

Research

Characterization of Semi-Feral Periyar Cattle of Kerala

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ABSTRACT

Periyar cattle, a semi-feral breed native to the banks of the Periyar river in Kerala, primarily in the Thrissur and Ernakulam districts, were studied for breed characterization based on data from 992 animals. These cattle are mainly raised in a silvopastoral system with a herd size of 7-10 animals. Coat colours include red, black, brown, and grey, with distinct sexual dimorphism. A straight forehead is a distinguishing feature, and the muzzle is typically black, though some individuals show grey pigmentation. Ears are medium-sized and oriented horizontally. Males have larger, black horns, while females have smaller, more varied horns in both size and colour. Males also exhibit prominent humps, whereas females have smaller, less pronounced humps. The tail is long, almost touching the ground, with a black switch. Adult males have a mean body length of 108 ± 10.8 cm, chest girth of 138 ± 12.0 cm, and height at the withers of 112 ± 11.10 cm, while females measure 98.44 ± 5.39 cm, 132 ± 5.07 cm, and 100.19 ± 4.07 cm, respectively. Calves had weight of 12.50 ± 0.3 kg at birth. The average adult body weights of males are 193.50 ± 6.8 kg, and females 153.6 ± 3.70 kg. The inter-calving period ranges from 338 - 366 days, with mean service period of 86.0 ± 9.0 days. Periyar cattle had an average daily milk yield of 1.95 ± 0.39 kg, peak milk yield of 3.25 ± 0.53 kg, and a lactation length of 180.0 ± 10.0 days. The total lactation yield ranges from 310-390 kg, with a fat percentage of 4.09 ± 0.59 . Periyar cattle known for their disease resistance, stress tolerance, and efficient foraging, are well-suited for smallholder farmers in resource-constrained environments.

Keywords: Body weight, Characterisation, Periyar cattle, Semi feral, Silvopastoral

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INTRODUCTION

Indigenous cattle have long been central to Kerala's agrarian landscape, valued for their adaptability to the tropical climate, resistance to local diseases, and suitability for low-input, traditional farming systems. However, the crossbreeding for enhanced milk production has resulted in a significant decline in native cattle populations. According to the 2019 Livestock Census, Kerala's total cattle population was 1.329 million, reflecting a 9.96% decline from 2012. Of this, crossbred cattle comprised 1.252 million (94%), while indigenous cattle accounted for only 0.077 million (6%), indicating their marginalization. Despite lower milk yields, indigenous breeds remain crucial for sustainable agriculture, biodiversity conservation, and cultural practices. Kerala is home to several unregistered native cattle types, including Periyar, Kasargod, Ananganmala, Vadakara, Vilwadri, and Attappady cattle, in addition to the registered Vechur breed. Among these, Periyar cattle, also known locally as *Kuttampuzha Dwarf* represent a unique semi-feral ecotype found primarily in the Periyar river basin of central Kerala.

These cattle are distributed across forest regions of Ernakulam and Thrissur districts, specifically between latitudes $10^{\circ}1'N$ to $10^{\circ}8'N$ and longitudes $76^{\circ}30'E$ to $76^{\circ}7'E$, encompassing villages like Malayattoor, Kalady, Kodanadu, and Kuttampuzha. Semi-feral cattle live in a largely wild state with minimal human contact and forming self-sustaining herds. Periyar cattle thrive in silvopastoral systems with minimal human intervention or management, exhibiting traits such as hardiness, foraging efficiency, and climate resilience. They contribute to biodiversity by promoting plant diversity through natural grazing and are often valued for maintaining open, wild landscapes due to their resilience in harsh environments. In recognition of their unique genetic value, a characterization survey was initiated in November 2023 by ICAR-NBAGR, in collaboration with Kerala Veterinary and Animal Sciences University (KVASU), under the *Mission towards Zero Non-Descript Animal Genetic Resources*. This survey aims to document and conserve Periyar cattle as part of India's broader strategy for safeguarding indigenous livestock biodiversity.

