

ANNEXURE – IX-B

CATTLE

The write up of the content will be developed by the authors assigned the responsibility. The content development plan is given below.

History, origin and distribution

World Population and Production

General characteristics

Breeds of Cattle

Genetics

Adaptability

Reproduction

Nutrition

Production

Cattle health

Management

Jurisprudence in cattle management

The detailed contents will be developed in the following plan.

- 1 Anatomy and Histology
- 2 Biochemistry
- 3 Bio-products
- 4 Biotechnology
- 5 Breeding
- 6 Economics and marketing
- 7 Epidemiology
- 8 Extension
- 9 Genetics
- 10 Gynecology and obstetrics
- 11 Immunology
- 12 Meat
- 13 Medicine
- 14 Microbiology
- 15 Milk and milk products
- 16 Nutrition
- 17 Nutrition Rumen
- 18 Parasitology
- 19 Pathology
- 20 Pharmacology
- 21 Physiology
- 22 Reproduction- Embryo
- 23 Reproduction Female
- 24 Reproduction Male
- 25 Reproductive physiology
- 26 Statistics
- 27 Surgery
- 28 Toxicity
- 29 Zoonoses

POPULATION STRUCTURE OF VARIOUS SPECIES OF LIVESTOCK – 2003

(In thousands)

Sr. No.	States/UTs	Cattle			Buffalos	Sheep	Goats	Pigs
		Cross bred	Indig-eneous	Total				
1	Andhra Pradesh	1107	8193	9300	10630	21376	6277	570
2	Arunachal Pradesh	13	445	458	11	19	231	330
3	Assam	440	7999	8440	678	170	2987	1543
4	Bihar*	1274	9455	10729	5743	382	9490	672
5	Chhatisgarh	253	8629	8882	1598	121	2336	552
6	Goa	12	63	76	37	-	11	87
7	Gujarat	639	6785	7424	7140	2062	4541	351
8	Haryana	573	967	1540	6035	633	460	120
9	Himachal Pradesh	677	1559	2236	774	926	1125	3
10	Jammu & Kashmir	1320	1764	3084	1039	3411	2055	2
11	Jharkhand	145	7513	7659	1343	680	5031	1108
12	Karnataka	1602	7936	9539	3991	7256	4484	312
13	Kerala	1735	387	2122	65	4	1213	76
14	Madhya Pradesh	317	18595	18913	7575	546	8142	358
15	Maharashtra	2776	13527	16303	6145	3094	10684	439
16	Manipur	69	349	418	77	6	33	415
17	Meghalaya	23	744	767	18	18	327	419
18	Mizoram	9	27	36	6	1	17	218
19	Nagaland	243	208	451	34	4	175	644
20	Orissa	1063	12840	13903	1394	1620	5803	662
21	Punjab	1531	508	2039	5995	220	278	29
22	Rajasthan	464	10390	10854	10414	10054	16809	338
23	Sikkim	80	79	159	2	6	124	38
24	Tamilnadu	5140	4001	9141	1658	5593	8177	321
25	Tripura	57	702	759	14	3	472	209
26	Uttar Pradesh	1634	16917	18551	22914	1437	12941	2284
27	Uttaranchal	228	1961	2188	1228	296	1158	33
28	West Bengal	1119	17794	18913	1086	1525	18774	1301
29	A& Nicobar	13	51	64	16	0	64	52
30	Chandigarh	5	1	6	23	-	1	-
31	D & Nagar Haveli	1	49	50	4	-	21	3
32	Daman & Diu	0	4	4	1	-	4	-
33	Delhi	58	34	92	231	3	17	28
34	Lakshadweep	2	2	4	0	0	47	0
35	Pondicherry	63	16	78	4	3	48	1
	All India	24686	160495	185181	97922	61469	124358	13518

POPULATION STRUCTURE OF VARIOUS SPECIES OF LIVESTOCK – 2003

(In thousands)

Sr. No.	States/UTs	Horses and ponies	Mules	Don keys	Camel	Yaks	Mithun	Total Livestock	Total Poultry
1	Andhra Pradesh	9	-	33	-	0	0	38895	102278
2	Arunachal Pradesh	7	0	0	0	9	192	799	1743
3	Assam	12	0	0	0	0	0	5390	21664
4	Bihar*	117	4	23	1	0	0	16432	13911
5	Chhatisgarh	4	-	-	-	0	0	4610	8181
6	Goa	-	0	-	0	0	0	136	566
7	Gujarat	18	1	65	53	0	0	14231	8153
8	Haryana	25	14	8	50	0	0	7345	13619
9	Himachal Pradesh	18	24	9	-	2	0	2881	767
10	Jammu & Kashmir	172	40	24	2	47	24	6816	5568
11	Jharkhand	5	-	-	-	0	0	8167	14429
12	Karnataka	14	-	25	-	0	0	16082	25593
13	Kerala	-	-	-	0	0	0	1358	12216
14	Madhya Pradesh	32	4	39	8	0	0	16704	11705
15	Maharashtra	40	1	57	-	0	0	20460	37968
16	Manipur	2	0	0	0	0	20	553	2941
17	Meghalaya	2	0	0	0	0	0	785	2821
18	Mizoram	2	-	0	0	0	2	245	1125
19	Nagaland	1	-	0	0	0	40	898	2789
20	Orissa	-	-	9	-	0	0	9489	17611
21	Punjab	29	9	5	3	0	0	6568	10779
22	Rajasthan	25	3	143	498	-	0	38284	6192
23	Sikkim	2	0	0	0	7	0	178	322
24	Tamilnadu	25	0	26	-	0	0	15800	86591
25	Tripura	0	0	0	0	0	0	698	3057
26	Uttar Pradesh	154	52	182	16	0	0	39980	11718
27	Uttaranchal	17	22	1	0	0	0	2755	1984
28	West Bengal	18	-	-	0	0	0	22704	60656
29	A& Nicobar	0	0	-	0	0	0	132	931
30	Chandigarh	-	-	-	-	0	0	24	152
31	D & Nagar Haveli	-	0	0	-	0	0	28	106
32	Daman & Diu	-	0	0	-	0	0	5	29
33	Delhi	1	1	1	-	0	0	282	459
34	Lakshadweep	0	0	0	0	0	0	47	146
35	Pondicherry	-	0	-	0	0	0	56	244
	All India	751	176	650	632	65	278	485002	489012

Note: *- Data from 2 districts are yet to be received from State Government.

-' denotes less than 500.

Source: Provisional census results received from State Governments

CATTLE BREEDS

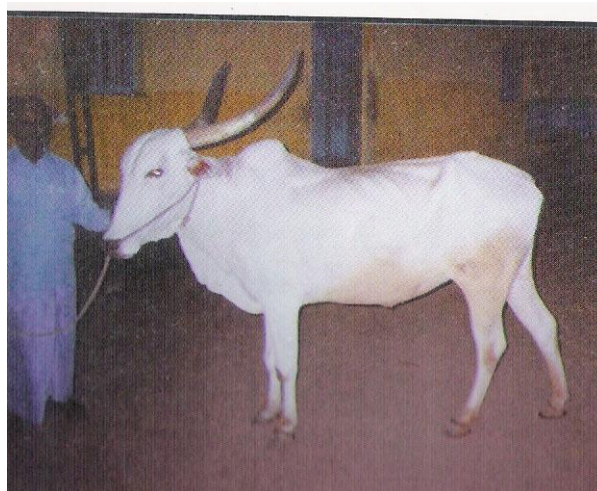
Amrit Mahal

Origin

Amrit Mahal literally means the department of milk. Originally the rulers of Mysore State had started an establishment of cattle collected from the prevalent types of cattle within the area for the supply of milk and milk products to the palace. At the same time, the bullocks were utilized for the movement of army equipage. The bullocks were regularly classified as gun bullocks, pack bullocks, plow bullocks, etc. They attracted great attention during the nineteenth century on account of their endurance and the speed with which they could move army equipment. It is claimed that they could maneuver a march of 100 miles in 2 1/2 days. The cattle of Amrit Mahal establishment originally comprised three distinct varieties: Hallikar, Hagalvadi and Chitaldroog. Prior to 1860 it seems that these three varieties were maintained separate from each other. In 1860, the whole establishment was liquidated for reasons of economy. By the year 1866, it was realized that an establishment for the supply of cattle was necessity, and during the year a herd was again established. Thus, the foundation cattle from which the Amrit Mahal breed was developed were of the Hallikar and closely related types.



Amrit Mahal bull



Amrit Mahal cow

Characteristics

The coloring of Amrit Mahal cattle is usually some shade of gray varying from almost white to nearly black, and in some cases white-gray markings of a definite pattern are present on the face and dewlap. The muzzle, feet and tail switch are usually black, but in

older animals the color looks lighter.

The most striking characteristic of these cattle is the formation of the head and horns. The head is well-shaped, long and tapering towards the muzzle. The forehead bulges out slightly and is narrow and furrowed in the middle. The horns emerge from the top of the poll, fairly close together in an upward and backward direction, and terminate in sharp points which are usually black. In old animals the long sharp points approximate each other and may even interlace to some extent. The eyes look bloodshot. The ears are small and taper to a point, being carried in a horizontal position. They are yellow inside.

The dewlap is thin and does not extend very far. The sheath and navel flap are very small and close to the body. The hump is well-developed and shapely in the bulls, rising to a height of about 8 inches. The body is compact and muscular with well-formed shoulders and hindquarters. The neck is strong and fairly long. The back is level, with broad loins and level rump. Legs are of medium length and well-proportioned. The fetlocks are short and the hooves are hard, close together and small. The skin is thin, mellow and jet black in color, with short glossy hair.

As the cattle are maintained in the pasture areas without any restrictions and handling, they show a very impatient, wild and unruly disposition. They are at times dangerous, particularly to strangers. They need patience and care in training; hard treatment makes them stubborn. Once they are trained they are extremely fine bullocks, particularly for quick transportation. They are observed to have great endurance. Cows are very poor milkers.

