



CATTLE: BREEDING

Breeds and breeding

Domestic animal breeds are the result of thousands and hundreds of years of selection through man. Only the best animals were used for further breeding. In this process, not only exterior characteristics, but also properties like the potential for milk or meat production and adaptation to a certain environment and climate were optimized.

Pure Breeds

"Pure breed" means that the typical characteristics of a breed, like colour, size, shape, and productivity in terms of milk and meat production are handed down from one generation to the next.

During the past decades, breeds were usually optimized for either milk (Friesian, Jersey) or meat production (Charolais, Boran), as it is genetically impossible to have excellent yields for both milk and meat at the same time. Dairy breeds are usually of light, fine build, while beef breeds are heavier, especially around their rear part.

Common indigenous breeds in Kenya include East African Zebu, Boran, and Sahiwal. They are tolerant of tropical conditions and diseases and can cope with times of feed scarcity. They are "late maturing" and heifers are ready for mating only in the third year.

"Exotic" breeds include Friesian, Jersey, Guernsey or Ayrshire. They were all bred in a cool temperate climate mainly for dairy production and show low resistance to high temperatures, dry climate, common diseases in tropical regions, and scarce feeds of low quality. They therefore often perform poorly under tropical conditions. Heifers are ready for mating at around one and half a year.

Improved breeds

In improved breeds, desired characteristics like higher milk yield or disease resistance have been stabilized by breeding over many generations. Their offspring can therefore be expected to show about the same characteristic traits. Improving breeds or creating a new breed from existing breeds can take decades and requires a well-organized breeding programme, high efforts and sufficient resources.

Crossbreeding

If two pure breeds are crossbred, the offspring inherits characteristics of both breeds. But the result is often insecure and coincidental. The offspring may show the positive traits of both breeds, resulting in animals which are high yielding in milk as well as disease resistant. Unfortunately, it can also be the other way round: The offspring may show the weaknesses of both breeds, and may display low milk production as well as low disease resistance. It is also insecure which characteristics the offspring of crossbred animals will have.

The hybrid effect

Crossbred animals often show increased vitality and performance. This is known as heterosis or hybrid effect. A good example is the Sahiwal - Friesian cross. It is resistant to most of the common cattle diseases and has a good milk production.

In order to maintain the hybrid vigour in the offspring of crossbred animals, a "criss-cross" breeding programme is recommended. This means that the cows are mated alternatively with a bull of the two involved breeds. A Sahiwal-Friesian cow for example would be mated with a pure Friesian bull. Her daughter would be mated with a pure Sahiwal bull and the daughter of the daughter again with a pure Friesian bull. Only the best cows are used for breeding!



Pure Holstein Friesian cow



Pure Jersey cow



Pure Boran cow



Friesian - Sahiwal cross

Artificial insemination

Artificial insemination has had a tremendous effect on improvement of breeds worldwide. The semen comes from bulls whose mothers and fathers have already performed exceptionally well. In order to guarantee high quality semen, the performance of the daughters of a dairy breed bull must be documented.

It is not possible to know whether a bull produces good cows (or bulls), if there is no recorded proof of it! Improvement of dairy cattle is not possible if the performance of cows is not documented and reported back to the breeder. This is another important reason why dairy cows in Kenya have such low milk yields.

Upgrade your dairy cows!

The lack of good quality dairy cows is a real problem for the Kenyan dairy industry. All farmers with dairy cows are asked to help improve the national herd. This is how it is done:

- Selection of good cows for breeding is done with the help of an inspector. Once a cow is identified, the farmer looks for a pedigree bull which sires cows with high milk productivity, good udder position, good pregnancy rate and easy calving.
- His cow is then registered as a “foundation cow” with the Kenya Stud Book (KSB) and is served with semen from the selected bull.
- The first daughter of this cow is registered as “intermediate stock” as soon as she is born. When she comes on heat, she is served with semen from a different pedigree bull of the same breed.
- The first granddaughter, the “appendix”, is also registered with the KSB and is served with semen from a high grade pedigree bull of the same breed.
- Finally, the first great-granddaughter is now registered as a “pedigree cow”.
- Registration includes membership at the Kenya Livestock Breeders Organisation (KLBO) and record keeping. A milk record book for daily milk production must be sent to the Dairy Recording Services of Kenya (DRSK) every month. The records also include calving intervals, number of services, and health records (treatments, vaccinations, deworming etc.).
- All upgraded animals whose records are registered with KSB fetch a higher price in the market.
- The breeder can maintain his pedigree line by continued use of semen from high quality bulls.

