

REPRODUCTION AND BREEDING MANAGEMENT

Fertility is a factor which has a great effect on the economy of dairy farming and is to a large extent influenced by management. Better reproduction and breeding management improves the herd's economic results in two ways:

- Higher total life-time milk production of the cows.
- Higher number of calves per year.

Factors that influence a dairy animal's reproduction

a. Heat detection

Most cows show signs of heat better during the cooler periods of the day. Good detection results are obtained when the cows are observed three times a day, preferably:

- In the morning, before and after milking.
- In the afternoon, before and after milking.
- In the evening around 10pm.

An optimal calving interval can be achieved only if the farmer maintains a healthy, properly fed herd in which each mating is carefully planned. The farmer must know how to detect when an animal is on heat. Below are some of the signs of heat in dairy animals.

i. Early heat period

Early heat starts with the development of the ovary. This period lasts between 6 to 24 hours. Signs of early heat include:

- Cow does not stand when mounted.
- Attempts to mount other cows.
- Seeking company of other cows.
- Restlessness, extra attentiveness.
- A wet, slightly swollen vulva.
- Bellowing at, and sniffing, other cows.



Figure 1: Cow in early heat.

ii. Standing heat period

Early heat becomes standing heat. The phase lasts from 6 to 18 hours. The signs include:

- Cow standing while being mounted.
- Mounting other cows.
- Frequent bellowing and restlessness.
- Attentiveness, 'ear play'.
- Bending backbone, loin part downward and sacrum upward.
- Regularly sniffing other cows' reproductive organs.
- Red, swollen vulva. Clear mucus discharge.
- Ruffled tailhead from mounting.
- Diminished appetite and lower milk output. This is another important aspect of keeping milk records.

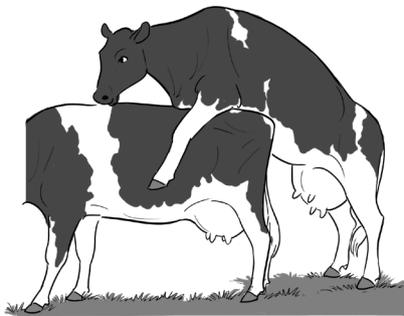


Figure 2: Cows in standing heat.

iii. Late heat period

After the period of standing heat some cows continue to show behavioral signs of heat. This is called the late heat period and can last for 12 to 24 hours. The signs include:

- Cow not standing when mounted.
- Cow is sniffed by other cows and sometimes sniffs other cows.
- Clear mucus discharge from vulva.
- Dry mucus on tail.

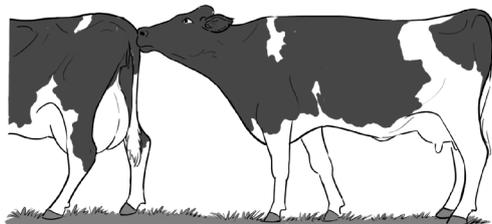
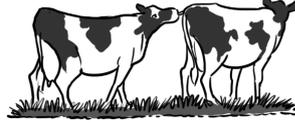


Figure 3: Cows in late heat.

About two days after the end of heat, cows may show a bloody mucus discharge from the vulva. The next heat period should then occur about 19 days after the bloody discharge. Book keeping is key.

b. Artificial insemination (inseminating at the right time)

Artificial Insemination (AI) must be performed at the right time, ideally at the end of the standing heat period or at the start of the late heat period. Do not inseminate when the cow is still in early heat.

POOR	FAIR	GOOD	EXCELLENT TIME TO BREED		GOOD	FAIR	
	0 hrs	5hrs	10hrs	15hrs	20hrs	25hrs	30hrs
							
Coming into oestrus	Stands to be mounted		Going out of oestrus				
First observation of standing oestrus							

Source: Adas Dairy Herd Fertility

Figure 4: Inseminating at the right time.

AM-PM rule

All cows that are in heat in the morning should be inseminated later the same day. When heat is first seen in the afternoon or evening, insemination can safely be postponed until the next morning. Cows that are still in heat the next morning, should be re-inseminated.

