

Review

Biodiversity of Indian Livestock in 13th Century: A ReviewPravin Bankar^{1*} and Snehal Patil²¹College of Veterinary and Animal Sciences, Akola-444104, MAFSU, Maharashtra, India²Livestock Development Officer, PanchayatSamiti, Akola-444001, Maharashtra, India**ABSTRACT**

Categorization of domestic animal diversity on the basis of phenotypic traits has been an important step in understanding life on earth. Classification of animals on the basis of coat color, geographic origin, behavior, etc., highlights the earlier attempts for the description of phenotypic attributes of domestic livestock. Classification of domestic animals gives an idea for understanding history and is essential for effective conservation of genetic diversity. All modern classification systems have their roots in the Linnaean classification system, developed in the 17th century. However, a systematic attempt at classification of wild and domestic fauna based on behavior and phenotype was made in the 13th century only in India. A Jain monk, 'Hansadeva' has described in detail the classification of domestic and wild animals in his Sanskrit book, '*Mrigapakshi Shastra*' i.e., Science of animals and birds. This information not only glorifies the ancient Indian knowledge but also provides a valuable base in understanding the diversity of animals and birds. This article covers the attempts of ancient Indian scholars to classify the domestic livestock.

Keywords: Indian Livestock, Biodiversity, *MrigapakshiShastra*, Classification

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Received: September 2, 2025

Accepted: September 15, 2025

INTRODUCTION

The Linnaean system of classification is a systematic approach for the classification of flora and fauna, developed by Swedish botanist Carolus Linnaeus in the 1700s. It consisted of taxonomy i.e., the hierarchy of groupings from Kingdom to Species. The Kingdom is the largest group; however, the Species is the smallest and most exclusive grouping. It consists of organisms that are similar enough to produce fertile offspring together. Closely related species are grouped in a Genus. The Linnaean system of classification has emphasized cranial or horn morphology. Subsequent classifications were based on coat color, geographic origin, or molecular markers. Several theories were developed that linked breed characteristics either to a supposed ancestral auroch subspecies or to a presumed ethnic origin. Most of the older classifications have now been discarded; however, the most consistent classification was proposed by Felius (2011), which emphasized the geographic origin of breeds, in his book "On the Breeds of Cattle". This is largely in agreement with the breed clusters indicated by a biochemical and molecular genetic analysis, which reflect either groups of breeds with a common geographic origin or single breeds that have expanded by export and/or crossbreeding.

Olver (1938) classified zebu cattle of the Indian sub-continent into four major groups and one separate breed. He differentiated the groups based on the

migration of the human population into India in prehistoric times. These groups are

- (1) Large white cattle of the north.
- (2) The distinct Mysore type of the south.
- (3) The 'highly peculiar' Gir of Kathiawar and the west of India.
- (4) Small black, red, or dun cattle are found all over India, mainly in hilly tracts and forest areas.
- (5) The Dhanni breed of the Punjab.

Joshi and Phillips (1953) classified these types and developed a scheme of six groups

- (1) Lyre-horned; wide forehead with flat or dished profile; deep body; grey color; powerful animals.
- (2) Short-horned; long, coffin-shaped skulls, slightly convex profile; white or grey color; the best dairy cattle.
- (3) Curled, often lateral horns; ponderous build, loose skin; red or red spotted.
- (4) Mysore cattle: long, pointed horns, rising close together; prominent forehead; poor milkers.
- (5) A heterogeneous mixture found particularly in rugged mountainous areas of India and Pakistan.
- (6) The Dhanni breed from Pakistan

Efforts have been made earlier to document the information on livestock breeds in the form of books

by various authors, viz. Kaura, 1952; Joshi and Phillips, 1953; Payne, 1970; ICAR, 1979; Bhat *et al.*, 1981; Singh and Moore, 1982; Basu, 1985; Bhat and Taneja, 1987; Maule, 1990; Mason, 1996; Payne and Hodges, 1997; Nivsarkar *et al.*, 2000, respectively. However, the present paper highlights the unnoticed Indian Sanskrit literature "*Mrigapakshishastra*" which has described types of animal diversity on the basis of phenotype and characteristics in the 13th century. Over the last 7 centuries, significant changes have occurred in livestock production, evolution, and distribution of breeds. These historical changes may not align with the present scenario due to natural and artificial selection pressure and changes in the priorities of farming communities. Moreover, the characteristics of these breeds have also undergone considerable changes due to adaptation to agro-climatic conditions and market demand. A few of the breeds are nearly extinct, and some new ones have found their way into the list during these years.