Avoid inbreeding - it leads to poor performance

Inbreeding is a big threat for the dairy industry. The adverse effects of inbreeding in animals are well known. Mating of close relatives results in reduced vitality, called “inbreeding depression”. Disorders, abnormalities and inherited diseases are frequent in the offspring. Survival, fertility and reproduction are highly affected.

It is therefore essential to keep records for all cows and their daughters. The first thing to avoid is mating them with a bull of a related blood line or even with their own father! Each daughter and each granddaughter have to be served with different bulls.

The opposite of the inbreeding depression is the hybrid effect (see the green box on the first page). It is commercially used for the production of hybrid crops (e.g. maize) or hybrid chicken. Deliberate inbreeding and crossing of several unrelated lines improves yields and performance. But if hybrids from the same line are crossed with each other, their offspring usually performs much worse than the parents. This is why hybrid maize should not be re-seeded.

This is important when serving your cow

- These records **must** be kept:
 - Name of the cow and date of birth
 - Names and breed of her father and her mother
 - Date of each service
 - Name and breed of the serving bull
- Use semen from high quality bulls whose potential is already known.
- Do not throw away the semen straw when your cow is served through artificial insemination! Name and code of the bull are documented on it – use this for your records.
- Using semen from known service providers such as CAIS will upgrade your cows and improve milk production, health, and growth rate of the offspring.
- Avoid using village bulls because there is a high chance that they will infect your cow with sexually transmitted diseases.



Common cattle breeds in Kenya

Main purpose	Breed	Live weight (kg)	Milk / lactation (kg)	Av. milk / day (kg)
Dairy	Friesian pure	600 – 650*	7500*	25*
	Ayrshire pure	450 – 500*	7000*	23*
	Guernsey pure	450 – 500*	6000*	20*
	Jersey pure	400 – 500*	6000*	20*
Dairy / beef	Sahiwal cross		up to 2500	7.5
Beef / dairy	Sahiwal pure	350 – 400	up to 1500	5
Beef	Boran pure	350 – 400	around 1200	5
Beef	East African Zebu	300	?	< 5

Ayrshire cow

* These live weights and milk yields are usual in Northern countries

The right time to serve a cow

Serve your cows on time!

A healthy cow should give birth every year, after about every 365 days. The most common cause of poor fertility and delayed conception is poor feeding and mineral deficiency. A poorly fed dairy cow cannot come on heat at the expected time because her body is not in a good condition for conception. Diseases associated with the animal's reproductive system may also interfere with fertility. Another reason for failed conception is that the farmer doesn't observe the cow well enough and misses the right time to serve her.

If cows are allowed to be suckled by their calf, this may also delay the first heat for some time.

The first heat after calving is usually infertile if it occurs earlier than 45 days after calving. The cow has not fully recovered from her last pregnancy and should not yet be served. But she will now come into heat about every three weeks (18 – 24 days) until she gets pregnant again.

The best time to serve a cow is between 60 to 90 days after calving. During this time, a farmer should watch his cow with close attention in order to be able to serve her at the right time.

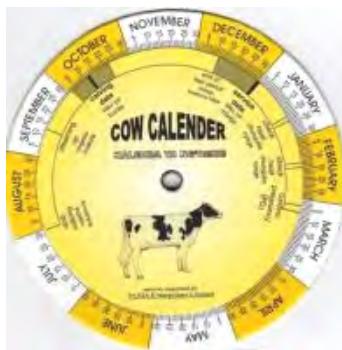
A pure bred exotic dairy heifer is ready for her first service at around 14 to 18 months. But crossbred animals are often only ready after 24 months.

The heat period is short

Observe the cow attentively during morning and evening milking. The visible heat period lasts only for about 12 hours. Often only a few of the typical heat signs may be clearly visible. When the weather is hot, for example, the cow will not be very active.

If an animal is kept alone, it is especially difficult to identify heat signs, as most of them are shown in interaction with other cows.

Bleeding from the vulva is a sign that the right time to serve the cow has already been missed and that it is too late to serve her now.