Use good quality insemination

- Using an experienced AI technician, and good quality semen, will provide the best pregnancy rate.
- Monitor and evaluate the results of the AI technicians, to improve pregnancy results.
- Store semen in a regularly tested storage tank for optimal pregnancy results.

Causes of AI failure

i. Human Factors: Human causes could either be attributed to the farmer or the inseminator.

The farmer can contribute to AI failure through:

- Failure to keep records like date of last calving, date of last heat. This increases the chances of missing to observe the next cycles due to a lack of anticipation.
- Inaccurate reporting of heat and when the cow started showing signs of heat. This may lead the inseminator to mistiming insemination.

ii. An inseminator can cause failure by:

- Using dirty equipment – pistolette, socks, scissors, paper and towels.
- Rolling semen between arms, under arm pit, exposing it to low or high temperature.
- Improper handling of semen - lack of liquid nitrogen in container.

- Exposure of semen straws to sunlight.
- Failure to deposit semen at target area.
- Injury of reproductive tract - uterus.

iii. Animal factors that cause AI failure include:

- Failure of the cow to show clear signs of heat due to either; an abnormal reproductive tract (difficult cervix), an infected reproductive tract (vagina, cervix, uterine horns) or hormonal imbalance (FSH/LH balance).
- Poor nutrition i.e. imbalance or inadequacy in energy, proteins, minerals and vitamins.

Factors to consider prior to using artificial insemination

- **Staffing for AI Service:** Inseminators must be well trained to do their job effectively.
- **Heat Detection:** Timely and reliable detection is necessary.
- **Recording:** Records on conception rate per bull, per inseminator and per area.
- **Cost:** The farmer should be able to meet the cost of AI services.

c. Repeat breeders

Not all inseminations result in a successful pregnancy. Sometimes a cow does not conceive, even after several inseminations. Cows can also conceive, but the embryo or foetus may die.

- It is vital that heat detection continues after a cow has been inseminated. Continue to observe the cow every 3 and 6 weeks after insemination. If the cow comes back in heat (repeats), she should be inseminated again to avoid losing time and money.
- Cows without any signs of heat should be pregnancy-tested by a veterinarian about 6-8 weeks after the last insemination in order to be absolutely certain that the cow is in calf. This may prevent disappointments.

If a cow is not pregnant after several inseminations, one should consider culling it. If there are more cows with such problems, contact a veterinarian.

d. Nutrition

- Good nutrition means sufficient energy, proteins, minerals and vitamins. This will enhance cows' reproductive performance.
- Cows that are (too) fat at calving seem more likely to get problems at calving and to develop insufficient dry matter intake in early lactation.
- Cows should continuously have access to good quality minerals of the required composition.
- Feeding rations with sufficient and good quality roughage, and formulated for correct levels of protein, energy, minerals, vitamins and trace elements will normally result in a short period between calving and first heat.

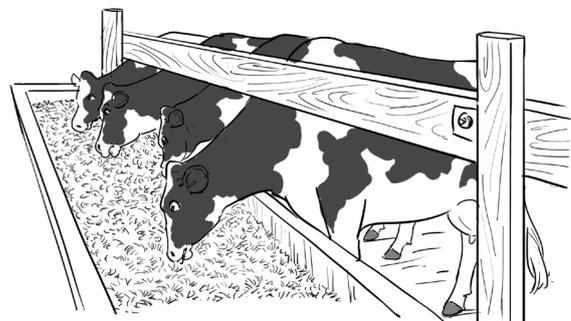


Figure 5: Nutrition for dairy cows.

e. Good book keeping

Good record keeping helps in heat detection and identification of any challenges on the farm. Good systems for proper fertility recording are:

- A cow calendar.
- A herd fertility and health monitor chart.
- Individual cow records.

All data relating to the cow's reproductive status should be recorded, i.e. calving date, ease of calving, date of heat, insemination date, name of sire, fertility disorders and their treatment, etc. These records also indicate when cows can be expected to be in heat, which cows need special attention and which cows should be inseminated when in heat.