Mrigapakshi Shastra

In the 13th century AD, the science of animals (*Mrig*) and birds (*Pakshi*) i.e., "*Mrigapakshi Shastra*," was first composed extensively in India by the famous Jain author, Hansdeva, in the Sanskrit language. It has 36 groups with nearly 1700 Shlokas in the Anustup meter. King Sandadeva of Jinapura. The author described the nature and qualities of animals and birds as per the directives of King Sandadeva of Jinapura. The author described the animals in general, time of their intercourse, period of pregnancy, early stages, number of kinds, colour and work, life span, and their qualities like ferocious, calm, or dull, etc (Chitampalli and Bhatkhande, 1993).

The author has classified varieties of wild (Lion, Tiger, Hyena, Bear, Rhinoceros, Elephant, monkey, Jackals, Rats and hares, Wolves etc) and domestic (Horse, Camel, Donkey, Pig, Buffalo, Cattle, Goat, Deer, Cat and dogs) animals as well as birds (Swan, Geese, Sarasa, Hawk, Eagle, Crane, Crow, Owl, Parrot, Peacock, Pigeon, Cock, Chataka, Heron, Wagtail etc). In this article, the classification of domestic animals and their observations noted by the Hansdeva have been summarized (Sundaracharya, 1927).

Cattle

Hansdeva has classified cows and bullocks separately, depending upon their qualities. Cows give sweet and good milk, are generally kind, faithful, submissive, and pleasing to all, affectionate to their calves, enhance the well-being of the owner, and hence are worshipped. Their productive age starts in the 4th year and generally produce 4 to 5 calves in their lifetime. They have a passion for cohabitation in the winter season. Cows have been classified into two major groups as follows:

1. Gau: These cows are of uniform colour and short horns. These are moderate in size with beautiful eyes, faces, and long tails, walk slowly, have a shining coat, take little food, and are beautiful in the young stage.
2. Dhenu: Multiple coat colours, invariably have red or black spots on face, belly, and rear portions of body, taller and longer horns, slow pace, smooth bod, and long tails. Animals are faithful and grateful to their masters, have good memories, and are epitomised as the "Goddess of virtue", and need careful feeding.

Hansdeva described 7 varieties of bullocks and mentioned that they are the main support to cultivators, easily trainable, and have a good nature. The productive age in a bull is 5 to 12 years, and the general life span is 20 years. The bullocks were classified as follows:

1. Uksha: These bulls are pure white in colour with stout horns, good curls on face and stomach, calm and beautiful, walk with grandness, and capable of carrying a heavy load.
2. Balivard: Bulls are very tall, strong, and powerful, having either pure white or red colour, curved horns, broad hoof, a very long tail, and are pleasant and faithful to their masters. They run swiftly like an arrow, easily trainable, cry loudly, and breathe long and hard. They are devoid of fear, fond of green grass, and respect their owner.
3. Rishabh: Bulls are black and moderately sized, having a long tail and horns, a big hump, and a stout belly. They get irritated when angry, but complete work entrusted to them, are naturally timid, and less passionate.
4. Vrush: Bulls are pure red, white, or black and never of mixed colours. They have red eyes, are always willing to work hard, running swiftly and powerfully in their youth. They can endure hunger, thirst, heavy weight, and other challenges while working.
5. Anandvaan: Available in different colours, these bulls are strong, powerful, speedy, and disease-resistant. They have a smooth body, are fond of eating, passionate, and can be destructive when angered.
6. Mahoksha: These bulls are tall, strong, and fairly uniform in colour. They are characterized by a hanging neck, a huge hump, and a long tail. In terms of behaviour, they are highly alert, intelligent, and patient. They work diligently in agriculture, show passion for cohabitation, and are playful.
7. Saurabhya: Bulls are superior, very tall up to 6 feet in height, with a uniform body colour and a shining coat. They have a well-developed muscular build with a long hanging naval. These animals are swift walkers, easily trainable, faithful, and submissive to masters and often called "King of bulls"

Buffalo

Hansdeva mentioned that the productive age of buffalo begins in the 4th to 5th year, and the average lifespan is 20 years. He classified buffaloes into 5 categories as follows:

1. Mahish: These buffaloes are jet black in colour, with a compact body, stomach, and horns. They run very fast, are harmless, and loyal to their masters. They can be easily controlled or trained, can carry a heavy burden, and are resilient to hunger and thirst.
2. Lulaay: Partially bluish in colour, these animals are tall with a big head, long horns, stout tail, and hanging testicles. The body is covered with long hair, and the front knees are slightly longer than the hind knees. The animals are powerful and inclined to work hard and somewhat gluttonous.
3. Vaahdwish: Tall, swift and black coloured, these animals have broad eyes, big humps, long tails, thick hair, and skin. They are difficult to control when angry, have hard breathing, are devoid of diseases at an early age, often roll in mud and sand.
4. Kaasar: The Kaasar buffalo are blackish red in colour with white hair. They are moderate in size, strong with a stout belly and body. They are characterized by speed and herd instinct.
5. Sairibha: Mostly dwell in the forest, with rough, thick skin and are black, grey, or bluish in colour. They have a stout belly, and females are good milk producers. However, they can be destructive, not easily controllable, cruel-minded, and unfit for work.

