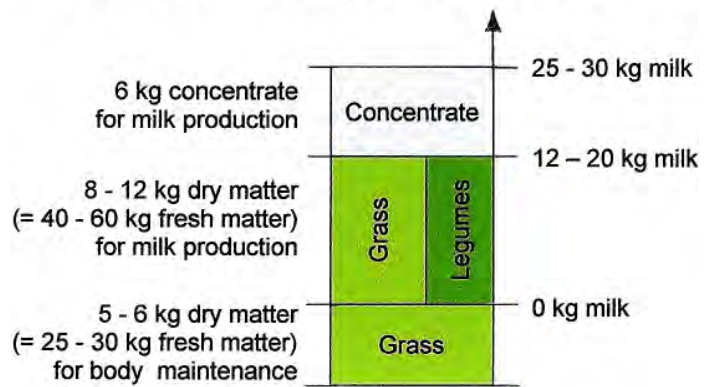
After three months, the milk yield drops gradually.

Feed the cow as much good quality forage and legumes as she will eat. From this feed alone and depending on fodder quality, between 12 and up to 20 liters of milk can be produced.

You may now stop feeding concentrates altogether. Supplement them only if necessary and according to the milk yield. For every kilogram of concentrate fed, 1.5 to 2 additional liters of milk can be expected. Remember that the share of concentrates in the ration should be as low as possible!

While milk production drops further, you may introduce low quality feeds like crop residues into the diet. Start with only feeding small quantities and gradually increase their share. When the cow is dried off, they may actually form a large part of her ration for several weeks.

Feeds, feed amounts and expected milk amounts



Dry matter: what remains in forage when all water is removed
The first 25 - 30 kg of fresh roughage you feed to a cow of 450 kg weight will maintain her body. From the next 40 - 60 kg, 12 to 20 kg of milk is produced. Above this level, you may support higher milk production with concentrates.

Mazo: a high risk of poisoning for animals and people

A common practice among farmers is to sort maize after harvesting and to preserve rotten maize as animal feed (mazo). Under humid conditions, mould grows on it and may produce toxins. A frequent type of toxin that occurs in rotten maize is Aflatoxin, a highly dangerous poison for animals as well as for people. Animals fed on rotten maize containing toxins store the poison in the liver, and small amounts are also transferred to the milk. When people consume this milk, the toxins are retained in the human liver. Their accumulation can lead to serious diseases like liver and pancreatic cancers.



Feeding the dry cow

The feed requirements of dry cows are drastically reduced compared to those of lactating cows. The cow now requires nutrients mainly to maintain her body and to support the growth of the unborn calf. The milk-producing cells of the udder may now recover and prepare for the next lactation. These two months must ensure that the cow is in good condition at the time of calving and that she gives birth to a healthy calf.

60 days to 3-4 weeks before calving

- Stop milking the cow seven to eight weeks before the next calf is expected.
- For at least two weeks after you stopped milking, no concentrates should be fed.
- After this, the feeding regime depends on the body condition of the cow. A thin cow should now gain some weight and should be fed with good quality feeds. Low quality crop residues should be supplemented with legumes and some concentrates.
- All cows need access to a good quality mineral mixture during this time.

Important: The dry cow should not gain excessive body weight. Fat cows are more likely to have problems at calving time. Especially ketosis is a high risk.

Preparation for next lactation (3-4 weeks before calving)

It is essential to prepare the cow for the next lactation. This will avoid serious and common health problems at calving (milk fever) and in early lactation (ketosis). It will also enable the cow to produce as much milk as it is capable of during the coming lactation. First of all, the cow's stomach needs to be prepared for the high fodder amount and the high rates of concentrates needed after calving. During the last two weeks of pregnancy, the cow's appetite will be reduced, so you have to support her feed intake with high quality forage.

- In addition to the basal forage, resume feeding concentrates 3 to 4 weeks before calving in increasing amounts (see schedule below). This is called "steaming up". By the time of calving the cow should be getting 4 kg concentrates per day.
- Reduce mineral supplements to a minimum 3 to 4 weeks before calving is due. This will stimulate the body's mechanism for drawing on calcium stores in the bones and can help avoid milk fever in early lactation.
- Resume feeding minerals one week before calving is due.

Possible steaming-up schedule:

- 1.0 kg dairy meal per day 4 weeks before calving
- 2.0 kg dairy meal per day 3 weeks before calving
- 3.0 kg dairy meal per day 2 weeks before calving
- 4.0 kg dairy meal per day 1 week before calving

After calving, gradually increase the amount of dairy meal further if necessary.