For instance, when a cow is seen to be in heat, this should be marked on the calendar or chart for a close observation of the cow three weeks later.

f. Intervals from calving to first insemination

In order to maintain an average calving interval of one year, the average cow should be pregnant 90 days after calving. Therefore, cows should generally be inseminated for the first time between 50 and 75 days after calving. This usually means the second or third heat after calving.

- To achieve the best pregnancy results, a cow must be in perfect physical condition. This means that a cow must be fed according to her nutritional needs and must not have any health problems.
- For high-yielding cows or cows with fertility problems due to a retained placenta or endometritis it may be advisable to postpone the first insemination for a while.

Cows which do not show heat within about 60 days after calving should be checked by a veterinarian.

g. Hygiene

Good hygiene, especially around calving is essential.

- Clean the cow's vulva, birth-ropes and your hands before the calving process.
- Having a clean, disinfected pen for the cow to calve will normally be sufficient.

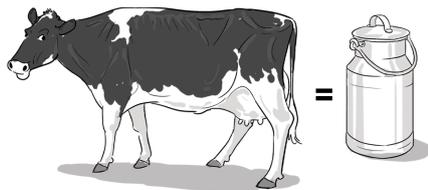
If hygiene is neglected, uterine inflammation (endometritis) may occur. This affects the cow's subsequent fertility and it will take longer before the uterus is ready for another pregnancy.

- Practice frequent heat detection, at least three times a day and at least 20 minutes each time.
- Record all data relating to the cow's reproductive status, predict heat by making use of these records, and observe the cow closely at those dates.
- Cows that are seen in heat and are eligible for insemination and should be inseminated about 10-15hrs later.
- Most cows should be inseminated for the first time 50-75 days after calving, which is usually the second or third heat.
- Cows which have been inseminated should be checked for heat at intervals of 3 and 6 weeks after the last insemination.

- Pregnancy diagnosis 6-8 weeks after the last insemination by a veterinarian will give absolute certainty about the cow being in calf.
- Inseminations should be carried out by a trained AI technician.
- Aim at the right body condition at calving.
- Especially in early lactation, cows should be fed well-balanced rations of high quality roughage and concentrates with the required minerals available at all times.
- Maintain high hygienic conditions at calving.

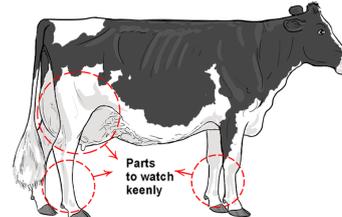
Important economic traits in dairy cattle

Production traits



Choose cows that produce a high volume of milk.

Type / conformation traits



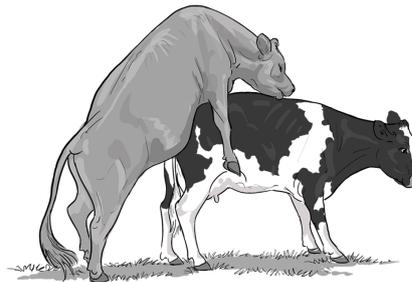
Pay attention to a cow's udder, strength of legs, and sturdiness of its stature.

Fertility traits



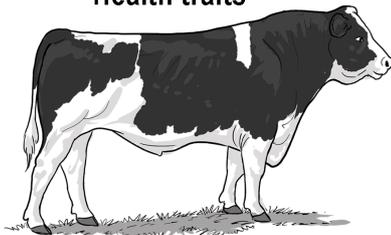
Choose animals with a good conception rate.

Longevity traits



Choose heifers or semen from families with a history of maintaining high production across many lactations.

Health traits



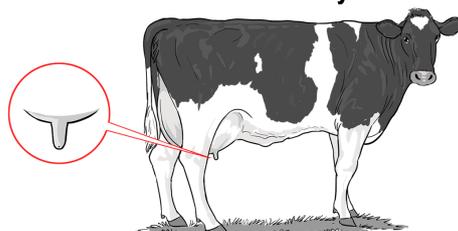
Choose disease-resistant animals whose milk has a low somatic cell count.

Calving ease traits



A wide pelvic diameter and a gentle slope from pin to hip bone make calving easier.

Workability



Choose docile animals with the right teat size, teat shape and teat opening.

Figure 6: Important economic traits in dairy cattle.