Bachaur

Origin

The Bachaur appears to belong to the group of shorthorned white or light-gray cattle. The breed has very close similarity to the Hariana breed. Some think it may be a deteriorated strain of the Hariana. The breed is well-known for its draft qualities and ability to thrive with lower quality feeds. The breed is found in the Bachaur and Koilpur subdivisions of the Sitamarhi district of Bihar State, India.

Characteristics

The Bachaur are compact with straight backs, well-rounded barrels, short necks and muscular shoulders. The forehead is broad and flat or slightly convex. The eyes are large and prominent. The horns are medium-sized and stumpy. Ears are medium-sized and drooping. The hump is compact, firm and medium-sized. The sheath and navel flap are light and close to the body. The dewlap is medium-sized and not so heavy. The feet are fine, well-shaped and strong. The height of a bull behind the hump is 58-62 inches and the heartgirth measurements range from 68-72 inches. The tail is short and thick and usually does not go far beyond the hocks. The most common color is gray or graying white.

The breed is well-known in the area for its medium draft abilities. In the days of the East India Company during the early part of the nineteenth century, large numbers of bullocks of the breed were always in demand for transport purposes. Bullocks of this breed are medium-paced and a pair can carry loads in a cart up to 2/3 of a ton. The cows are not good milk producers.

Haryana

The Haryana a *Bos indicus* breed used for draft purposes in northern India where they are found. They are well suited to fast road work, being able to pull a one ton load at 2 miles per hour and cover 20 miles a day. While females are kept primarily for breeding of oxen, they are also milked. The breed averages 1400 kg of milk per lactation but high producing animals will produce over 2300 kg in a single lactation.



The breed belongs to the shorthorned type of zebu and is grey or white. The average cow weighs 310 kg and the average bull 430 kg.

Bengali

Also Known By: Chittagong Red, Kamdhino, Madaripur, North Bangladesh Grey

The Bengali originated in what is now Bangladesh and Bengal, India. It is one of the Zebu or *Bos indicus* breeds native to India. The Bengali ranges in size from small to dwarf. The image on the right side of this page shows the size comparison between a mature Gir and Bengali animal.

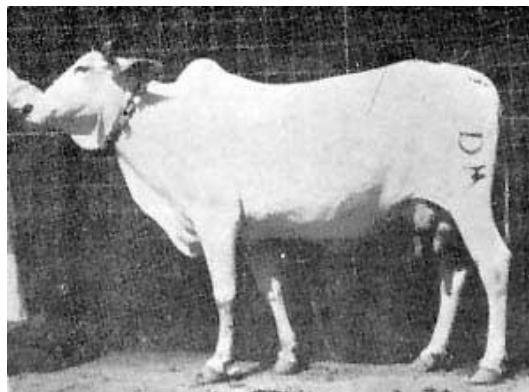
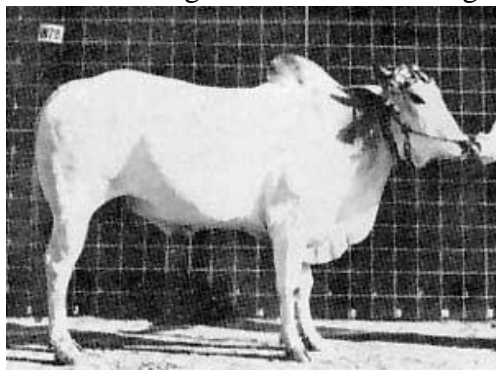


Channi :The Channi is one of the premium draft breeds of Pakistan and India.



Dajal

The Dajal are a draft type of cattle and are found mainly in the Dajal area in district Dera Ghazi Khan in Punjab Province. Their color is white or gray, deepening to almost black on the neck, shoulder and hump in mature males. The average weight at maturity of Dajal cattle is 500 kg for males and 390 kg for females.



The Dajal breed is an off shoot of Bhagnari breed, having almost similar points. However, Dajal cattle are comparatively smaller in size and lighter in color.

Dangi

Origin

Dangis have taken their name from the tract of the country in Bombay State known as Dangs. It is a hilly tract with heavy rainfall and very poor agricultural economy. The breed has become well-known on account of its hardy nature and its ability to work hard under heavy rainfall conditions. The Dangi breed, which is similar to Deoni, appears to fit into the group of cattle represented by the Gir, Red Sindhi and Sahiwal.

Characteristics

The Dangis are of broken red and white or black and white color. The animals are medium in size, with deep bodies and generally of ponderous build. The height behind the hump ranges from about 45 to 50 inches while the heart girth measures from about 58 to 60 inches, on the average.

The head is usually small with a slightly protruding forehead. The muzzle is large. The horns, though of variable size, are generally short and thick. The ears are small.

The animals have powerful hind and forequarters with a short back well-coupled, and the legs are short and stout. The hooves are exceptionally hardy, being black and flint-like. The dewlap is slightly pendulous. The sheath, though loose, is not excessively pendulous. The hump is medium-sized and firm. The skin is of medium thickness and the coat is shiny. It is observed to exude an oily secretion which protects it from heavy rain.

The Dangis are primarily medium-slow draft animals. They are well-known for their excellent working qualities in heavy rain and in rice fields and also on the hilly tracks. They are hardy animals and subsist mostly on grazing alone. As draft animals they carry heavy timber at the rate of 2 to 3 miles per hour depending upon the type of terrain and can cover a distance of 20 to 24 miles per day. Cows are poor milkers but attempts have been made to improve their milking qualities.

Deoni

Origin

The Deoni breed of cattle also sometimes known as Dongari (which means "of the hills"), has been evolved within the last 200 years. It is claimed that it has been developed from a

strain descended from the mixture of Gir, Dangi and local cattle. A contribution from the Gir type of cattle is quite evident in the formation of the head and ears, and also of the horns to a certain extent. They also show a great similarity in general conformation and ruggedness to the Dangi cattle of Bombay State, an area which is not far from the Deoni cattle breeding area.

Characteristics

The Deoni is a medium-sized animal which resembles the Gir in physical structure to a large extent. The body color is usually spotted black and white. The face is also similarly patchy and spotted with black and white. The forehead is convex and bulging, though breeders have not paid the same scrupulous attention to this trait as the breeders of Gir cattle, and though the ears are long and open forward they lack the leaflike structure and also the notch at the tip of the ear that is typical of the Gir. The horns in typical animals take a characteristic outward and backward curve similar to that generally to be seen in Gir cattle.

The skin is loose and of medium thickness. The dewlap is heavy and the sheath is usually pendulous. The hair is soft and short. The cows have a fairly well-developed udder. The body is massive and upstanding with considerable depth. The hooves are well-made and shapely and of a black color. The body structure gives appearance of strength.

Gaolao

Origin

The Gaolao cattle fit into the group of shorthorned, white or light-gray in color, with a long coffin-shaped skull, orbital arches not prominent and with a face slightly convex in profile. It is also observed that the native home of the breed is located along the route taken by the Rig Vedic Aryans from the Northern passes through Central India to the South. There is a close similarity between the Ongole and the Gaolao except the latter are much lighter, with greater agility.

It is said that the Marathas developed this breed into a fast-trotting type suitable for quick army transport in the hilly areas of Gondwana, Madhya Pradesh. It was used mainly for military purposes by the Maratha army when invading the local Gond Kingdom. Old historical records show that the breed had fair milk-producing capacity, but during the last two centuries selection has been directed mainly towards developing a capacity for quick draft. The breed is found principally in the districts of Wardha, Nagpur and Chindwara.

Characteristics

Gaolao animals are of medium height, or rather light build and tend to be narrow and long. The head is markedly long and narrow with a straight profile usually tapering towards the muzzle and somewhat broader at the base of the horns. The forehead is usually flat, though it appears to recede at the top, giving a slightly convex appearance. The eyes are almond-shaped and placed slightly at angles. The ears are of medium size and are carried high. The horns are short and stumpy, blunt at the points and commonly slope slightly backwards.

The neck is short, with a moderately well-developed hump, which is usually loose and hangs on one side. The hind quarters are slightly drooping. Limbs are straight and muscular. Hooves are of medium size, hard and durable, and suited to hard road and hillside work. The dewlap is large but the sheath is only moderately developed. The skin is thin but loose. The tail is comparatively short, reaching only a little below the hocks. Females are usually white and males gray over the neck, hump and quarters.

Gir

The Gir is one of the principal Zebu or *Bos indicus* breeds in India and is used for both dairy and beef production. It has been used locally in the improvement of other breeds including the Red Sindhi and the Sahiwal. It was also one of the breeds used in the development of the Brahman breed in North America.

The Gir is distinctive in appearance, typically having a rounded and domed forehead, long pendulous ears and horns which sweep back and spiral up. Gir are generally mottled with the color ranging from red to white. They originated in southwest India in the state of Gujerat and have since spread to neighboring Maharashtra and Rajasthan.

The females average 385 kg with a height of 130 cm and the males average 545 kg and a height of 135 cm. The average milk production for the Gir is 1590 kg per lactation, with a record production of 3182 kg at 4.5% fat.



Guzerat

Also Known By: Guzera, Gujera, Gujrati, Gusera, Guzerath

The Guzerat breed was developed from importations of the Kankrej breed from India during the time frame from 1875 until 1964.

In 1986, James O. Sanders in a review of the "History and Development of Zebu Cattle in the United States" (*J. Anim. Sci.* 50:1188-1200) detailed the history and importance of Zebu cattle in their native lands as well as Brazil and the U. S. Guzerat cattle, with the Nelore and Gir, are the three major Indian breeds that have had the most important impact on U.S. cattle breeding. Guzerat cattle are gray cattle of northern India and have long, lyre shaped horns. They are among the largest cattle of India and are prized as powerful draft animals and are moderate milk producers. Guzerat cattle have short broad faces with long ears drooping and open to the front. Color varies from light gray to black at maturity. The barrel is generally lighter in color than the rest of the body, especially in bulls. Bulls tend to get darker than cows or steers. Guzerat cattle are maintained as a pure breed in India and Brazil in large numbers, with a few in the U. S. The Guzerat was the most important breed in the formation of the American Brahman.

