

UNIT:4 (ANIMAL HUSBANDRY AND POULTRY)

Cattle Farming

CATTLE FARMING

17.1 INTERODUCTION

The term 'cattle' is used to mention or refer to the cows and bulls in general. They are raised as dairy animals for **milk and milk products** and as **draft animals** for pulling carts and plows. Other products of cattle include **cattle dung** used as manure and as fuel. It is because of their economic importance that the total cattle population in the world is 1.5 billion and **India has the highest cattle population** (190 million) in the world.

In India cattle are sacred. According to Vedic scripture cows are to be respected in the same way as one's mother because they also give milk. In Mahabharata, there is a special reference as "The cow is my mother".

Cattle are believed to have been among the first livestock animals domesticated well before the advent of Neolithic age (10200 BC). Since then the domestication of cattle has shaped the world in untold ways. Their contribution may be the most important development in the history during the past about 13000 years (Diamond 2002). Cattle also have the distinction of having been the first live stock animal with fully mapped genome in 1997. **The account given here in this chapter refers only to cows.**

These belong to :

- Phylum : Chordata
- Class : Mammalia (milk giving)
- Order : Artiodactyla (even-toed, hooved)
- Suborder : Ruminantia (cud chewing)
- Family : Bovidae (hollow horn)
- Genus : *Bos*
- Species : *B. indicus*, *B. taurus*

About 800 breeds are recognized in the world and these fall in to 2 main species, ***Bos indicus* and**

Bos taurus The two species are closely related and according to Epstein and Mason (1984) they have **evolved from** the Aurox, the wild species, ***Bos primigenius***. The last known individual of this wild Aurox died in Masovia, Poland in 1676. *Bos indicus* and *Bos taurus* have both **60 chromosomes** and differ only in the morphology of Y chromosome. They can be easily interbred and produce fertile offspring.

A. *Bos indicus* :

1. This is the Indian Zebu cattle or humped cattle.
2. It is characterized by a prominent hump.
3. The size of the hump varies with breed, sex and age.
4. This breed has elongated face, drooping ears, thin and long legs, upright horns.
5. The body is narrow ; hide is thin and loosely attached.
6. Dewlap is large particularly in males.

Some of the economically important traits of *Bos indicus* are :

1. High degree of tolerance to high atmospheric temperature due to its ability to dissipate heat through loose skin over large area and high density of efficient sweat glands to help in the loss of heat through evaporation.
2. Resistance to ticks and hence tick borne diseases, prevalent in tropical countries.
3. Low nutritional requirements, because of their small size, low metabolic rate and efficient digestion at low feeding levels.

It is for their adaptability under environmental stress that this species has been introduced from India into America and Australia.

However, their potential for milk production is low and often not much more than feeding the calf properly. The cows of this type do not usually let down milk without the stimulation from the suckling of the calf. The zebu cattle are late maturing, both physiologically and sexually. They are classified into subgroups on the basis of external traits like colour, size, and shape of horns and particularly on the basis of their utility.

B. *Bos taurus* :

1. This is originally the cattle species of Europe and North America.
2. These are all non-humped
3. These are high milk yielding, well built cattle that are ideally suited and adapted for wet and cold climate.
4. These have small dewlap and more hair on the skin.
5. They go for bulk grazing, have high metabolic rate, and are less tolerant to heat.
6. These are susceptible to tick borne diseases.
7. The cows of this species mature at 13 months and average productive age life is for 3-4 years.

17.2. INDIGENOUS BREEDS

The indigenous breeds of cattle in India are the different varieties of *Bos indicus*. There are 26 known and well defined breeds that comprise about 18% of our total cattle population in India. The remaining 82% of cattle in India are categorized as “non-descript” or **desi breeds**. The well defined 26 breeds are classified into three types, depending upon their utility or purpose of domestication, as follows :

- A. Milch breed
- B. Dual purpose breed
- C. Drought breed

A. Milch breeds

The cows of this breed have high milk yielding potential while male animals are poor or slow work performers. The average milk production of this breed per lactation is about 1600 liters. These breeds include Sahiwal, Red Sindhi, Deoni and Gir

B. Dual purpose breeds

The male and female individuals of these breeds are useful. The cows yield average milk per lactation (500 – 1500 liters) and the male animals/ bulls/ox are good work performers. Some of the dual purpose breeds of cattle in India include Haryana, Kankrej, Tharparker, Ongole, Mewathi etc.

C. Draught breeds

The male animals are very good work performers while cows have poor milk yielding potential, providing less than 500 liters of milk per lactation. They are used to pull the cart or plow the agriculture land. The examples of these breeds are Kangayam, Umblacherry, Amritmahal, Hallikar etc.