Calving and calf rearing

It pays off to take good care of young stock. Bull calves can be sold for meat and heifer calves are the future dairy cows. The first weeks and months of a calf are crucial for a healthy development and have a large influence on disease resistance, fertility and milk production later in life.

Calving

Calving will occur 280 ± 10 days from last service. Signs that calving is immediate are a rigid udder, discharge of clear mucus from the vulva, loss of appetite, restlessness, and softening of the tissue on both sides of the tail. The natural behaviour of cows is to give birth in a protected place apart from the herd, to leave the calf there and to visit it frequently for feeding. After three days, the calf will want to follow its mother and join the herd.

- Bring the cow to a separate, clean, dry and spacious pen shortly before calving.
- Observe calving heifers well as they are more likely to have problems.
- Clean and disinfect your hands and the hind quarters.
- After the calf is born let the cow lick it. She should remove all mucus from nostrils, mouth and eyes.
- Cut and tie the naval cord and disinfect it with iodine.
- The afterbirth (placenta) should come out within 12 hours after calving.
- **Important:** in case of a difficult calving or retained placenta, call a veterinary doctor.

Calf handling and housing

Calves are especially delicate and require careful handling, as they are very susceptible to diseases. They should be sheltered in a dry environment which protects them from coldness, rain and hot sun. This prevents calf pneumonia and other infections. Frequent cleaning and thick dry bedding are essential to prevent diarrhoea.

Like all other animals, calves need adequate space for movement. Provide at least 2 square meters for each calf in a pen, and regular access to an outside area.

Suckling or bucket-feeding?

Calves can either be fed naturally, by allowing them to suckle from their mothers, or from a bucket. In most cases, natural suckling is recommended for small-scale dairy farmers for the following reasons:

- Suckling is easiest to manage and requires no labour and no feeding equipment. Bucket feeding is labour intensive and always a health risk for the calf.
- The calf will develop much better; health problems like scours are rare and mortality rate is lower.
- Milk is at the correct temperature and there is no chance of contamination through unclean equipment.
- A well fed dairy cow produces two to six times more milk than her calf requires.
- **Cows produce more milk when they are suckled in addition to being milked than when they are milked only, because of better stimulation!**

Cows with indigenous blood sometimes require the presence of the calf for milk letdown. In this case, let the calf suckle each teat for a few seconds before milking the cow. A simple way to feed the calf is to leave two teats un milked (during the first 2 months), and later one teat. Leave the calf with the mother for around two hours and then remove it until after the next milking.



The first week

Encourage and help the calf to suckle immediately after birth. The milk that cows produce for the first days after calving, the colostrum, is different from normal milk. It is easily digestible and rich in nutrients, vitamins and minerals. But most importantly: it contains antibodies which immunize the calf and protect it against diseases. Immunization is most effective during the first few hours!

Without colostrum, a calf will grow poorly and be prone to diseases throughout its life, or it may even die within short time. A calf should drink 4 – 8 litres of colostrum within the first 12 hours. You may milk some colostrum and hand-feed it to the calf, if you can do it hygienically! Colostrum also assists the calf to pass its first faeces.

Leave the cow together with the calf for 3 days. Alternatively, leave them together for at least 6 hours, and then allow the cow to visit her calf about every one to three hours. For the rest of the first week, allow the calf to suckle 3 to 4 times a day. This will also help to prevent milk fever in the cow.

Second week to weaning

- Begin to offer good, fresh fodder. Hay is ideal. This allows the rumen to develop, and the calf gets used to digesting fibrous feeds. Sweet potato vines are one of the best fresh forages for calves, as they are easy to digest and palatable, and have a high protein content.
- From the second week, concentrates can also gradually be introduced, ideally calf pellets.
- Provide clean drinking water at all times.
- Also provide a mineral lick.
- Calves should be left to graze where good pastures are available.

Weaning

A calf should have increased its weight at least by $2 \frac{1}{2}$ times its birth weight before it is weaned. If you provide good forage and concentrates from the second week on, weaning after about 4 months will be easier. Beef breed calves are left with their mothers as long as possible to ensure a high growth rate.

Managing young animals and heifers

Growing animals have high nutrient requirements. Continue feeding good quality fodder as much as the calf will eat. In addition, feed about one kilogram of pencils or a good quality dairy meal per day. Provide access to water and a mineral lick at all times.

By six months of age, good quality fodder is sufficient to meet a heifer's needs. If only poor quality fodder is available, however, continue to feed dairy meal.

Note: Well-fed, healthy heifers are ready for mating earlier and will also produce more milk after calving!