A literature review of these and other Indian breeds in India, Brazil, Mexico and the U. S., would indicate production characteristics similar to the American Brahman and other *Bos indicus* breeds with lower birth weights in purebreds than *Bos taurus* breeds. Crosses of *Bos indicus* bulls with *Bos taurus* cows result in higher birth weights than the reciprocal cross. Preweaning growth of Guzerat purebreds is among the highest of the *Bos indicus* breeds but lower than improved *Bos taurus* breeds. Similar results are reported for weaning weight, post-weaning gain, yearling weight, and feedyard gain and efficiency. Carcass traits of purebreds tend to be lower quality and yield grading when compared to *Bos taurus* breeds but similar for all *Bos indicus* breeds except Nelore. Like all *Bos indicus* breeds the Guzerat adds environmental adaptability to tropical and subtropical conditions, insect tolerance and some disease resistance, longevity, and maternal ability,

especially in crosses with *Bos taurus* breeds. The cattle are gentle without a disposition problem and are fertile under adverse conditions.



Nelore

Origin

The Nelore is of the species *Bos indicus* (Zebu), and has great dissimilarities to breeds of the *Bos taurus* (European) species, like the Angus, Hereford, Charolais and others. Their most distinctive characteristic is the presence of a prominent “hump” behind their neck, but there are many other fundamental differences between the Nelore and the European breeds.

There has never existed in India a breed called Nelore. This name corresponds to a district of the old Presidency of Madr as, now belonging to the new State of Andra, by the Bengal Sea. It was in Brazil that some authors started to use the name Nellore as a synonym to Ongole, the Indian breed that contributed most to the creation of the Nelore. The history of the Ongole dates back 2,000 years before Christian times. It was the Aryan people that brought the ancestors of the Nelore to India, where they were submitted to extreme weather conditions. The arid lands of Belushistan, the cold winters of Punjab, the alluvial lands of Ganges and the torrid lands by the Bengal sea provided the Ongole breed with the adaptation genes that are now favorably expressed in the modern Nelore.



Brazil has become the largest breeder of Nelore, and from there the breed was exported to Argentina, Paraguay, Venezuela, Central America, Mexico, United States and many other countries. In all those places, the contribution of the Nelore was remarkable, whether through purebred selection within the breed or through crosses with local breeds, many times of European origin.

The Nelore was first acknowledged in Brazil in 1868, when a ship on its way to England carrying two Ongoles stopped in Salvador, Bahia, and the animals were there sold. Ten years later, a breeder from Rio de Janeiro, named Manoel Ubelhart Lemgruber, bought another couple from the Hamburg Zoo in Germany. Then the Nelore breed expanded gradually, first in Rio de Janeiro and Bahia, then in Minas Gerais, having reached Uberaba in 1875.

The creation of the Nelore Herd Book and the definition of the breed standards in Uberaba, 1938, was of great relevance in the formation of the Nelore. In 1960, 20 animals were imported, and in 1962, the last and most relevant purchase of live animals from India authorized by the Brazilian Government, 84 Ongoles were imported. These became founders of important breeding lines like Godahvari, Karvadi and Taj Mahal, and were decisive to the great expansion of the Brazilian herd in the last 30 years, going from 56 million in 1965 to 160 million in 1995, 100 million of which are Nelore.

Distinguishing Characteristics

It is said that there is no ideal breed, and that every breed has strong points and none is better for all important economic traits, the Nelore is certainly the best alternative for economic beef production in the tropics, which are responsible for 65% of the world's bovine population.

1. **Hardiness.** The main advantage that the Nelore has over other breeds of beef cattle is its hardiness. Calves are alert, with an active behavior, standing up and suckling soon after they are born, without any need for constant human intervention. The Nelore has notable physical strength and is unexcelled in its ability to thrive under harsh climatic, nutritional and sanitary conditions, frequent in the tropics. Because of their hardiness and rustling ability, Neloires surpass all other breeds under conditions of poor range and drought.
2. **Heat and Insect Resistance.** The Nelore has a loose skin with sweat glands that are twice as big and 30% more numerous than those of the European breeds. The Nelore's

black skin, covered by a white or light gray coat helps filtering and reflecting harmful sun rays. Its low level of metabolism also contributes to heat resistance, as the Nelore feeds less but often, generating less internal heat. Neloires possess natural resistance to various insects, as its skin has a dense texture, making it difficult for blood sucking insects to penetrate. Neloires also have a well developed subcutaneous muscle layer which enables them to remove insects simply by shaking their coat.

3. **Metabolic Efficiency.** The Nelore can efficiently convert poor quality forages into beef, and withstand long periods without water. Due to their habit of feeding lightly but frequently, Nelore and Nelore hybrid cattle are highly resistant to bloating, and death losses rarely occur from this cause. Excellent feed conversion ratio and good disposition allow the Nelore to be early finished in feedlots, with highly positive results.

4. **Meat Quality.** While the beef of some breeds have excessive marbling, or intramuscular fat, beef from Nelore cattle have enough fat to be highly palatable. The Nelore matches the recent shift in the beef industry towards a low calorie, leaner meat diet, without compromising taste. This was demonstrated at the 1991 Houston Livestock Show and Rodeo, when a purebred Nelore steer won the “Best Overall in Taste” contest, competing against dozens of hybrid and European steers.

5. **Reproductive Efficiency.** Neloires have long, deep bodies with clear underlines, keeping vulnerable parts out of the way of infection. Cows have small udders and short teats, while bulls' sheaths are also short. These characteristics contribute to the breed's reproductive efficiency. Nelore dams have a long and prolific reproductive life, pronounced mothering ability, and plenty of milk for their calves. The Nelore cows calve very easily due to their greater frame, wide pelvic opening and larger birth canal, which reduces the incidence of distocia.

6. **Maternal Instinct and Disposition.** Nelore dams have highly developed maternal instinct throughout the whole milking period, which is of great importance for extensive breeding systems. They lick their newborn, put them to suckle and look for a safe place to hide them from predators. The active and vivid disposition of the Nelore is largely responsible for their unusual thriftiness, hardiness and adaptability to a wide range of feed and climate. Neloires like affection and quickly respond to kind handling methods, becoming extremely docile.

Selection

A lot of genetic variation exists among all breeds, and the selection within a breed is almost as important as the choice of the breed itself. Generation after generation, during thousands of years favoring the survival of the strongest and better prepared to withstand the intense heat, the lack of forages, the prolonged dry season and the many diseases has shaped anatomically and physiologically the ancestors of the modern Nelore with a common denominator: hardiness, fertility and longevity.

Once in Brazil, this natural selection base was then managed and redirected for beef production. The result was encouraging. In a few decades, the Brazilian Nelore became an impressive biotype in terms of uniformity, conformation and quality, still preserving the attributes of hardiness and vivid disposition. Once the ethnic purity was consolidated, the Brazilian Nelore breeders have been selected for body size and muscular development, as well as skeletal soundness.

Each and every registered Nelore sire is the outcome of a complex process of selection. Breeders receive assistance from a nationwide association, the Associação Brasileira dos Criadores de Zebu or ABCZ. Birth weight, weaning weight, yearling weight, scrotal circumference, are some of the traits measured. Research centers and universities calculate EPDs (Expected Progeny Difference) through complex mathematical models

and powerful super-computers, making the results available to breeders to support their selection decisions.



Genetics and Breeding

Today, the number of purebred registered Nelore is above 5 million. The challenge faced by selection is to multiply the genetic gains to a much larger population. To multiply the genetic potential of Nelore sires, Artificial Insemination is being used in large scale since the 60's. Sales of Nelore semen represent 65% of the AI market of all beef breeds in Brazil. The leading Nelore sire there produced and sold 34,000 straws of semen in 1995, followed by another Nelore that sold 30,000, which means that both sires must have bred more than 20,000 cows.

Effort is also being made to multiply the genetic potential of Nelore dams through the use of embryo transfer. With more than 50,000 embryos transferred per year, a great part of which are Neloires, Brazil is already the 3rd country in this technology, after the United States and France. Work is also well under way with frozen embryos, embryo splitting and In Vitro Fertilization of Neloires.

The Polled Nelore

There is a worldwide tendency for the elimination of horns in all cattle breeds through the use of naturally polled animals. The advent of the Polled Nelore, some 50 years ago, has presented the beef cattle industry with an option to avoid the mechanical removal of horns, a common practice, especially in feedlots. This dehorning method is expensive, time consuming and painful for the animal, causing stress and weight loss, besides exposing the steers to various infections. If horns were necessary for defense purpose in a wild environment, today a naturally polled animal brings many advantages.

Management of polled herds is easy and friendly, as herds are more homogeneous and it is possible to gather more animals at one time in the corral or in a truck for transportation. The polled Nelore also presents less injuries from fights, preserving their coats for the leather industry. As a result of these advantages, the number of genetically polled steers in commercial herds is rapidly increasing.

Since the polled type is genetically dominant over the horned type, when a horned dam is bred to a polled sire or a polled dam is bred by a horned sire, approximately 85-90% of the offspring will be genetically polled. That is of great importance to the polled Nelore selection, as breeders have access to both the polled and the horned Nelore genetic banks. It also allows breeders of the horned type to easily start a polled herd simply by using a

polled sire on their dams.