The common indigenous breeds are as follows :

17.2.1. Sahiwal

Sahiwal was originally bred as a double purpose breed (draft and dairy) of cattle but now they are recognized as the **best milk yielding** cows of India. The average milk production of Sahiwal under village conditions is about 1300 liters per lactation but it is maximized to 2500 liters under commercial farm conditions.

Sahiwal has originated in Punjab of erstwhile undivided India (Montgomery district of present Pakistan). It is presently mainly distributed in Punjab, Haryana, Delhi, Bihar, U.P and M.P.

This breed is characterized by deep body, broad head, short and stumpy horns, not beyond 3 inches, short legs and loose skin. The males have a large hump and the cows have a **prominent naval flap**. Dewlap is very well developed. Tail is long and whip like.

They are resistant to drought and known for their longevity, easy calving, and rapid weight gain and bloat tolerant.

First calving occurs at 32 – 36 months, and then after interval of 15 months up to the age of 20 years.

The Sahiwal breed has various shades of red, pale red and dark brown with white spots. In India this breed has been crossed with exotic breeds like Ayrshire and Holstein to increase the milk yield.


17.2.2. Red Sindhi

Red Sindhi has originated in the Sindh State of Pakistan. They are now bred in India, Pakistan, Bangladesh, and Sri Lanka. In India it is mainly found in Punjab, Haryana, Bengal, Bihar, Chatisgarh, Rajasthan, Karnataka, Kerala, and Orissa. This breed has been used by many countries including Australia, America and Sri Lanka for crossbreeding of Holstein, Jersey, Brown Swiss and Danish Red and other European breeds.

This is the **most popular breed** of *Bos indicus* known for its **high milk yielding** potential besides being hardy and tolerant to heat. Under good management conditions the cow of Red Sindhi breed yields 1700 liters of milk per lactation. By ensuring optimal rearing conditions, the yield can go up to 3400 liters of milk per lactation. It accepts wide variety of forages.

These are docile and relatively smaller than Sahiwal with proportionately compact body conformation. Head is large, occasionally with a **bulge on the forehead**. The horns are thick and stumpy in males but thin in females. They can be up to 14 inches in length and grow upwards and backwards. Hump is very large and dewlap is moderate in both sexes. Udder is capacious and pendulous.

The first calving occurs at 45 months, lactation period is about 13 months, gestation period is 100 days and dry period is 81 days. Inter-calving period of this breed is 13 months.

This breed has red colour as the name signifies but not deep red. Males are however darker than females. 

17.3. EXOTIC BREEDS

The exotic cattle breeds that have very high milk yield are generally from temperate regions of the world. Some of the important exotic breeds are as :

17.3.1. Red Dane

Danish Red cattle, also known as Red Dane, originated on the islands off the coast of Denmark. They were developed from local North Slesvig Red with Angeln breed and became the major category of cattle bred in northern Europe. This breed is imported to many countries including India for improving the local breeds. In India Red Dane has been cross bred with red zebu dairy breeds like Sahiwal and Red Sindhi.

Red Dane is a very good exotic milk cow, giving about 5200 kg/lactation. The milk has higher fat (4.17%) and protein content (3.48%).

Red Dane breed is known for improved fertility, easier calving, better longevity, and maintaining high milk production over a longer period with first calving at the age of 28 months and then calving interval of 12 months.

17.3.2. Jersey

This breed of cattle has originated in the island of Jersey, a small British island in the English Channel off the coast of France, believed to have descended from French cattle. The jersey is one of the oldest dairy breeds that remained pure for about 6 centuries. This is one of the best exotic milk breeds among cattle that have also been introduced into India for improving the local breeds.

Jersey is sensitive, calm, docile and easy to handle as dairy animal. The colour varies from light gray to dark fawn. The mature body size is small in comparison to other exotic cows. Both cows and bulls are darker around the shoulders, head region and hips than the rest of the body. They have a **dark switch** (long hairs of the terminal part of tail) and black hooves.

The milk yield per lactation is about 5000 – 8000 kg with daily production of about 20 liters. The age at first calving is 30 months with a gestation period of 280 days. Inter-calving period is 13-14 months.

They are known for high fertility and high content of butterfat (4.8%) and protein (3.95%) in their milk. Their adaptability under hot and humid conditions besides ability to thrive on local feeds has made them very popular among the exotic cattle breeds.

Jersey has very well acclimatized in India despite hot and humid conditions. In India it is generally crossed with Red Sindhi.

Holstein-Friesian constitute about one-third of all dairy cows in the world owing to their highest milk yielding potential. These are large sized, generally black and white or red and white in colour. Cows have large udders. The **head is long**, narrow and straight, with slightly **rounded withers** (portion at the base of neck where animal has the maximum height).