MATERIALS AND METHODS

Data was collected from the home tract of Periyar cattle especially from the Kodanad, Kalady, Kuttampuzha, Bhoothathankettu and Malayattoor regions along the banks of the Periyar river. The Questionnaire provided by the ICAR-National Bureau of Animal Genetics and Resources, Karnal was used for survey and characterisation. Total 992 animals and 112 farmers were covered under the study. Socio economic profile of the farmers as well as general description, morphological characters, reproductive traits and dairy performance of animals were included in the study. Morphological characteristics like coat colour, skin colour, muzzle colour, eyelid colour, tail switch colour, horn (colour, size, shape and orientation), ear length and orientation, shape of forehead, udder (shape and size), shape of teat and teat tip were considered for the study. Body weight of animals at birth, pre-weaning, 12 months, 24 months, age at first mating, first calving and adult weight were recorded. Body measurements (chest girth, body length and height at withers) of adult animals were collected. Reproduction traits like age at first mating in males, age at first oestrous, oestrous cycle duration, oestrous duration, age at first mating and calving, service period, calving interval, gestation length and number of services per conception in females were recorded. Milk production traits like daily milk yield, peak milk yield, total milk yield, days

to attain peak yield, lactation length and percentage of fat, protein, lactose, ash and solids not fat (SNF) were estimated.

RESULTS AND DISCUSSION

Herd size and management

The average herd size of Periyar cattle is 8.67 ± 0.56 animals (Fig 1). About 34.21% of farmers are maintaining 5-10 cattle, followed by 24.90% having 2-5 animals, 18.42% rearing 10-15 cattle and about 22 % farmers rearing more than 15 cattle. Herds consist of breeding males, females, and calves, with breeding females forming the majority. The cattle are primarily reared for milk, manure and meat. They are managed under extensive and semi-intensive systems. Periyar cattle are part of silvopastoral systems (Thomas *et al.*, 2025), where they roam freely in the forest regions and graze on native vegetation. Kasargod cattle are reared on Gobbora system of rearing animals which is traditionally unique system of rearing and mainly for manure (Sreelakshmi *et al.*, 2016). Supplement feeding with agricultural byproducts, concentrate feeds and rice gruel exclusively for pregnant and lactating animals were practised in both Kasargod (Sreelakshmi *et al.*, 2016) and Periyar cattle feeding (Thomas *et al.*, 2025). Periyar cattle are well-adapted to minimal management, showing strong foraging ability, disease resistance, and environmental resilience.



Fig. 1: Periyar cattle – Herd and calf

Physical characteristics

The morphological evaluation of Periyar cattle revealed significant variation in coat colour, with males predominantly exhibiting red (40%) and black (35%) coats, while females mostly displayed brown (31%) and black (30%) colouration (Table 1, Fig.2,3). In Kasargod cattle (Iype *et al.*, 2001), black and brown are the prominent colours while red and black are prominent in Vechur cattle (Iype *et al.*, 2016) like the Periyar cattle. Coat colour variations in Periyar cattle

was found to be similar with the indigenous cattle breed of Tripura (Pundir *et al.*, 2014). Horn characteristics also differed between sexes, with males possessing larger, predominantly straight horns oriented upward sideward. Females mostly have medium-sized, curved horns oriented inwards. Ear length averaged 17.61 ± 1.22 cm, with a horizontal orientation. Ears in Kasargod dwarf cattle, from Kerala was short unlike the Periyar cattle (Iype *et al.*, 2001). Body conformation traits such as hump and dewlap size varied notably between sexes, reflecting sexual dimorphism. Udder morphology in

females was mainly trough-shaped, while in Kasargod cattle, it is bowl shaped. Teat shape and tip are cylindrical and round, respectively in Periyar cattle. Studies on Kasargod and Vechur cattle also revealed cylindrical teat and round teat tip. Morphological

traits of Periyar cattle and Tripura cattle (Pundir *et al.*, 2014) were found to be similar in case of udder, teat morphology and the prominence of milk vein. These morphological differences highlight the distinct characteristics of the Periyar cattle.



Fig.2: Periyar cattle – Adult male



Fig. 3: Periyar cattle – Adult female

Table 1: Morphological characteristics of Periyar cattle

Parameters		Male (39)	Female (332)
Coat Colour	Red	40%	28%
	Black	35%	30%
	Brown	20%	31%
	Grey	5%	11%
Muzzle Colour	Black	100%	83%
	Grey	-	17%
Eyelids Colour	Black	100%	78%
	Grey	-	22%
Tail switch colour	Black	100%	
	White	-	
Forehead	Straight	95%	82%
	Concave	4%	13%
	Convex	1%	5%