Crossbreeding

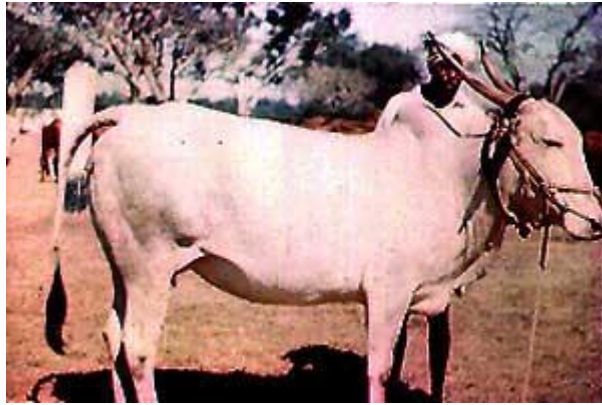
There is a universal trend toward meat production through crossbreeding. Heterosis, or hybrid vigor, is the biological phenomenon in which the performance of the offspring is greater than the average of the parents. The more distantly related the parents are, the greater is the hybrid vigor response in their progeny. Classic scientists like Linneo and Darwin supported the idea of *Bos Indicus* (Nelore) and *Bos Taurus* (European) to be considered separate species due to the differences they presented from the adaptation to environments diametrically opposites in latitude. In beef cattle, maximum hybrid vigor results from crossbreeding these two historically unrelated species.

Hybrid vigor in beef cattle is expressed in heavier weaning weights, increased milk production, greater calf vitality, higher fertility and increased resistance to disease. In addition to increased weight for age and greater carcass efficiency, the hybrid animal inherits to a great extent many economic characteristics of its Nelore parent, such as drought resistance, heat tolerance, disease resistance and increased longevity.

Hallikar

The Hallikar is a *Bos indicus* breed selected primarily for draft purposes and are of the Mysore type of zebu cattle. Considered one of the premier draft breeds in India they are often raised by families who have specialized in production of Hallikar draft animals for hundreds of years. It is not unusual for a cow to be brought 100 miles to mated with a bull from these breeders. They are found primarily in the southern region of Karnataka state, in the area surrounding Mysore, in the bottom of the Indian peninsula. In addition to normal draft uses the breed is also used for cart racing. Once trained, a team of Hallikar oxen can pull a loaded cart over rough roads at a rate of 40 miles per day.

The typical color is dark grey. The Hallikar are the origin of the Amritmahal breed.



Kangayam

The Kangayam cattle conform largely to the Southern Indian Mysore type, though there is evidence of the blood of the gray-white Ongole cattle in their composition. Possibly this mixture has given the breed its larger size in comparison with other cattle of the Mysore type. This breed, in its native area, is also known by other names of Kanganad and Kongu though the name Kangayam is well-known. These cattle are bred in the southern and southeastern area of the Coimbatore district of Madras State in India. It is observed that there are two varieties of Kangayam cattle, one small and the other large. The smaller variety is found to be more numerous in the Kangayam, Dharampuram, Udmalpet, Pollachi, Paddadam and Erode subdivisions, while the larger variety is found in the areas of Karur, Aravakurchi and Dindigul subdivisions. The breed is found in its pure form in the herds of some large breeders, notably the Pattagar of Palayakottai, who is supposed to have one of the best herds of the breed in the country.

Characteristics

Both varieties of this breed are strong and active, with compact bodies and short, stout legs with strong hooves. Horns in the smaller variety spread apart nearly straight, with a slight curve backwards. In the larger variety, the horns are much longer, curve outwards and backwards and almost complete a circle at the point where they approach the tips. The head is of moderate size with only slightly prominent forehead. The head is more proportionate to the body with a straighter profile than in most of the Mysore type cattle. The ears are small, erect and pointed. The eyes are dark and prominent with black rings around them.



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The neck is short and thick. The back is short, broad and level. The body is compact, with well sprung ribs. The quarters are slightly drooping. The dewlap is thin and extends only up to the sternum. The sheath is well tucked up to the body. The hump in bulls, though well-developed, is firm. The hair is fine and short and the skin is dark in pigment and fine in texture. The tail is of moderate length with a black switch reaching well below the hocks.

Kangayam color is usually gray or white. The males generally are gray with black or very dark gray coloring on the head, neck, hump and quarters. In the cows, the prevailing color is white and gray with deep markings on the knees, and just above the fetlocks on all four legs. The calves are light or dark brown with gray or white on the inside of the thighs, ears and forelegs, and occasionally with gray or white rings on the pasterns and fetlocks. At two years the heifer turns gray or dark gray and retains this color but with advancing age after maturity the color fades and becomes white. Male calves become dark gray or iron gray with black shading over the head, neck, hump, dewlap, fore and hind quarters. With maturity the black shading becomes intensified. Castrated males, however, show fading of the color.



Kangayam cattle are of moderate size, active and powerful, and are highly prized draft animals. The cows are generally poor milkers but there are encounters of fair producing abilities.

Kankrej

Also Known by: Bannai, Nagar, Talabda, Vaghiyar, Wagad, Waged, Vadhiyar, Wadhiar, Wadhir, Wadial.

The Kankrej breed of cattle gets its name from a territory of that name in North Gujarat of Bombay Province, India. The breed comes from southeast of the Desert of Cutch in western India, particularly along the banks of the rivers Banas and Saraswati which flow from east to west and drain into the desert of Cutch.

In Radhanpur State, which is adjacent to the Kankrej tract, the breed is known as Wadhiar. In Cutch State it is known as Wagad or Wagadia, taking its name from the community of herdsmen who breed these cattle.



Characteristics

The Kankrej is one of the heaviest of the Indian breeds of cattle.

Color varies from silver to gray to iron gray or steel black. Newly born calves have rust red-colored polls, this color disappearing within 6 to 9 months. Forequarters, hump and hindquarters are darker than the barrel, especially in males. The switch of the tail is black in color. The forehead is broad and slightly dished in the center. The face is short, and the nose looks slightly upturned. The strong lyre-shaped horns are covered with skin to a higher point than in other breeds. The ears are very characteristic, being large, pendulous and open. The legs are particularly shapely and well-balanced and the feet small, round and durable. They are active and strong. The hump in the males is well-developed and not so firm as in some breeds. The dewlap is thin but pendulous and males have pendulous sheaths. Pigmentation of the skin is dark and the skin is slightly loose and of medium thickness. Hairs are soft and short.

The Kankrej cattle are very highly prized as fast, powerful draft cattle. They are also fair producers of milk.

These cattle are resistant to Tick fever and they show very little incidence of contagious abortion and tuberculosis. It has also been observed that the red color is recessive.

Karan Fries

The Karan Fries were developed in India at the National Dairy Research Institute at Karnal. The breed was developed using Holstein (Friesian) and Tharparkar. The percentage of Holstein in the breed ranges from 3/8 to 1/2 of the breeding.



Karan Swiss

The Karan Swiss were developed in India at the National Dairy Research Institute at Karnal. The breed was developed using Brown Swiss and Sahiwal. The percentage of Brown Swiss in the breed ranges from 1/2 to 3/4 of the breeding.

The Karan Swiss is a dual purpose breed with the oxen being well suited for work and the

cows giving good quantities of milk. High producing females will produce 5000 to 6000 kg with a 4.78% butterfat during a lactation.

The breed is usually light gray to dark brown in color. Karan Swiss cows average 127 cm in height and weight in the range of 400 to 550 kg (880 - 1200 pounds). Males will average 136 cm in height and weight from 600 to 750 kg (1300 - 1650 pounds).



Kenwariya

Origin

The Kenwariya are also known as Kenkatha. They get their name from the River Ken, as they are bred along the banks of this small river in the hilly area of Bundelkhand. These cattle are also bred in territories of Panna, Charkhari, Bijawar and Ajaigarh which are part of Vindhya Pradesh in India.

Characteristics

The Kenwariya cattle are small, sturdy and fairly powerful, varying in color from gray on the barrel to dark gray on the rest of the body. The head is short and broad and the forehead is dished. Horns emerge from the outer angles of the poll in a markedly forward direction and terminate in sharp points. Ears are sharply pointed and do not droop. The body is short, deep and compact. The back is straight but the quarters are drooping. The limbs are short but powerful and the feet are hard. The hump is well developed. The sheath is somewhat pendulous and ends with a black tip. The dewlap is moderately heavy. The tail is of medium length with a black switch reaching below the hocks.

This breed is very popular for light draft on the road and for cultivation.

They are observed to thrive on poor feed. Because of the hilly nature of the region and the poor grazing, only animals, which can cover long distances and have strong feet can thrive.

Kherigarh

Origin

The Kherigarh cattle are closely tied to the Malvi breed. The breed is mostly found in the Kheri district of Uttar Pradesh, India. Though the horn formation is typical of the lyre-horned Malvi type, the animals of the breed are much lighter in general appearance than the Malvis.

Characteristics

The Kherigarh cattle are generally white or gray in color. The face is small and narrow. Horns are thin and upstanding and measure 12 to 18 inches in length in bulls; cows usually have smaller horns. The ears are small and the eyes bright. The neck is short and looks powerful. The hump is well-developed in bulls. The dewlap is thin and pendulous and starts from right under the chin and continues right down to the brisket. The barrel is

broad and deep. The sheath is short and moderately tight. Limbs are light. The tail is long, ending in a white switch.

The cattle of this breed are very active and thrive on grazing only. The bullocks are good for light draft and quick, light transport. The cows are poor milkers.

It is estimated that these cattle start work when they are about 4 years of age and weigh about 600 pounds. It is claimed that a pair of bullocks can haul about 1.5 tons of load in a cart to a distance of 30-35 miles in a day traveling at times 3 to 4 miles per hour.

Khillari

Origin

There is every reason to believe that the Khillari breed, with its several varieties, owes its origin to the Hillikar breed of cattle from Mysore State. Unlike some of the other breeds of cattle in India, it does not take its name from a geographical area. Khillar means a herd of cattle, while Khillari means belonging to Khillar; hence the herdsman is known as Khillari; in the Satpura range of hills, he is known as Thillari. There is a special tribe of professional cattle breeders in this region known as Thillaris.

There are four principal types of Khillaris prevalent in the different regions of Bombay State. The variety Hanam Khillar, or sometimes known as Atpadi Mahal (the word Mahal shows strong similarity of cattle of Mysore State), is prevalent in the southern Mahratta States of Bombay. In the districts of Sholapur and Satara and the adjoining areas the variety known as Mhaswad Khillari is prevalent. In the area of the Satpura range of hills comprising the West Khandesh district the variety prevalent is known as Tapi Khillari or Thillari. A variety of more recent origin known as Nakali Khillari - Nakali means "imitation" - is found in adjacent areas of these regions.

