

Birth of the calf

Most cows can calve and produce a healthy calf without assistance from the owner or herdsman. Cows should calve in a clean, well-grassed, sheltered paddock near the house or dairy where she can be observed in case calving difficulties develop. This area should not be overstocked and paddocks should be rotated and spelled to reduce disease build up. Prior to calving the cow must be adequately fed to meet her needs and those of her developing foetus, to reduce risks of metabolic diseases - milk fever or ketosis and difficulties at calving.

Calving time

You can accurately predict the time of calving by keeping good records. Good reproduction records should include:

- date a cow previously calved
- date(s) she was serviced
- sire used and method (artificial insemination or bull)
- expected calving date.

Average gestation for a cow is 283 days. Her expected calving date (ECD) can be calculated by adding 7 days and subtracting 3 months from the most recent mating date. Thus a cow mated on 1 July 2009 will be due to calve about 8 April 2010.

The birth process

The signs of parturition (birth process) are:

- The udder of the cow enlarges 1 to 2 weeks before calving. This is not a reliable sign in heifers as their udders begin to develop half way through pregnancy.
- Colostrum is produced (a creamy or pink secretion from the udder).
- Pelvic ligaments relax.
- Vulva swells (up to six times its normal size) and becomes flabby. White, stringy mucous is secreted from the vagina.

The birth process can be divided into three stages.

1. The muscles of the wall of the uterus begin to contract. These contractions occur about every 15 minutes and last from 15 to 30 seconds. This stage may last 3 to 4 hours. The cow will become restless, stand alone, and occasionally strain weakly. The foetal membranes enter the vagina and pass on to the vulva where they appear as the 'waterbag'. This waterbag soon ruptures. By this time, the head and forelimbs of the calf enter the cervix; dilating it so that the cavity of the uterus becomes continuous with the vagina.
2. During this second stage, the calf enters the vagina causing stronger contractions from the diaphragm, abdominal muscles and uterus. The cow may stand or lie down and strain for 10 to 15 seconds every 2 minutes. When the calf's feet reach the vulva, a second membrane ruptures which lubricates the passage for the head and body. As the forelimbs appear the cow may rest before expelling the calf completely.
3. This final stage begins immediately after the calf has been expelled. The uterus contracts rapidly which causes the afterbirth to separate from the uterus. The contractions force the membranes through the cervix into the vagina and eventually through the vulva. The afterbirth (placental membranes) is usually expelled shortly after the calf is born but can take several days. Cows with retained placenta may require follow up veterinary attention.

Presentation, position and posture

Most calves at birth are in anterior presentation, dorsal position and normal posture (Figure 1) that is, the forefeet first, one foot just preceding the other, the head is lying on the knees, and the backbone is lying against the backbone of the mother.

Presentation relates to the region of the body that is first presented to the pelvic inlet. Four types are possible:

1. Anterior presentation: the front portion of the calf (head, forelimbs or chest) is directed towards the pelvic inlet (Figure 1).
2. Posterior presentation: the rear portion of the calf is directed towards the pelvic inlet. Sometimes calves are born naturally in this way, but more usually some assistance is necessary. If the calf is in the dorsal (upright) position and its posture is normal, with the hind legs extended to pass through the vagina, it can be safely delivered, occasionally with some traction. The presentation shown in Figure 2 with legs forward is a dystocia, the calf cannot be born naturally until the hind legs are extended to the rear. This requires manual assistance by an experienced person or veterinarian.
3. Transverse presentation: the calf is placed crosswise to the pelvic inlet.
4. Vertical presentation: the calf is vertically placed over the pelvic inlet. In the last two presentations the long axis of the calf is at right angles to that of the mother. Transverse and vertical presentations rarely occur. The calf must be manipulated into a suitable position to present for birth. Veterinary assistance or surgery (caesarian operation) may be necessary.

'Position' relates to the surface of the uterus to which the backbone of the calf is joined. The three positions are: dorsal (calf upright) as in Figures 1 and 2, ventral (calf upside-down) (Figure 3), and the lateral (calf on its side).

'Posture' describes the position of the individual moving parts of the foetus, for example, head and limbs, in relation to its body. A calf may be in anterior presentation but with one or both forelegs folded back or the head twisted to prevent normal birth until manipulated into correct birthing position.

Dystocia

Dystocia is the term used when the cow is unable to deliver a calf by herself.

Some causes of dystocia are:

- Abnormalities of presentation, position and posture.
- The foetus is a normal size but too large in relation to the size of the cow's pelvis.
- Oversized foetus. The cow's pelvis is a normal size but the calf is over-developed.
- Torsion of the uterus. The uterus is twisted on its long axis (the twist can be felt in the wall of the vagina, which is reduced in size).
- Uterine inertia, which occurs when the uterine muscles do not contract as vigorously as they should; the cervix fails to open to its fullest extent and the calf cannot be expelled.
- Monstrosities. Many types of developmental malformations of the foetus can occur.