Horn colour	Colour	Black	100%	23%
		-	70%	
		-	7%	
	Shape	Straight	80%	82%
		Curved	20%	18%
	Size	Small	-	32%
		-	48%	
		Medium	100%	20%
	Orientation	Upward sideways	80%	18%
		Curved inwards	20%	72%
		Curved forwards	-	10%
Ear	Length		17.61 ± 1.22 cm	17.61 ± 1.22 cm
	Orientation - Horizontal		100%	100%
Hump	Small		-	88%
	Medium		-	12%
	Large		100%	-
Udder	Shape	Trough		68%
		Bowl		25%
		Pendulous		7%
Teat	Shape	Cylindrical		63%
		Conical		30%
		Pear		7%
	Tip	Round		70%
		Pointed		30%
Milk vein	Prominent			45%
	Not prominent			55%

Body weight and measurements

The body weight at birth, 6 months, 12 months and adult for male and female are presented in Table 2. Male calves had an average birth weight of 12.50 ± 0.30 kg, which was higher than that of female calves, weighing 10.50 ± 0.2 kg. Birth weight of Vechur has been reported to be 11.5 ± 0.2 kg (Iype *et al.*, 2016) and in Kasargod cattle, it has been observed to be 11.1 ± 0.2 kg (Iype *et*

al., 2001). The adult body weight of female and male Periyar cattle was 10-13 % higher than that of Vechur (133.60- 173.50 kg) and 4-6 % higher than that of Kasargod cattle (146.40- 182.50 kg). Body weight gain from birth to adult in Periyar cattle was 196.03 - 247.95 gm, whereas 167.26 - 221.92 gm and 185.34- 234.79 gm in Vechur and Kasargod, respectively.

Table 2: Mean $\pm$ SE for body weight (kg) of Periyar cattle at different age groups

Age group	Body weight (kg)	
	Male	Female
Birth	12.50 $\pm$ 0.3 (49)	10.50 $\pm$ 0.2 (50)
6 months	45.00 $\pm$ 0.70 (46)	43.5 $\pm$ 0.6 (52)
12 months	86.10 $\pm$ 3.1 (51)	62.70 $\pm$ 1.3 (53)
Adult weight	193.50 $\pm$ 6.8 (39)	153.6 $\pm$ 3.70 (332)

The body measurements of Periyar cattle show clear evidence of sexual dimorphism and reflect the breed's

moderate size (Table 3). Male Periyar cattle exhibit larger dimensions across all measured parameters.

Table 3: Mean $\pm$ SE for body Measurements of Periyar cattle

Parameter	Male (39)	Female (332)
	Mean	Mean
Chest girth (cm)	138 $\pm$ 12.0	132.58 $\pm$ 5.07
Body length (cm)	108 $\pm$ 10.8	98.44 $\pm$ 5.39
Height at withers (cm)	112 $\pm$ 11.10	100.19 $\pm$ 4.07

Table 4: Morphometric traits of Vechur, Kasargod and Periyar cattle of Kerala

Morphometric traits	Adult male			Adult female		
	Vechur	Kasargod	Periyar	Vechur	Kasargod	Periyar
Adult body weight (kg)	173.5 $\pm$ 6.80	182.5 $\pm$ 22.70	193.50 $\pm$ 6.80	133.6 $\pm$ 3.70	146.4 $\pm$ 3.30	153.60 $\pm$ 3.70
Length (cm)	104.4 $\pm$ 3.10	106.0 $\pm$ 5.80	108.0 $\pm$ 10.80	93.4 $\pm$ 1.10	96.0 $\pm$ 1.20	98.44 $\pm$ 5.39
Height at withers (cm)	99.8 $\pm$ 1.40	103.3 $\pm$ 4.10	112.0 $\pm$ 11.10	89.0 $\pm$ 0.70	90.0 $\pm$ 1.10	100.19 $\pm$ 4.07
Chest girth (cm)	128.1 $\pm$ 1.20	133.1 $\pm$ 6.70	138.0 $\pm$ 12.10	122.2 $\pm$ 1.00	124.4 $\pm$ 1.60	132.58 $\pm$ 5.07

It is evident from Table 4 that Periyar cattle are medium in size compared to Vechur and Kasargod in terms of adult body weight, body length, height at withers and chest girth. Periyar cattle adult male and female are 11.53%, 14.97%, 6.03%, 4.92% heavier than Vechur and Kasargod respectively (Iype, *et al.*, 2001; Iype, *et al.*, 2016).