The heifers of this variety can breed at the age of 15 months (early calving) but cattle breeders prefer to make them calve first time at 26 months of age. Gestation period is 9.5 months and inter-calving period is about 400 days.

The annual milk yield is 7500-9000 liters with an average of 25 liters/day. The lactation length lasts for about 1 year. Holstein cows have average lactation of 3.2 in their life. The milk fat and protein (3.5% and 3.1%) is lower than that of Jersey.

Holstein breed performs well in coastal and delta areas. In India this breed is crossed with Haryana, Red Sindhi and Sahiwal breeds.

- i. Body is symmetrical with long head and medium sized forehead.
- ii. It has short and stumpy horns.
- iii. The legs are short.
- iv. Skin is loosely attached to body (Fig.1).
- v. The udder is well developed.
- vi. It is a good dairy breed with yield of 3000 kg to 3250 kg per lactation.
- vii. The bulls are lethargic and slow.

This has been mostly used for breed improvement in countries other than Pakistan, the other two breeds having been used only to a limited extent.

It is used both as a pure breed, for upgrading of unimproved cattle and for crossbreeding with European breeds.

Sahiwal has made important contributions to most of the new breeds of Zebu x Temperate cattle.

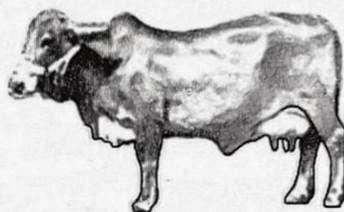


Fig. 1. Sahiwal cow.

Values for breeding : 1. upgrading native cattle 2. cross breeding with European breeds

✓ 2. Red Sindhi Cattle

Red Sindhi cattle are the most popular of all Zebu dairy breeds. The breed originated in the Sindh province of Pakistan. They are widely kept for milk production across India, Pakistan, Bangla Desh, Sri Lanka, and other countries.

They have been used for crossbreeding with Temperate (European origin) dairy breeds in many countries to combine their tropical adaptations (heat tolerance, tick resistance, disease resistance, fertility at higher temperatures, *etc.*) with the higher milk production found in temperate regions.

It has been crossed with Jerseys in many places, including India, the United States, Australia, Sri Lanka, *etc.*

It has also been crossed with Holstein-Friesian, Brown Swiss and Danish Red.

It has been used to improve beef and as dual purpose catue in many tropical countries. It is sufficiently meaty to produce good beef calves in such crosses and the high milk production helps a fast growing calf which is ready for market at one year.

It is somewhat smaller than the very similar Sahiwal and as a result, produces a little less milk per animal (Fig. 2).

The animals of this breed are docile and quiet.

The female weighs about 300 kg, while male about 450 kg.
 (i) Head is moderate and horns are thick.



Fig. 2. Red Sindhi bull (A) and cow (B).

- (ii) Horns grow laterally and then turn upward, forward and inwards to end bluntly.
- (iii) Hump is heavy, ears are drooping, legs are short and tail is long.
- (iv) Udder is medium sized.
- (v) They yield about 2000 kg of milk per lactation. However, in exceptionally well maintained cows, the yield goes upto 6000 kgs.
- (vi) The bulls of this breeds are medium sized and employed in cart pulling and field tilling.
- (vii) The Red Sindhi cattle are red, ranging from a deep reddish brown to a yellowish red, but most commonly a deep red.

They are distinguished from the other dairy breed of Sindh, the Tharparkar or White Sindhi, both by colour and form. The Red Sindhi is smaller, rounder, with a more typical dairy form, and with short, curved horns, while the Tharparkars are taller with a shape more typical of Zebu draft breeds and with longer, lyre shaped horns.

✓ 8.1.2. BOS TAURUS GROUP

For over two centuries, the temperate breeds of cattle have been subjected to strong selection pressure for improved dairy, beef or dual purpose (dairy and beef) characteristics.

Many of these breeds have been used in crossbreeding in the tropical countries.

Some of the more important ones are as follows:

4. Holstein Friesian breed (also called Friesian, Holstein or Black and White)

The Holstein cow originated in Europe. The major historical development of this breed occurred in what is now the Netherlands and more specifically in the two northern provinces of North Holland and Friesland which lay on either side of the Zuider Zee. The original stocks were the black animals and white animals of the Batavians and Friesians, migrant European tribes who settled in the Rhine Delta region about 2,000 years ago.

It is the predominant breed in most developed countries.

There are about 70 million Holstein Friesian type cows in the world accounting for about one-third of all dairy cows.

The breed is well known for its high milk yields (with averages of over 6,000 kg per lactation in several countries), but fat and solids-not-fat contents are low.

They also have larger weight gains and higher mature weights than other temperate breeds of dairy or dual purpose cattle.