In the southern Mahratta States and the districts of Sholapur and Satara the Khillaris are bred by cultivators. In these regions the size of the herd is small, usually not more than one or two cows. In the Satpura ranges the Khillaris are bred by professional breeders known as Thillaris. These breeders produce bulls and bullocks for which there is always a very good demand. Besides their extensive use in their home tracts they are used in the adjacent districts of Poona, Ahmednager, Nasik and Bijapur. Khillaris are classified as "medium fast draft."

Characteristics

The typical Khillari animal is compact and tight skinned, with clean cut features. The whole appearance is like a compact cylinder with stout, strongly set limbs. There is a slight rise in the level of the back towards the pelvis. The ribs are well sprung and give the trunk a barrel shape. The hindquarters are squarely developed and the coup is well-moulded. The gait of the Khillari is quick and spirited.

The Khillaris of the Deccan plateau, the Mhaswad and the Atpadi Mahal types are grayish white in color. The color in the males is deeper over the forequarters and hindquarters, with peculiar gray and white mottles markings on the face. The Tapti Khillari is white with carrotty nose and carrotty hooves. The Nakali Khillari is gray with tawny or brickdust color over the forequarters. Newly born calves have rust red colored polls, but this color disappears within a couple of months.

The forehead in Khillaris is long and narrow with a gradual convex bulge backwards toward the horns. A distinct groove runs in the center of the forehead from the nasal bridge to the center of the poll. The face is lean and long with smooth, tightly drawn skin. The nasal bridge is sharp and prominent. The muzzle is frequently mottled in color, a pink muzzle is not like by some breeders. Eyes are set in elongated fashion and are rather small, though prominent and often a little bulging; thick, wavy skin folds around the eyes

give them a dull appearance and not often liked. Ears are small, pointed and always held sideways. The ears are pale yellow colored inside. Horns are long and pointed and follow the backward curve of the forehead. They are placed close together at the root and grow backwards for half the length and then turn upwards in a smooth bow shape peculiar to this breed. The horns are thick at the base and taper to a fine point. Black colored horns are preferred though pink colored horns are frequently seen, especially in Tapti Khillaris.

The neck is rather short. The dewlap is light with very little fold. The hump in males is firm fleshed and of moderate size. The shoulders are tightly muscled, well set in and merge smoothly with the cylindrical shape of the body. The legs are clean cut, round and straight. The hooves are black with digits closely set. The base of the hoof is small. The barrel is cylindrical. The lines of the back and belly are observed to be almost parallel. The navel flap, as well as the sheath, is tight and close to the abdomen. Hindquarters are well muscled. The tail is just touching the hock joint. The skin is soft and pliable though tightly drawn over the body. The hairs are fine, short and glossy.

Krishna Valley

Origin

The Krishna Valley breed of cattle is used exclusively in the black cotton soil of the watershed of the River Krishna and other adjacent rivers such as Ghatprabha and Malprabha in the southern portions of Bombay State and Krishna Valley tract of Hyderabad State of India.

The breed is of recent origin. It is claimed that during the last two decades of the nineteenth century some of the Rajas of the Southern Mahratta country which lies in the watershed of these rivers tried to evolve a powerful bullock for agriculture purposes in the sticky black cotton soil. It is claimed that Gir cattle from Kathiawar, Ongole cattle from Madras, possibly Kankrej from Gujarat, and local cattle having Mysore-type blood in them were used to evolve the Krishna Valley breed. Maharaja Sangli, at one time a well-known breeder of Krishna Valley cattle, contributed substantially in making judicious use of all these strains to produce the desired type of animal which eventually were used for breeding on a wide scale even before the characteristics were fixed to any extent, there is wide variation in the characteristic of the breed. Massiveness in size was the chief dominating factor which attracted the attention of the cultivators.

The breed is found in the districts of Satara, Belgaum, Dharwar and parts of Bijapur of Bombay State and also in the native States of Miraj, Sangli, Kolhapur and Jamkhindi which are now part of Bombay State also. They are also bred in the southwestern part of Hyderabad State.

Characteristics

As the breed is an admixture of at least three distinct types, Gir from Kathiawar, Ongole from Madras State and local beasts with blood of the Mysore basic type, it shows a variety of characteristics which in its short history of formation have not become well fixed. However, certain characteristics were emphasized by the original breeders and had a greater chance of perpetuation.

The animal is large, having a massive form with deep broad chest, but is loosely built.

The color most sought after is gray-white with a darker shade on the forequarters and hindquarters in the males. Adult females look more white. Brown and white, black and white and mottled colors are often met with. The forehead has a distinct bulge surmounted by small curved horns which usually emerge in an outward direction from the outer angles of the poll and curve slightly upwards and inwards but which vary a great deal in size and shape. The neck is short and thick and the dewlap is well-developed and pendulous. The

sheath is also slightly pendulous. The ears are small and pointed and breeders prefer them not the droop too much.



The body is short but the barrel is large and well-developed. Legs are short and thick and look powerful. Hooves are said to be soft.

The Krishna Valley is a heavy draft breed suitable for cultivation purposes in the black cotton soil area which becomes extremely difficult to work during the rainy season, and for hauling heavy loads. on account of contributions from Gir and Ongole it has also potentialities of milk production. However, the milk-producing capacity is extremely variable in the breed.

Due to the softness of the hooves and the heavy weight of the animals they are not generally appreciated by the cultivators in areas other than the native home of the breed. However, their large size and heavy weight attracted the attention of breeders from Brazil and the United States of America but, though animals of this breed were exported to these countries, they did not retain their identity.

Malvi

Origin

The Malvi is primarily a draft breed which has developed in to different strains which are heavy, light or medium in size, depending on soil conditions. These cattle are mainly bred in the Malwa tract of Madhyabharat State of India. In the western parts adjoining Rajputana the type bred is larger in size. In parts of Madhya Pradesh where Malvis are bred, it is smaller in size. It is also bred in the northeastern section of Hyderabad state, where it is a popular breed for medium and light draft on the roads and for cultivation. It has been said that the Malvis resembles the Kankrej in many ways.

Characteristics

Malvi cattle have short, deep and compact bodies. The back is straight but the hindquarters are drooping. The legs are powerful but short and the hooves are strong and black in color. The dewlap is well-developed and the sheath is moderately pendulous. The head is short and broad with dished forehead. The hair around the eye sockets and the eye membranes are black in color. The muzzle is broad, dark colored and slightly upturned. The horns, which emerge from the outer angles of the poll in an outward and upward direction, are strong and pointed. The ears are short and pointed and not drooping. The tail is of moderate length with black switch reaching to about the fetlock. The color is gray almost black on the neck, shoulders, hump and quarters. The cows and bullocks eventually become nearly pure white with age.

The breed is well-known for draft qualities. It is observed to be good on the road for quick transportation. Also the bullocks work well in the black cotton soil. They show great endurance and ability to carry heavy loads on rough roads. The cows observed in the

village areas are observed to be poor milkers but selected cows on the farm show that they can produce 2,000 to 2,700 pounds of milk per lactation.

Mewati

Origin

Mewati cattle are found in the tract known as Mewat, but the breed is sometimes called Kosi, due to the large numbers of cattle of this breed sold from the market at Kosi, a small town in the district of Mathura. Mewati cattle are similar in type to Haryana, but show definite evidence of Gir blood. Native habitants of Rath and Nagori cattle being adjacent to Mewat, these two breeds may also have contributed to the formation of the Mewati.

Characteristics

Mewati cattle are usually white in color with neck, shoulders and quarters of a darker shade. Occasionally, individual beasts have Gir coloration. The face is long and narrow with the forehead slightly bulging. Horns emerge from the outer angles of the poll and are inclined to turn backwards at the points. Eyes are prominent and surrounded by a very dark rim. The muzzle is wide and square and the upper lip thick and overhanging, giving the upper part of the nose a contracted appearance. The muzzle is pitch black in color. The ears are pendulous but not so long.

The neck and the whole frame is strong but the limbs are light. The legs are relatively long and the frame of the body gives an impression of being loosely built. The chest is deep but the ribs are flat. The head and neck show an upright carriage. The dewlap, though hanging, is not very loose. The sheath also is loose but not pendulous. The legs are fine and round with strong, somewhat large hooves, well-rounded in shape. The tail is long, the tuft nearly reaching the heels. Cows usually have well-developed udders.

Mewati cattle are in general, sturdy, powerful and docile, and are useful for heavy plowing carting and drawing water for deep wells. The cows are said to be good milkers.

Nagori

Origin

Nagori cattle are prevalent in the former Johrpur State, now a part of the State of Rajasthan in India. Nagori cattle are classified into the short-horned white or light gray cattle with a long coffin-shaped skull, orbital arches which do not prominent, and their face is slightly convex in profile. It has been suggested that probably the blood of gray lyre-horned cattle might have entered into the composition of Nagori cattle. Taking into consideration the proximity of the native homes of the Haryana in the north and northeast and Kankrej in the south and southwest, it seems reasonable to suppose that Nagori cattle may have evolved from these two groups. Frequency of famines in its native home has necessitated extensive movements of the cattle to other regions in search of fodder, and this has no doubt led to frequent intermixture.

Characteristics

Generally the Nagori cattle are fine, big, upstanding, active and docile, with white and gray color. They have long, deep and powerful frames, with straight backs and well-developed quarters. There is throughout the Nagori breed a tendency to legginess and lightness of bone, though the feet are strong. It is supposed that this characteristic has given the breed its agility and ease of movement.