Goat

Hansdeva classified goats into 5 categories, as follows:

1. Aja: White colour, tall, thin with long horns, wattles, strong legs and hanging testicles. These animals are voracious eaters, can ascend mountains and elevations, and are easily tamed.
2. Chhaga: Red in colour with smooth bodies, soft skin and flesh, these animals are peaceful, swift, and have a sure footing (Himalayan Tahr).
3. Mesha: Black in colour, red eyes, smooth and soft skin, beautiful lean bodies, these animals run fast on hard grounds, valleys, and forests. Although they are lazy, they can easily walk through thorny places (Nilgiri Tahr).
4. Vrushni: They are black and smoky in colour, with patches of other colours on their faces, neck, and stomach. These animals have short horns, stout stomachs, their body is covered with long hair, and they appear fearsome or scary (Wild goat).

5. Edaka: The face is uniformly coloured, while the stomach and hindquarters may display a different shade compared to the rest of the body. The animal is tall, with long legs and a stout abdomen. It runs swiftly and endures fatigue, rain, and intense sunlight.

Horse

Horses have been primarily classified into 7 categories and coat colour: white, red, black, mottled, or mixed. Horses having good curls (marks) on their bodies are a symbol of prosperity, wealth, and the health of their masters. Horses are beautiful and powerful in their 6th year to join mares. Ash coloured horses with irregular faces, idle, ungrateful, not having good curls, are advised not to be maintained in stables. The productive age in horses is 5 to 16 years, and the general life span is 25 years. The varieties of horses described by Hansdeva are as follows:

1. Turanga: White coloured horses with long neck and face, large eyes, short testicles, and penis. Strong, yet peaceful, these horses are submissive to their masters. They carry themselves with uplifted faces, appearing beautiful and graceful. These horses have excellent walk, trot, canter, jump, and gallop.
2. Ashwa: Red in colour with honey colour eyes, these animals are strong and can withstand hunger and thirst. They run fast like an arrow, are good swimmers, but are terrible while hunting and in war. They are not fickle-minded, have a strong memory, and are docile, hence fit for riding.
3. Ghotak: Black in colour, these horses are very powerful, stout, swift, clean with a strong neck. They survive on short sleep, can withstand difficulties of work, bite to show anger, and are fond of war and hunting.
4. Arva: Small in size and found in several colours, they have broad eyes and smooth skin. These animals are good at walking rather than running swiftly; they fear hunting, are faithful, and can carry heavy burdens.
5. Vaah: Red coloured body with white face and legs, long and stout neck, red tongue, and long tails. The body is medium but long with visible curls (marks). These animals are strong in temperament but are submissive to their masters.
6. Gandharva: Their body displays different coloured spots. Red coloured horses have white faces, chest, legs, and hind portion and are considered better, as they are generally peaceful, intelligent, consume little food, are fit for all kinds of work like war, hunting, riding, drawing vehicles, etc.
7. Haya: These horses are uniformly white, red, or black in colour, without any mixture of other colours. They have broad faces, long manes, and good curls on

their bodies. The animals are fond of hunting and war, passionate and appear beautiful, can withstand heavy wind, rain, and hot sun, can walk in different styles, and carry loads.

Donkey

Donkeys have been classified into 3 categories as follows:

1. Gardarbha: Donkeys are of medium size, with a uniform grey colour body; however, the face, belly, and hind portion are white. These animals are calm and resilient to harsh climates, hunger, and thirst. They can carry a heavy burden and are grateful to their masters.
2. Khara: This class of donkeys has black coloured, long bodies, big eyes, while some animals have a coloured coat with spots and knotted hair on their bodies. The animals are somewhat stout, patient, disease-resistant, with sharp memory. They work submissively to the satisfaction of their masters, have good endurance, and a carrying capacity.
3. Raasabh: This class belongs to mules, i.e., crosses of horses and asses. They are found in various coat colours, viz., red, white, black, or grey. These mules are generally tall, having long stripes, exhibit less speed, can be easily trained due to strong memory, and are highly attentive.