Reproduction traits

The average age at first oestrus/first calving and gestation length in Periyar cow was 22.00 $\pm$ 3.29, 35.30 $\pm$ 3.59 and 279 $\pm$ 4.0, respectively (Table 5). A study on Kasargod (Iype *et al.*, 2001) and Vechur (Iype *et al.*,

2016) cattle revealed similar ages at first estrus, calving and gestation length suggesting a consistent onset of female reproductive maturity. The fewer services per conception in Periyar cattle (1.2 $\pm$ 0.1) underscores their high fertility rates when compared to other indigenous breeds like Vechur and Kasargode cattle. In Periyar cattle, natural service is practised commonly and artificial insemination is very rare. Since the animals are reared on free range system, no such mating plan is followed. Periyar cattle demonstrate superior reproductive efficiency, characterized by earlier age at first mating, and a shorter calving interval.

Table 5: Mean $\pm$ SE for reproductive parameters of Periyar cattle

Reproductive parameters	Male	Female
Age at first oestrus (months)		22.00 $\pm$ 3.29 (112)
Oestrus cycle duration (months)		21.00 $\pm$ 0.50 (108)
Oestrus duration (hrs)		23.50 $\pm$ 0.40 (108)
Age at first mating (months)	20.50 $\pm$ 1.20 (29)	26.20 $\pm$ 3.73 (70)
Age at first calving (months)		35.30 $\pm$ 3.59 (119)
Service period (days)		86.00 $\pm$ 9.0 (109)
Calving interval (days)		352 $\pm$ 14.0 (112)
Gestation length (days)		279 $\pm$ 4.0 (136)
No. of services per conception		$\pm$ 0.1(121)

Dairy performance

Dairy performance of Periyar cattle is presented in Table 6. Calves were not weaned at birth and were allowed to suckle. The lactation length had an average of 180 $\pm$ 10.00 days which is less when compared to Kasargod (Iype *et al.*, 2001) and Vechur cattle (Iype

et al., 2016). The peak milk yield was attained by the 26th day of lactation which is three days more than that of Vechur cow. The daily milk yield was 1.95 $\pm$ 0.39 kg which is less when compared to Vechur 2.5 kg per day. In terms of lactation milk yield, Periyar cattle have slightly higher yield than Kasargod dwarf but lower than Vechur cattle, with 351 $\pm$ 39.00 kg milk.

Table 6: Mean $\pm$ SE for dairy performance of Periyar cattle

Parameters	Mean $\pm$ SE
Daily milk yield (kg)	1.95 $\pm$ 0.39 (129)
Peak milk yield (kg)	3.25 $\pm$ 0.53 (129)
Days to reach peak yield	25.50 $\pm$ 3.0 (129)
Lactation length (days)	180 $\pm$ 10.00 (129)
Lactation milk yield (kg)	351 $\pm$ 39.00 (129)
Dry period (days)	185 $\pm$ 4.00 (129)

Milk composition

Milk composition study results on 45 samples collected from Periyar cattle are presented in Table 7. Fat percent was found to be most variable with an average of 4.09 $\pm$ 0.59% which is lower than Vechur cattle (4.65 $\pm$ 0.17 %) (Iype *et al.*, 2016) and slightly higher than that of Kasargod cattle (3.9 $\pm$ 0.30 %) (Iype *et al.*, 2001). While the protein content of Periyar cattle was found to be less than that of Kasargod cattle, all other parameters were higher.

Table 7: Mean $\pm$ SE for milk composition of Periyar cattle

Milk constituents	Mean $\pm$ SE
Fat%	4.09 $\pm$ 0.59 (45)
Protein%	3.29 $\pm$ 0.12 (45)
Lactose%	4.83 $\pm$ 0.25 (45)
Ash%	0.69 $\pm$ 0.02 (45)
Solids Not Fat%	9.07 $\pm$ 0.33 (45)
Total Solids%	0.91 (45)

CONCLUSION

Periyar cattle represent a unique, semi-feral indigenous breed well-adapted to the silvopastoral systems of Kerala. They exhibit distinct morphological traits, including varied coat colours, sexual dimorphism, and efficient foraging ability. The breed shows strong reproductive efficiency with early maturity, short

calving intervals, and high conception rates. Though their milk yield is modest, it is nutritionally rich with high fat and solids content. Body measurements and weight suggest good potential for meat and manure use. Their disease resistance and minimal management needs make them ideal for low-input farming. Compared to other indigenous breeds, Periyar cattle hold their own in adaptability and resilience. These characteristics highlight their value in sustainable agriculture. Continued documentation and support will aid in conserving this vital genetic resource.

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