The face is long and narrow but the forehead is flat and not so prominent. The eyelids are rather heavy and overhanging and the eyes are small, clear and bright. The ears are large and pendulous. The horns are moderate in size and emerge from the outer angles of the poll in an outward direction and are carried upwards with a gentle curve to turn in at the points. The neck is short and fine, and looks powerful. The dewlap is small and fine. The

hump in the bulls is well-developed but not so firm and thus in many cases hangs over. The shoulders and forearms look muscular and powerful. The legs are straight with hooves compact, strong and small. The tail is of moderate length reaching just below the hocks and terminating in a tuft of black hair. The sheath is small. The skin is fine and slightly loose. The cows usually have well-developed udders with large teats.

The Nagori breed is one of the most famous trotting draft breeds of India and is generally appreciated for fast road work. As such, more attention has been paid by the breeders towards producing an agile yet powerful animal with a great deal of endurance.

Nagori cattle are famous as trotters, being used all over Rajputana in light iron-wheeled carts for quick transportation. They are also worked for all agricultural purposes, such as plowing, cultivation drawing water from wells and transportation of field produce to markets.

Nimari

Origin

Nimari cattle show a mixture of Gir and Khillari (Tapi Valley strain) breeds. The breed has taken the coloration from the Gir as well as its massiveness of frame and the convexity of the forehead. It has acquired the hardiness, agility and temper of the Khillari with the formation of feet and occasional carrot color of the muzzle and hooves. Starting from Barwani and Khargone districts of Madhyabarath, the breed spreads into Khandwa, and parts of Harda of Madhya Pradesh. It is also bred in adjacent parts of Bombay State. In the Satpura ranges of Madhya Pradesh there is a strain of cattle known as Khamla, which is much smaller in size but very akin to the Nimari. In addition, the Khamgaon strain found in Berar may be an offshoot of the Nimari. This breed of cattle is prized for draft work, though few animals show evidence of fair milking qualities.

Characteristics

The animals are well-proportioned and compact in appearance. In general they are red in color with large splashes of white on various parts of the body. In the Khamgaon strain the color is occasionally black or light red and white. In the Khamla strain it is red with a violet tinge and white or yellow and white.

The head is moderately long with a somewhat bulging forehead, it is carried alertly and gives the animals a graceful appearance. The horns usually emerge in a backward direction from the outer angles of the poll, somewhat in the same manner as in Gir cattle, turning upwards and outwards and finally backwards at the points. Occasionally, the horns are also like the Khillaris in size and shape, with copper color and pointed. The ears are moderately long and wide and are not pendulous. The muzzle in many animals is either copper-colored or amber-colored.

The body is long, with a straight back and moderately arched ribs with the quarters usually drooping to some extent. There is a tendency to prominent hips common to the Gir. The dewlap and sheath are moderately developed, though the sheath is apt to be pendulous. The hump in bulls is well-developed and apt to be hanging at times. The limbs are straight and clean and the tail is long and thin with a black switch reaching to the ground. Hooves of the animals are strong and can stand rough wear on stony ground. The skin is fine and slightly loose. The cows usually have well-developed udders.

Ongole

Origin

The Ongole breed, like other breeds of cattle in India, takes its name from the geographical area in which it is produced. It is also called the Nellore breed for the reason that formerly Ongole Taluk, a division of a district, was included in the Nellore district,

but now it is included in the Guntur district. The area is part of the Andhra Pradesh in India.



This breed is included among the gray-white cattle of the north, having white or gray color, stumpy horns and a long coffin-shaped skull. It has a great similarity with the Gaolao breed of Madhya Pradesh and also has a resemblance to the Bhagnari type of cattle in the north of India. This similarity is not surprising in view of the fact that these breeds lie along the path taken by the Rig Vedic Aryans in their march from the north to the south of India.

It is claimed that the finest specimens of the breed are found in the area between the Gundalakama and Alluru rivers in the Ongole and Kandukur taluks, and also in the villages of Karumanchi, Nidamanur, Pondur, Jayavaram, Tungtoor and Karvadi and along the banks of River Musi. They are also famous from the taluks of Vinukonda and Narasraopet.

Characteristics

The Ongoles are large-sized animals with loosely knit frames, large dewlaps which are fleshy and hang in folds extending to the navel flap, and slightly pendulous sheaths. They have long bodies and short necks; limbs are long and muscular. The forehead is broad between the eyes and slightly prominent. Eyes are elliptical in shape with black eyelashes and a ring of black skin about 1/4 to 1/2 inch wide around the eyes. Ears are moderately long, measuring on an average for 9 to 12 inches, and slightly drooping. Horns are short and stumpy, growing outwards and backwards, thick at the base and firm without cracks. In some animals the horns are loose; this is probably due to the horn core not growing well.

The hump in the males is well-developed and erect and filled up on both sides and not concave. The skin is of medium thickness, mellow and elastic and often shows black mottled markings. The popular color is white. The male has dark gray markings on the head, neck and hump and sometimes black points on the knees and on the pasterns of both the fore and hind legs. A red or red and white animal of typical conformation is occasionally seen. They have a white switch of the tail, white eyelashes, a flesh colored muzzle, light colored hooves, dark gray marking on the hindquarters and dark mottle appearance on the body.

Ongole cattle are efficiently used in their native home for both work and milk production. They are usually docile and the bulls are very powerful, suitable for heavy plowing or car work but are not considered to be suitable for fast work or trotting purposes. The cows are fair milkers.

All animals currently used for food and agriculture and the result of Domestication from wild progenitor species like their wild relatives. These Domestic species are continuously evolving albeit at an accelerated rate due to human activity. In general the history of cattle followed the history of man, where even either primitive or modern. Man has migrated he

has tended to bring with him his own breeds of cattle. During vedic period many of the useful animals have been brought under service of man, particularly

Milk became useful since Rigvedic period. The selected those animals species that are having vigor, inborn nearness, social ability and docility. The evolutionary process has been accelerated in the domestic species particularly cattle, as a consequence of 10,000 years of selection by human, during this period with in the species genetic variation which is essential for the survival of all species, has been partially redistributed in the formation of the large number of unique cattle breeds now exists.

These breeds have adopted too many environments as the breeds spread and have been used to produce different types and combinations. A major group of mammals to be domesticated after caprinae were the large ruminants (Bovinae), which included the humped (*Bos indicus*) and hump less (*Bos Taurus*) cattle, yak, mithun, banteng and buffalo. This range of species in the family Bovinae make a very large number of important contributions to food and agriculture, providing just under 30% world meat and 87% world milk. This Bovinae provided the planet with a means of digesting via fermentation. Same types of zebu animals are present from the time of Indus Valley civilization dating back to 3000 BC Indian subcontinent is a treasure house of *Bos-Indicus* Cattle.

Farmers in the breed tract has selected and preserved each successive variation, with the distinct intention of improving and altering a breed, in accordance with a preconceived idea, and by thus adding up variations, often so slight as to be imperceptible to the uneducated. He has effected wonderful changes and improvements in the direction he desired as we see here under in Ongole Breed from 1880. There is a tendency in the breed to grow leggy with sparse light carriage, but their form, temper and endurance earned nearness to the breeders.

Effect of heat loads on Ongole cattle

Radiation:

Solar radiation received from sun is through solar terrestrial. The amount of radiation emitted for a particular location depends on global positioning, latitude, and longitude. Infrared radiation is intense in tropics, having sterilizing effect, stimulates tissues, increases metabolic processes. Non-pigmented skin has a definite hazard. 85% of solar radiated heat is sent back to the environment by the Ongole animal through its white, reflective coat. Diurnal variations such as seasons, humidity, latitude, altitude, influences variation in radiant heat loads. The rest 15% of heat immediately absorbed by the under lying black skin. When the animal has nine blacks, total body skin will be black these cattle reduces heat load through behavioral means, and postural adjustments, also orientation towards sun make it protect its own parts through shade and thus reducing heat loads. Long legs of this breed helps in minimizing absorption of solar radiated heat. Light carriage also helps are exposed to sun.

Conductive and convective heat loads on these cattle transfer between surroundings and direct contact through soil and bedding, drinking water, feeds and fodders. Avoiding lying down stretching its body parts also helps.

Light is the most constant factor having vigor. Light influences on pituitary, shedding of hair on seasons, increase in metabolism, vision. High light intensity decreases cell wall content and increases water-soluble carbohydrates in vegetation and thus influences livestock.

Relative Humidity: Percentage of moisture in air is humidity. Air moisture content influences animals heat balance particularly in warm climates where evaporative cooling is crucial to homeothermy. High humidity associated with high temperature favors less

nutritive value of feeds and fodders, of ten the stock are light colored, with pigmented skins, and shade lovers. These influence humidity aerial movement, transpiration, rainfall and temperature.

Characters associated with hardiness and thriftiness:

- Has the ability to reverse down metabolism during extremes of scarcity.
- Efficient forager and does not force the calf for foraging.
- Fruitful in milk with exact fat percentage to keep the calves at rapid growth.
- Tight sheath and small teats to avoid injuries of grazing animals.
- Sloppy rumps are suitable for quick and hard work, having 4 sacral vertebrae.
- Have more number of bigger, functional, sweat glands per unit area of the skin.
- Having white or light colored, short, sleek, densely, reflecting and glistening coat, which will not attract vectors and dislodge them with insulting character.
- Skin, pigmented, black, mellow, loose, thick and presence of subcutaneous panniculus carnosus muscle, which repels vectors by twitching.
- Highest heat tolerant coefficient.
- Basal metabolic rate low.
- Nutritional uniqueness, ability to convert low protein, high fiber roughage materials into high-grade foodstuffs with the aid of Omasal symbionts, such as thrives and performs well on inferior fodders.
- Crude protein utilization is highest.
- Perform well where even pastures are seasonal, scanty, and sparse.
- Spent much time in grazing even during daytime, seek shade only 3% of their total grazing time.
- Slow to cycle, when under nutritional stress or lactation stress, but response to cycle is immediate when nutrients are plenty.