Camel

Hansadeva classified camels into four distinct varieties, noting that all share certain common characteristics. They possess a comparatively ungainly body form and a short tail. Despite their appearance, camels are generally docile in temperament, highly resilient, and capable of carrying heavy loads. They are well adapted for long-distance travel across desert environments and have an average lifespan of approximately 30 years.

1. Ushtra: This class of camels is 9-10 feet tall, with long legs, brown-coloured body, and a curved, long neck. They are capable of running very fast with a heavy burden without exhaustion and can withstand harsh climates.
2. Kramelaka: These camels are grey in colour with a big hump, frothy mouth, and fine, long hair over their bodies. Young animals have higher body weight. They are tolerant to hardship at work, can be impatient when hungry, and their eyes become red when the animal is exhausted. They are fat at a younger stage.
3. Daseraka: Camels of this category are whitish brown in colour and may reach a height of 10 feet. Their bodies often emit a strong odour, have long breaths, and are capable of running fast. They exhibit feral

characteristics and wander into forests, and are difficult to capture.

4. Mahaag: Camels are taller than 10 feet, with a brown coloured coat. The animals are powerful, have long necks and legs with hair on their bodies. These animals are generally loyal and responsive to their handlers, making them comparatively easy to train. In their youth, they tend to be robust and physically strong. Females typically exhibit lower running speed than males.

Pigs

Hansadeva mentioned that pigs are black in colour and very swift in running. They have a hairy body and are fond of eating. The pigs produce a gurgling, unpleasant noise and emit a foul odour. He has mentioned 7 varieties of pigs as follows:

1. Varaha: Black in colour with a short tail, fat, and cannot withstand a hot climate.
2. Sukara: Whitish in colour with pointed and rough hair on the body. The animals are characterized by long legs, stout stomachs, a fondness for mud and water, and sluggishness. These animals can be vicious when hungry, taking long breaths and destroying all kinds of crops.
3. Kol: This class of pigs is grey in colour with short bodies, small jaws, crooked and curved tails, and extremely long ears. The body is covered with bushy and dense hair. These animals fear shrill noise, are naturally cowardly, fond of wandering, and take little sleep at night.
4. Potri: Their bodies are clad in dirt. The animals are very short with a strong and stout neck and hanging testicles. They are capable of running swiftly like an arrow, light, sleepless, and fond of playing in mud and water.
5. Kiti: Tall, swift, and deformed faces, these pigs are found in multiple colours with short stripes. The legs may be white or red, and they have thorny hair on their bodies.
6. Danshtri: These pigs have swordlike teeth and a fierce appearance with big jaws. They are disease-resistant, fond of cohabitation at frequent intervals, cannot withstand rain and sunshine, and tend to sleep under shade.
7. Bhudaar: This category consists of jet black-coloured pigs with a big head and stout stomach. They frequently engage in rooting behavior using their tusks and snouts and are known to have a quick temper. Additionally, these pigs display a strong affinity for wallowing in mud.

Dogs

The dogs have been classified as follows:

1. Shwan: These dogs are characterized by a red coat and tall body structure. The posterior and abdominal regions are notably robust and stout. These dogs have long tails, small and sharp ears, and curved nails. They exhibit nocturnal restlessness, showing a strong aversion to wandering at night, and demonstrate submissive behavior towards their handlers. Their appearance is particularly striking during their juvenile stage.
2. Kukkura: This category is characterized by black-coloured animals with long tails and large heads. They emit a strong odour and their bark sounds harsh. They tend to be impatient but lack physical strength. They move with a swift gait and exhibit a strong memory.
3. Shunak: The animals may have a mixed or uniform coat colour and curved tails. They are smaller in size with short legs and a big head. Capable of running swiftly, these animals are shrewd and can withstand hunger and thirst.
4. Mrugdanskak: These are mainly hunting dogs that are very strong and tall with long jaws and very short tails. They are usually brown and black in colour, and the body is covered with thick and rough hair. They are fond of hunting animals.
5. Saarmey: They exhibit a spotted coat, are taller in size, and have long tails. They have a calm and quiet demeanor and are loyal to their masters. Commonly found in villages, they are swift runners and require little sleep during night hours.
6. Gramyamrug: These animals have brown-coloured coats and short ears. They exhibit lower speed, are dull, and need training at an early stage for guarding and hunting.

The Indian scenario mentioned in the “Mrigpakshishastra” book could be the earliest known evidence of classification of domestic and wild animals, which throws light upon the rich biodiversity of the Indian subcontinent. It also emphasizes the need to revisit the ancient Indian Sanskrit and contemporary literature to reveal the origins of breed diversity, while pursuing the “Mission Zero non-descript AnGR” as well as to understand the rich biological heritage of the country.

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