Cow calendar

A cow calendar is a very useful tool to estimate calving dates. It displays the intervals between service date, repeated heat cycles, and the calving date. It also shows when a cow should be dried and steamed up. It can be ordered from:

- CAIS (Central Artificial Insemination Station) Kenya.
Tel: 4181325/6 - Email: info@cais.co.ke
- Fuga Enterprises Limited, P.O.Box 653, Uthiru-00605, Nairobi
Tel. 0733 866 191. Price Ksh200

Other useful addresses

Kenya Stud Book (KSB): maintains records of all members of the Kenya Livestock Breeders Organisation (KLBO). Farmers' groups or individuals interested in acquiring skills on breeding can contact an expert farmer: James N. Karanja, Pokea Dairy Farm, P.O. Box 157, Njoro, 20107, Tel. 0733 555 621.

National Sahiwal Stud (breeding farm) of KARI Naivasha: offers pure-bred Sahiwal cattle for arid and semi-arid areas, and Friesian-Sahiwal crosses for milk production in all areas. The demand is high! Prices: in-calf heifer Ksh 40,000, bull Ksh 55,000. Also semen from bulls bred at the Centre is available. Contact address: Centre Director, KARI National Animal Husbandry Research Centre, P.O.Box 25, Naivasha Tel. 0722 336 589.

Signs of an animal on heat

Early heat

When an animal shows these first signs, it is not yet ready to be inseminated.

- The cow is restless and nervous.
- She keeps on looking around while bellowing like a bull.
- The vulva (lips of vaginal opening) is slightly swollen, moist and reddish.
- She sniffs the vulva or urine of other animals and is also sniffed by them.
- She attempts to rest her chin on the back of other cows.



- She rushes forward as if attacking and is seen in head-to-head position with other cows.
- She tends to push against the sides of other cows and attempts to mount.
- **She walks away when mounted.**

Standing heat

If you note these signs, the cow needs to be inseminated immediately or at least within the next 12 hours.

- All the signs already mentioned above can be observed.
- The vulva is swollen, deep red and there is a flow of clear watery mucus from the vaginal opening.
- The cow's tail is bent away from the vulva.
- She may forget to eat and milk production may go down.
- **The cow will stand immobile when mounted by another cow.**

Late heat

- The mucus from the vulva is drying off.
- The cow continues sniffing other animals and is also sniffed at.
- **She refuses to stand when being mounted.**
- All heat symptoms cool down rather suddenly.



How do you recognize a good dairy cow?

The value of a dairy cow can not be seen from her colour, but from the build of her body. Whether you want to buy or to sell a cow or a heifer – you must know what is important when judging dairy animals.

- Tall animals with long bones tend to carry their udders higher, to eat more forage and to produce more milk.
- A long and lean neck is typical for dairy cows.
- The front legs are straight and wide apart. Shoulder blades and elbows are firmly set against the chest wall.
- The back is strong and more or less straight between the withers (or the hump) and the tail.
- Wide rump, pins and thighs** enable a dairy cow to give birth to a calf with relative ease (A).
- The rump is nearly level with a slight slope from hips to pins**, and long and wide. This is related to less calving difficulty, fewer reproductive problems, and greater longevity (B).
- A wide and big rib cage** (barrel, stomach, chest) enables the animal to eat lots of feed for milk production (C).
- A deep heel with short, closed toes and short, strong pastern are an advantage.
- A steep foot angle** is associated with better mobility, less hoof trimming, and longer life (D).
- The hock joint is at a moderate angle** and the rear legs are straight. The hock is flat and clean and shows no swelling. Sickle-legs put too much strain on leg muscles and tendons (E).
- Flexible joints allow the cow to move with ease.
- A large udder indicates high milk production.** Ideally, quarters are evenly balanced, soft, and well collapsed after milking.
- A high and firmly attached udder** is essential for long-term dairy performance. High udders are related with less mastitis, less udder injuries, and longer life. Udders should not hang below the hock, but the age of the cow needs to be taken into account. The udder should have little movement when the cow is walking (F).
- The rear udder has an udder cleft that shows a strong suspensory ligament** (G).
- The fore udder should be long and firmly attached** to the body wall (G)
- Teats should be placed nicely under each quarter, be plumb and uniform in size, and of medium length and diameter.

Body condition

Cows which are too thin at calving will produce less milk and are more likely to have fertility problems.

Make sure your cow is in the good condition shown in picture 3 before calving!

The cows on picture 1 and 2 are too thin. This is how you can judge it:



1 Backbone notches are easily seen
Ribs are easily seen, short ribs are sharp
Pins have sharp edges
Tailhead: deep 'V' shape visible

2 Backbone notches are visible
Ribs are rounded but easily felt
Pins have rounded edges
Tailhead: shallow 'U'-shape

3 The backbone is smooth
Ribs are rounded and not visible
Pins are rounded, no sharp edges
Tailhead: even cover