Ongole Breed Tract:

Originally the breed tract comprises areas where there is no assured or commercial crops, leaving cattle raising as the only profitable proposition by selling bull ghee (Clarified butter), since crops and cultivation are not profitable. The farmers are quite aware of the food, investment, manure, forage, draught animal power and employment linkages, improving through subsistence security, transfer of nutrients, modification of vegetation and finally increasing the human support capacity of the land through Ongole breed of cattle. These cattle raising formed a part of risk education strategy with agriculture, as livestock is a saving account and their calves are interest. The farmer is quite conscious of the herd management policy options on direct costs and indirect costs, breeding, off take, purchase and culling. It clearly indicates this breed is originally dairy, later transformed as dual purpose i.e., dairy and draft animals, presently mostly a draught animal.

The breed tract comprised between rivers Krishna on Northern side, Pennar River on Southern side, nalamalai range of forest on Western side and Coromandai coast on Eastern side lying between 15.00 to 16.10' east latitude and 79.04' to 80.02' north longitude. The rivulets gundlakamma, madigandi, Paleru, Muneru, Musi, Chilakaleru. Whose extensive banks became excellent grazing areas. With population growth and consequent demand for cereals the Brahmini bull selection system has been oriented towards draft characters. The soils are black loam to black clay having large quantities of lime with soil pH of 6.9 to 7.2 most favorable for notification bacteria and luxuriant growth of legumes. Annual rain fall of about 900mm with about 50 rainy days out of

which 2/3 roads are from southwest monsoon and 1/3 from northeast monsoon supporting most of the cereal crops. The average ambient temperature of maximum 32 degrees Celsius and minimum of 23.5 degrees Celsius and average relative humidity of 79%.

After formation of Krishna and Godavari Ayacuts during 1850's with assured irrigation and increased demand for draft services, the breed tract extended to Krishna, Godavari and northern circars. Original tract is for breeding and extended tract for breeding and rearing, further ceded districts and Nalgonda and Mohaboob Nagar districts as rearing tracts. Extension of breed tract forced for 2 reasons. The demand for draft services from the area and generally the same species need the same resources and thus are bound to complete for the same, except when they are colonizing a new habitat, as such expansion of the tract.



Ongole Cattle Breeding:

Before organized efforts of the colonial rule, the institution of Brahmini Bull system in the Ongole area has substantially improved the breed by avoiding inferior breeding and inbreeding. It has been the custom in the area that dedicating a young bull selected by a village committee funded by village rich men or the local diety and the bull being branded at a ceremony either with Sanku, Chakra, Trisul, then becomes common property and Brahmini bull is the property of the village and covers the village herd, this is how a small farmer provided the stud services. The changes in cropping pattern from cereals to commercial crops like chillis, and Tobacco during the 1930's and cotton during 1960's have badly affected the breeds feed resources.

With the introduction and expansion of artificial insemination programs rapidly has resulted in affecting the distribution of breeding bulls under various schemes have been stopped and there is decay in the institution of Brahmini Bull system which primarily supported the breed for centuries. During 1960's introduction of Taurus breeds through aid programs has helped large scale indiscriminate breeding in the valuable Ongole herds. Like all other resources, the livestock wealth should also to be carefully and properly utilized and preserved. Planners in an attempt to improve milk production in Ongole cattle did many mistakes. One major error was the perception that output reflects efficiency, Hence the use of exotics on Ongoles to improve indigenous stock. Output was very often the main criteria for which a breed was imported. Finally after sinking in a lot of money and time, we could learn that genetics is only one and often not the main tool that can ensure greater efficiency of output. Husbandry, survival, health, reproduction efficiency of feed utilization parameters becomes important. In a craze for cross breeding the excellent government herds built up for decades were also not spared by the planners. The saying that breeding policy should depend on animal, existing production potential, anticipated, goals, environment, man and economic development rather than prejudice, taste and trivial dictates.

Character associated with disease resistance:

- Premunity high.

- Reticulo endothelial system well developed.
- Resistant to eye cancer.
- Through their coating, insulating, secretory characters are more resistant to tick born diseases.
- Zebum secretion is fly repellent.
- Flexible tail tip, having cartilage in place of last 3 or 4 vertebrae helps as a brush to repel vectors.

The effects of climatologically variables on Ongoles are varied. High external heat load due to both radiant and high air temperature exposure depends on degree, and duration. On acute exposure the animal tries to accommodate rather than combat. As a routine the metabolic heat and the catabolic heat produced within the body also needs to be eliminated. When heat loss mechanism reaches its maximum values the animal resorts to methods of reducing heat production in an effort to achieve homeothermic. Reduction in calorogenic hormones accompanies decrease in Basal Metabolic rate, voluntary feed intake, muscular and ruminal activity and changes in release of gonadotrophic hormone and thus reduced sexual activity. Ability of animals to maintain core temperature in physiological adaptability and the ability to maintain production/reproduction/growth rates in productive adaptability. These two are often at variance. Thus selection of traits of physiological adaptability is often incompatible with improvement of production and consequently they are undesirable. Mere reproductive opportunism is generally short lived, if the adaptive ness of the organism is not maintained and almost invariably proves self-limiting. This is not the case with the Ongoles. Long range fitness of ongole cattle population depends on adaptation, through the stability, variability and the rate of environmental changes helped through domestication by the farmers as they are treated as family pets. Selection of Ongoles, which attain homeothermy mostly by heat loss mechanism without resorting to reducing the heat production would be those of choice from economic view point.

Soil pH:

No larger breeds of livestock were ever bred in acid pH soils. The soil pH being 7.2 in tract most favorable for legumes. So it increased muscle protein and skeletal size. Cattle in acid pH soils are small in size and are shade lovers.

Feeding:

The fodder crops, grasses and trees that supported the breed for centuries need to be enlightened. The fodder crops either grain or crops or crop residues available from sorghum, zeamays, crotalaria, macrotylma, vigna, cicer, pennisestum, sataria, oryza, kollaganjeru, fodder trees like acacia, azaridachta and fiscus are also used to shade trees. The fodder grasses that were grown naturally on rivers and rivulets banks, private grazing lands and common grazing lands include andropogan, iseilema, indigofera grasses species has maintained this breed for centuries. After formation of ayacut the Ongole cattle need to go to forest for grazing from June/July and return only after December/January, surviving predation and theft later attending to threshing operations of cereals. The migration of population from rural to urban areas, changes in society and pressure on land working against the interest of Ongole cattle, since they are located specific the available poor, scanty, sparse, and seasonal fodders which are low in protein and high in fiber need to be improved by inter-cultivation of legumes, intercropping, chaffing, treatment by way of extensive use of agro industrial bye products should be extensively used.

Characters associated with self-reliance:

- Enduring and estimable.

- Docile but alert.
- Intelligent and respond well for treatment if handled with love, skill, and care.
- Athletic in nature, with majestic appearance, head high, square walk and quick step, giving noble but heavy look.
- Try to move in groups to avoid predators.
- Highest ability to self-preserve and longevity is more than 15 years.
- Long bodied with big skeletal size and with ability to gain weight more perceptible after 2 years of age and massive.
- Lack in heart girth due to preponderance of draught type.
- Vitality and Vigor unique in young ones.
- Outstanding Mothering ability.
- Highest combining ability for cross breeding and formation of new breeds.
- Highest rustling ability to walk long distances in search of food and water and to pace with the herds.
- Marked tolerance to direct sunlight and radiation.
- Loose skin, hump, dewlap and other appendages contribute 12% excess surface area per unit weight over Taurus breeds.
- Outward disposition of horns helps defend from predators.
- Have highest coetaneous and lowest respiratory heat loss as such panting is less.
- Have highest multiple ability of adaptation for climate fodder and pathogens.
- Sensitiveness, intelligence and shyness make them more independent and less dependent on man, more energetic and resourceful.
- Reproductive uniqueness, higher reproduction rates and more number of lifetime calves high calf survival rates.
- Calving ease and minimum dystokias, with more birth weight of cattle.



Skin:

The skin covers body and provides protection literally a thermostat for the body. Heat flows from core organs like brain, heart, liver, spleen, intestines, and lungs to surface of body and from surface it should be sent out to environment through radiation, conduction and convection. Skin contains sebaceous and sweat glands, muscles, roots of hair, fallacies and capillaries. When all nine blacks are present, the whole skin is pigmented and black. The presence of subcutaneous “panniculus carnosus” muscle helps in repelling vectors through twitching. When sweating/respiratory heat loss is 6 in zebus where as it is only 4 in Taurus breeds. Water resorption in kidney and colon is double that of the Taurus. Though skin studies were done in 10 indigenous breeds in India no work was done in Ongoles, but the skin type may lie between type 1 and type 3. Skin being highly vascular more heat is sent out as sensible heat loss or diffusion heat loss. In Ongoles

evaporative and sweat contribute much heat loss.

Ongoles cattle skin secretes zebum, which filters ultraviolet rays. Due to high vascular they bleed profusely if punctured and wounds will heal quickly. Being black in color the 15% of solar heat allowed by coat to pass on is at once absorbed by the skin. Our farmers are so intelligent that umbrellas are black in color but in villages they used to stitch white cloth over the black cloth on the analogy of the structure of Ongole cattle i.e. white external coat and black underlying skin. During evolutionary process the body temperature has been increased, at the same time tolerance for that temperature failed to take place in male gametes. This was circumvented through effective thermoregulation mechanism of tests.

Ponwar

Origin

The Ponwar is small and compact with frequent white markings on the forehead, dewlap and limbs. Black and white color is often seen in the hill type of cattle and these features are also common in the Ponwar breed. However, the horns are inclined to be lyre-shaped, which may be due to some mixture of the nearby plains cattle. The breed is restricted to a small geographical area of Pilibhit district of Uttar Pradesh, India.

Characteristics

The animals of this breed possess a small, narrow face, small ears and big, bright eyes. The forehead is slightly concave and often has white marking. The horns are long, upstanding and lyre-shaped. They measure from 12 to 14 inches in length.

The neck is short and powerful. The barrel is moderately long. The sheath is short and tight. The dewlap is light and thin. The hump is well-developed in bulls but is small in cows. The cows have small and poorly developed udders. The tail is long and tapering with a white switch.