In recent years, Friesians have gained in popularity as the temperate counterpart for crossbreeding of Zebu cattle and in some countries, this is the breed of choice.

For many years, Holsteins were bred and strictly culled to obtain animals which would

make best use of grass, the area's most abundant resource. The intermingling of these animals evolved into an efficient, high-producing black-and-white dairy cow.

✓ **Holsteins** : It is a dual purpose breed and is most quickly recognized by its distinctive colour markings and outstanding milk production.

(i) Holsteins are large, well built animals with colour patterns of black and white or red and white.

(ii) The tail is long and switch is black in colour (Fig. 4).

(iii) The head is long and narrow, thighs are straight and withers slightly rounded.

(iv) The cows are docile, but bulls are aggressive.

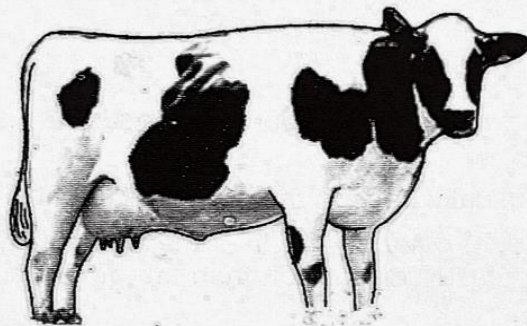


Fig. 4. Holstein-Friesian cow.

(v) A healthy Holstein calf weighs 45 kg or more at birth. A mature Holstein cow weighs about 750 kg and stand 58 inches tall at the shoulder.

(vi) Holstein heifers can be bred at 15 months of age, when they weigh about 400 kg.

(vii) Average production of milk for Holsteins range from 6000 kg to 9000 kg per lactation.

(.iii) The body fat is white in colour.

It is desirable to have Holstein female calve for the first time between 24 and 27 months of age.

Holstein gestation is approximately nine months.

While some cows may live considerably longer, the normal productive life of a Holstein is six years.

✓ 5. Jersey

The Jersey breed originated on the Island of Jersey, a small British island in the English Channel off the coast of France. It is one of the oldest dairy breeds, reported as being pure bred for nearly six centuries.

The breed was known in England as early as 1771 and was regarded very favourably because of its milk and butter fat production. During that period, the cattle of Jersey island were commonly referred to as Alderney cattle. Jersey cattle were brought to the United States in the 1850s.

Jersey breed is adaptable to a wide range of climatic and geographical conditions, and is found from Denmark to Australia and New Zealand, from Canada to South America, and from South Africa to Japan. They are excellent grazers and perform well in intensive grazing programmes. They are more tolerant of heat than the larger breeds.

Jersey breed is the smallest of the different breeds of cattle. The cow has an average weight of 425kg and the bull about 700 kg. The milk yield per lactation is about 5000 kg. They have following characteristics :

- (i) Fawn colour
- (ii) Small mature body size
- (iii) Early sexual maturity
- (iv) Lower milk yield/lactation
- (v) Yellow body fat
- (vi) Poorer beef capacity than friesian

Cows show very marked refinement about their heads and shoulders, carry long, straight top lines (Fig. 5).

For their size, they are usually deep in the body and full and deep in the barrel.

There is no more appealing dairy animal than the well-balanced Jersey cow, and although usually somewhat more nervous in disposition than the other dairy cows, she is usually docile and rather easy to manage.

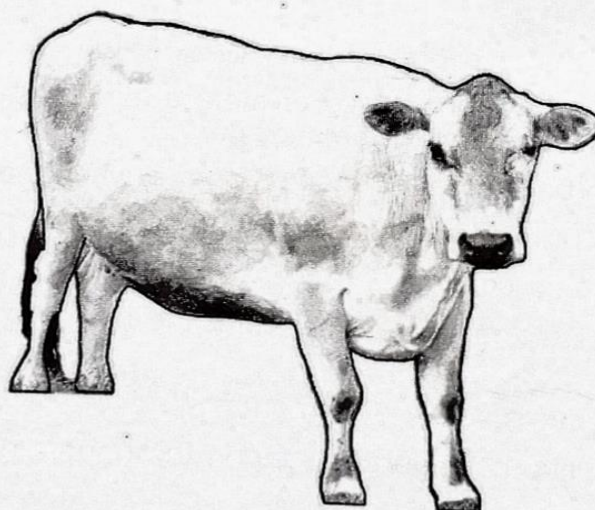


Fig. 5. Jersey cow.

Jersey bulls, although small as compared to the other dairy breeds, are extremely masculine.

They are quite muscular about their crests and shoulders and are considerably less refined throughout than are the females.

The same general qualities of straight lines and dairy conformation as are found in the cows are desired in bulls.