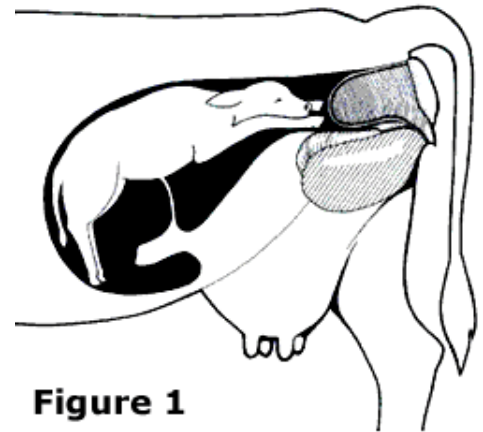


Figure 1

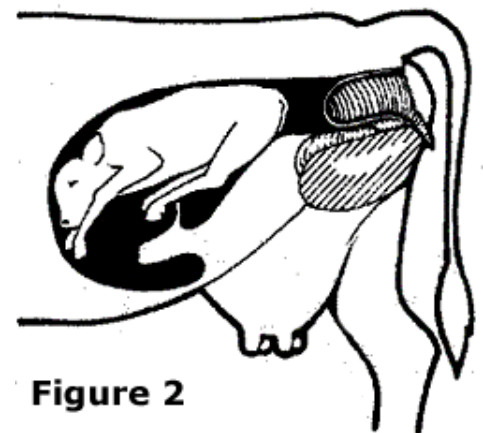


Figure 2

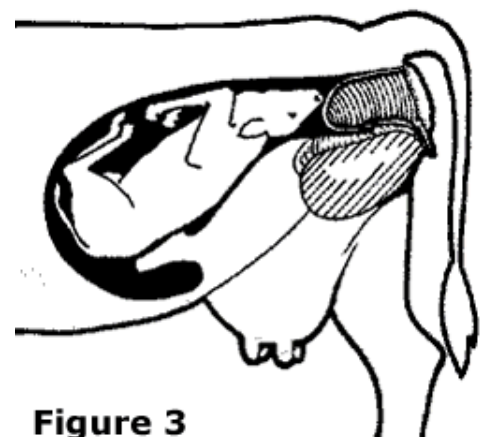


Figure 3

Observation and examination

A cow's average pregnancy is 283 days but ranges from 273 to 291 days. Cows should be closely observed around this time. Provided the cow behaves normally there is no need for concern if she is a week (or even longer) overdue. Once parturition has begun, observe closely at a distance. If this stage continues for longer than 24 hours the cow should be examined.

Once the cow enters the second stage of labour, abnormalities can be recognised. Be aware that heifers often take longer to calve so delay examinations. If cows have been straining (in labour) for 4 hours without making progress, investigation should be made.

The longer the cow is in labour, the less likely she is able to produce a live calf. Once the hind or forelimbs of the calf reach the vulva the umbilical cord is probably pressed between the calf and cow's pelvis or even ruptured. When this occurs the calf begins breathing. If the calf is normally presented and the muzzle is close to the vulva, the calf should be able to breathe. If it is in the posterior presentation it will soon die. If the operator is inexperienced and the calf is not presented and positioned normally, a veterinary surgeon should be contacted.

The first 2 to 3 weeks after birth are the most critical. Care for the calf should begin from birth by first disinfecting the umbilical (navel) cord with 20% iodine solution. This cord is a source of direct entry for infective bacteria which can cause death. Local infection at the navel ('navel ill') can spread to the liver, bladder, joints (causing arthritis- 'joint ill') and lungs (resulting in pneumonia).

Giving the calf a start

Colostrum

Calves must receive at least 2 L of colostrum (first milk) within 6 hours of birth. Leave the calf with its mother for the first 24 hours and make sure it has suckled successfully. Colostrum contains less sugar (lactose), but more protein, vitamins and minerals than normal milk (Table 1). It also contains immunoglobulins (immunological proteins - maternal antibodies to disease), which protect the calf against disease in its early life. Secretion of colostrum ceases at birth and due to hormone changes at calving and degradation of specific proteins, levels of these immunoglobulins present in colostrum reduce rapidly after calving. These antibodies can initially be absorbed from the calf's stomach directly into the bloodstream, but once the calf is 36 hours old the gut linings become less permeable so that large molecules such as these are no longer absorbed. Health and survival of the calf is dependent on how quickly and how much colostrum it drinks in its first few hours of life.

The practice of milking cows before calving is discouraged for the sake of calf health. After two milkings there are not sufficient antibodies in the milk to protect the calf from disease. If it is essential to milk a cow before calving to relieve udder congestion, take only a small amount. Any milk removed before calving should be frozen and kept for use by the newborn calf. An average of 5 to 10% of calves die from sickness (especially scours) mainly during the first few weeks of life. Many of these deaths could be prevented by adequate, early feeding of colostrum. Colostrum can be frozen and stored for emergency use for newborn calves unable to be suckled by their mother.

Colostrum substitute for emergency use

In emergency, colostrum substitutes can be made, but are nutritionally not as good as cow's colostrum and lack the essential immunoglobulins. A basic recipe for artificial colostrum :

- 1 egg beaten
- 300 mL water
- 2 ml (½ teaspoon) castor oil
- 600 mL whole milk

Feed this mixture three times per day for the first three days of life. If the calf has not received any maternal colostrum, it will be much more difficult to rear and will require a high level of care.

Milk composition

Milk composition is influenced by breed, cow differences (genetic), stage of lactation, and nutrition and environment (phenotypic effects). Average values for milk constituents in colostrum and whole milk for Holstein-Friesian are given in Table 1.

Constituents	Colostrum %	Normal milk %
Casein	4.8	2.6
Albumin	1.9	0.6
Globulin	7.0	0.1
Total protein	14.0	3.0-3.5
Fat	6.7	3.5-4.0
Lactose	2.7	4.9
Ash (minerals)	1.1	0.75
Total solids	23	12.6
Water	77	87.4

Table 1. Average composition of colostrum and normal milk of Holstein-Friesian cows

Removal from the cow

- To make bucket-feeding easier and for efficient dairy management the calf should be taken from its mother after 24 hours and before 4 days of age.
- The young calf should be kept warm and dry in a clean, draught-free environment.
- Within 12 hours of removal from its mother the calf should be able to drink by itself.
- Patience, cleanliness and warm fresh milk (or substitute) are all needed to encourage the calf to drink.

Source: Queensland Department of Agriculture, Fisheries and Forestry; 2009