Ponwar cattle are usually black and white; the color markings do not have any particular pattern, but large patches of black and white are intermixed.

The cattle of this breed are active and often fiery-tempered. They are observed to thrive well under free grazing conditions. The bullocks are good for draft purposes. They are quick movers. The animals of this breed are observed to mature late. The cows are poor milkers and are rarely milked even in the flush of their production.

Rath

Origin

Rath cattle belong to the white, narrow-faced, stumpy horned group of cattle represented by the Haryana cattle. As a distinct type, they are bred in a very small area in Alwar of Rajasthan State. Particularly the area between Bansur and Narnaul and between Mundawar and Narnaul is noted for pure specimens of the breed. They are also bred in adjacent areas but, owing to the proximity of other similar breeds such as Haryana, Mewati and Nagore, they are likely to be mixed with these in strain. Rath cattle are reputed to be economical to maintain. As medium-sized draft cattle, they are considered very suitable for work in the plow or on the road. The cows are fairly good milkers.

Characteristics

Rath cattle are medium-sized but powerful, with white or gray coloring. In the bull, the coloring of the neck and shoulder is generally darker than the rest of the body. The face is straight, narrow and medium-sized. The forehead is flat and does not show any protuberance in full-grown animals. Young animals under 3 years occasionally show this protuberance but it straightens up as the animal reaches maturity. The nasal bones are

somewhat wide and coarse. The muzzle is wide and black. The eyes are wide open and clearly defined by the dark eyelids. Horns are small and emerge laterally in a somewhat forward direction from a moderately broad poll and curve inwards at the tips. The ears are short and pendulous, the inner surface facing forwards.

The neck is fairly long. The hump is moderately developed, placed well in front of the withers. The dewlap is light and the sheath is very small. The body is of moderate length with deep chest and well-sprung ribs. Quarters are well-developed and also the legs. The tail is short with black switch and set rather high giving the quarters a somewhat drooping effect. The feet are small and compact.

As the area in which Rath cattle are bred is dry and with very limited grazing, the number of animals in the area is restricted, but at the same time, this has kept the breed pure as no outside animals come into the region for grazing purposes. It is observed that they are economical to maintain and are regarded as a poor man's breed. The bullocks are very good workers in this area being of heavy sand, powerful and active bullocks are essential and Rath beasts are well suited for this work. They are observed to work steadily for 10 hours a day in fields and can travel about 20 miles a day carrying a load of half a ton in heavy sand. They are created with long life.

Rathi

The Rathi is a *Bos indicus* breed used for draft and dairy purposes. It originated in Bikaner and Ganganagar in northwest Rajasthan, India. The breed is usually dark red or tan but occasionally spotted individuals can be found. The Rathi originated from the Sahiwal and Tharparkar breeds. They should not be confused with the Rath breed which is a separate breed kept by the nomadic Rath cattle breeders.



Red Sindhi

Also Known By: Malir (Baluchistan), Red Karachi, Sindhi

The Red Sindhi originated in the Pakistani state of Sind but due to its hardiness, heat resistance and high milk yields they have spread into many parts of India and at least 33 countries in Asia, Africa, Oceania and the Americas.

Under good management conditions the Red Sindhi averages over 1700 kg of milk after suckling their calves but under optimum conditions there have been milk yields of over 3400 kg per lactation.

The average height of a Red Sindhi cow is 116 cm with a body weight of 340 kg. Bulls average 134 cm in height and a body weight of 420 kg. They are normally a deep, rich red color but this can vary from a yellowish brown to dark brown. Males are darker than females and when mature may be almost black on the extremities, such as the head, feet

and tail.



Sahiwal

The Sahiwal originated in the dry Punjab region which lies along the Indian-Pakistani border. They were once kept in large herd by professional herdsmen called "Junglies". However with the introduction of irrigation to the region they began to be kept in smaller numbers by the farmers of the region, who used them as draft and dairy animals.

The Sahiwal is one of the best dairy breeds in India and Pakistan. It is tick-resistant, heat-tolerant and noted for its high resistance to parasites, both internal and external. Cows average 2270 kg of milk during a lactation while suckling a calf and much higher milk yields have been recorded. Due to their heat tolerance and high milk production they have been exported to other Asian countries as well as Africa and the Caribbean. As oxen they are generally docile and lethargic, making them more useful for slow work.

Their color can range from reddish brown through to the more predominant red, with varying amounts of white on the neck, and the underline. In males the color darkens towards the extremities, such as the head, legs and tails.



Siri

Origin

Animals of this breed are found in the hill tracts around Darjeeling (Bengal, India) and in Sikkim and Bhutan. Bhutan is said to be the real home of this breed. It is distributed from that area to the various parts of Sikkim and Darjeeling. The Siri has a hump that is thoracic and muscular-fatty. Presumably Siri cattle have some blood from the cattle in Tibet. Small cattle with similar black and white markings have been found in Sikong Province of China, which occupies a portion of the Tibetan highlands northeast of Bhutan. Siri cattle crossed with Nepali cattle look like Siri, but they can be distinguished by their color pattern and position of hump and horns. These are known as Kachcha Siri or imitation Siri cattle.

Characteristics

The color most frequently seen are black and white or extensive solid black, in color

patterns similar to that of Holstein-Friesians. The animal carries a thick coat all the year round, and it is generally believed that this protects them from heavy rains and severe cold. The general form of the animal is massive. The head is small, square cut and well set on. The forehead is wide and flat. The horns are sharp and directed forward and is usually covered with a tuft of long coarse hair. The position of the hump is slightly forward compared with that of other Zebu breeds. The dewlap is moderately developed and the sheath in the male is tight. Strong legs and feet are characteristics of this breed. The hooves are broad but strong. The udders of the cows are well developed.

It is observed that the animals of this breed can stand the rugged conditions of the mountains very well. When the animals are brought down to the plains they do not seem to do so well. Bulls are eagerly sought after for draft purposes due to their size and reputed great strength. They are also used for agricultural work such as plowing, cultivating, threshing, etc.

Tharparkar

Also Known As: White Sindhi

Origin

The Tharparkar a *Bos indicus* breed used for milk production and as draft animals. Tharparkar are of the lyrehorned type of zebu cattle. The Tharparkar came into prominence during the first World War when some animals were taken to supply milk for the Near East army camps. Here their capacity for production under rigorous feeding and unfavorable environmental conditions at once became apparent. Since then many breeding herds have been assembled in India and Pakistan. When left on arid pasture the milk production is approximately 1135 kg per lactation, while those animals maintained in the villages average 1980 kg.

In India and abroad, these cattle are known as Tharparkar since they come from the district of that name in the Province of Sind. The Tharparkar is, however, known differently in its own region. In its native tract and the areas neighboring on it, the breed is called Thari, after the desert of Thar; and it is also occasionally known as Cutchi, because the breed is also found on the borders of Cutch which adjoins Tharparkar to the south. Then again, in the past these cattle have been known as White or Gray Sindhi, since they are native to the Province of Sind and similar in size the Red Sindhi: this name, however, is no longer used. The Thari is not a homogeneous breed, but that it has the influence of the Kankrej, Red Sindhi, Gir and Nagori breeds.

It is observed that the typical Thari cattle are found in the areas in the vicinity of Umarnot, Naukot, Dhoro Naro, Chhor, Mithi, Islamkot and Khari Ghulam Shah. They are also produced in the adjoining Indian States of Jodhpur, Jaisalmer and Cutch.

Tharparkars are usually kept in herds of 50 to 300 animals by professional breeders called Maldars. They require daily contact with people to prevent them from becoming shy and wild. Tharparkar cows average 138 cm in height and an average weight of 408 kg.

Characteristics

Average animals of the Tharparkar breed are deep, strongly built, medium-sized, with straight limbs and good feet, and with an alert and springy carriage. As the animals are not handled frequently they are apt to be wild and vicious.

The usual color of the cattle is white or gray. In males, the gray color may deepen, particularly on the fore and hind quarters. All along the backbone there is a light gray stripe. The color of the cattle deepens during the winter months and also when the cows are pregnant. In the Thari tract, in addition to white and gray coat color, black and red or

combinations thereof are usually encountered on account of the influence of the Red Sindhi and Gir.

The head is of medium size, the forehead broad and flat or slightly convex above eyes: the front of the horns and face are practically on one plane. The skin between the eyes is often wrinkled, the wrinkles running perpendicularly. The eyes are full and bright. The eyelashes are black and there is a small ring of black on the eyelids.

The ears are somewhat long, broad and semi-pendulous and face forwards. Horns are set well apart curving gradually upwards and outwards in the same line as that of the poll with blunt points inclined inwards. A small portion of the skin with hairs extends over the base of the horns. In the males the horns are thicker, shorter and straighter than in the females.

The hump in males is moderately well developed, firm and placed in front of the withers. The dewlap is of medium size and the skin is fine and mellow. The sheath in the males is of moderate length, and is semi-pendulous. The navel flap in the females is prominent. The size is variable. Shoulders are light and legs are comparatively short, but in good proportion to the body. The hooves are hard and black, of moderate size and have no tendency to turn out.

The color of the skin is black, except on the udder, under the belly, on the lower part of the dewlap and inside the ears where it is rich yellow. The hair is fine, short and straight, but in the male it is slightly curly on the forehead.

Thari cattle are said to be very hardy and resistant to several tropical diseases but definite date is lacking. Although animals of the breed are excellent foragers and can stand the rigors of climatic and environmental conditions, they have not been used primarily as a source of meat, and breeders have given little attention to meat qualities.



Umblachery

Also Known By: Jathi madu, Mottai madu, Southern Tanjore, Therkuthi madu

The Umblachery is found in the region of Thanjanvur, Tamil Nadu in India. It is a draft breed of the zebu type, similar to Kangayam but smaller. They are grey with white points and back-lines. Calves are red or brown with white markings. The breed is rare.