

## Survey and characterization of Attappady black goats of Kerala, India

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### Summary

Attappady Black goats are found exclusively in Attappady, an isolated hilly region of Kerala, India. A survey on these goats was carried out in the breeding tract for the purposes of breed characterization. The total population of Attappady Blacks in the area was estimated to be 9351, which represented only 40% of the total goat population in the area. These goats are reared mainly by the tribes of Attappady and maintained on an extensive grazing system. The animals are black in colour with bronze coloured eyes. Ears are medium in length (13.5 cm) drooping over the lateral side of the face. Horns are present in both males and females and they are curved laterally upwards and backwards. Tassels are present in some animals. Their tail is of a bunchy type and curved. The average body length, height at withers, height at rump, chest girth and paunch girth of these goats in the adult stage were found to be 67±0.8, 80±0.8, 76±0.8, 71±1.3, 75±1.3 cm, in males and 63±0.4, 69±0.4, 71±0.3, 69±0.4, 75±0.3 cm in females, respectively. Adult males above 18 months of age weigh on average 35±1.1 kg and females weigh 31±0.4 kg. Attappady Blacks are reared for meat purposes.

### Resumen

La raza caprina Attappady Black se encuentra exclusivamente en Attappady, una zona montañosa aislada de la región de Kerala en la India. Se realizó una encuesta sobre esta raza en su zona de origen con el fin de caracterizar la raza. Se estimó la

población total de Attappady Blacks en el área en 9 351 animales, lo que representa el 40% de la población caprina en la zona. Esta raza viene criada principalmente por las tribus de Attappady en sistemas de pastos extensivos. Los animales son negros con ojos color bronce. Las orejas son medianas (13,5 cm) y caen a los lados de la cara. Los cuernos están presentes tanto en machos como en hembras y se curvan lateralmente hacia arriba y luego hacia abajo. Algunos animales presentan también borla. La cola es de tipo pequeña y curvada. En su fase adulta la media de largura corporal, altura al garrete, altura a la cadera, circunferencia torácica son, respectivamente, 67±0,8; 80±0,8; 76±0,8; 71±1,3; 75±1,3 cm en los machos y 63±0,4; 69±0,4; 71±0,3; 69±0,4; 75±0,3 cm en las hembras. Los machos adultos a los 18 meses presentan un peso medio de 35±1,1 kg y las hembras de 31±0,4 kg. La raza Attappady Black se cria principalmente para producción de carne.

**Key words:** Goats, Goat genetic resources, Habitat, Population, Physical characters, Management.

### Introduction

There are 122.7 million goats and 20 recognized breeds of goat in India, according to the livestock census of 1997 (Anonymous, 1997). Attappady Black goats, found exclusively in the Attappady area in the Palakkad district of Kerala and reared mostly by the tribes in Attappady, are not yet recognized as a breed despite their unique characteristics. They are identified by their

solid black body colour, bronze coloured eyes and long strong legs. Other goats in the area are crosses of the Attappady Black with other breeds, mainly the Malabari this being the only other breed existing in Kerala, as well as with a small number of Saanen goats and other exotic breeds.

The Malabari is a dairy type breed in Kerala with a milk yield of 1-2 litres per day, whereas the Attappady Black is a meat type breed with a milk yield of less than 200 ml daily. The eye colour of Malabari is yellowish brown. Distinguishing the Attappady Black from other groups is not at all difficult because of the distinctive features of the Attappady Black, Malabari and other exotic breeds. There is an Attappady Black goat breeding farm run by the Government of the State in Attappady, the native tract of these animals. Recently a study was completed comprising a survey, characterization and evaluation of Attappady Black goats as a part of the network projects of the National Bureau of Animal Genetic Resources, India to develop breed descriptors for many of the unrecognized breeds in India.

## Materials and Methods

The region of Attappady which is the home tract of the Attappady Black goats lies in the

north-east of the Palakkad district of Kerala, India. The three villages Agali, Pudur and Sholayur constitute the entire Attappady area of Palakkad district (Figure 1). There are 37 wards in the whole Attappady area, 17 in Agali and 10 wards each in Pudur and Sholayur villages. Each village forms the stratum, the wards within the village forming the first unit and houses within the ward forming the second units. Seven wards were randomly selected from each village and survey was conducted in these 21 wards for complete enumeration of the demographic distribution of the breed.

The questionnaire provided by the National Bureau of Animal Genetic Resources was used, with necessary modifications, to conduct the survey work. In total 9 207 households were surveyed within which goats were maintained in only 1 234 (13%) of households. General information about the households, management practices and animals maintained was collected from these 1 234 households. The surveyors were educated properly on the distinguishing features of different types of goats in the area and were shown the purebreds reared in the Kerala state Government Attappady goat farm.

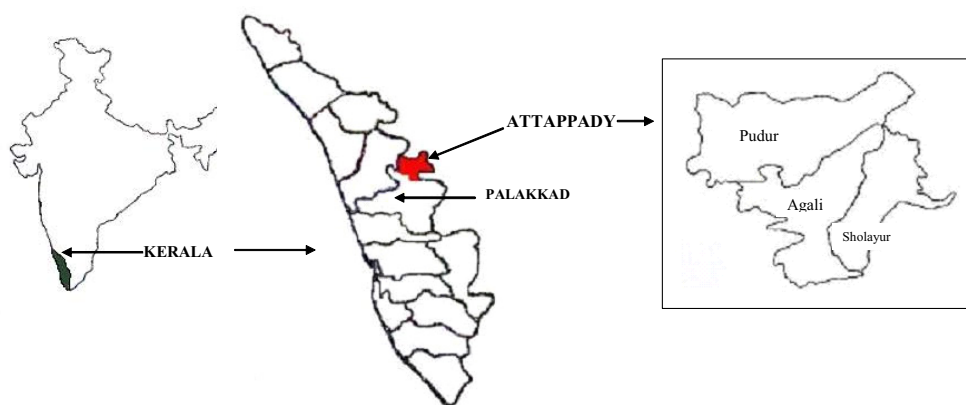


Figure 1. The three villages Agali, Pudur and Sholayur constitute the entire Attappady area of Palakkad district, breeding tract of Attappady goat.

## Results and Discussions

### The native tract of the Attappady Black goat and its distribution

Attappady is an isolated place in the high range areas of Kerala and lies between two hills of the Western Ghats namely the Nilgiris Hills (2300 meters above the sea level) in the north and the Muthikulam Hills (2000 meters above the sea level) in the south. The region is situated between 10°55' 0" N and 11°14' 9" N latitude and 76° 27' 11" E and 76° 48' 8" E longitude. The total geographical area of Attappady is 874.2 square km. The mean annual rainfall of this region is 3 396 mm. The rains fall mainly between June and November. The total cultivable area comes around 20% of the total geographical area of Attappady. The rest of the region is forest (50%), waste lands (25%) and water bodies (5%). Banana, coconut, pepper, groundnut and cotton are the main crops cultivated in this region.

### Goat population

A total number of 13 760 goats were present in the 1 234 house holds surveyed and of these only 5 595 were Attappady Black goats. As the name indicates these animals are pure black with bronze coloured eyes and are taller than Malabari goats. The distribution of goats in the surveyed units in Agali, Pudur and Sholayur villages were 2 689, 5 775 and 4 296, respectively and the number of Attappady Blacks in these villages were, respectively, 1 358, 2 394 and 1 843. Age based classification of the data showed that 21% of the total goats were kids up to three months of age, 19% belonged to kids aged 4-6 months, 8% were young stock, 5% were yearlings, 6% were adult males and 41% were adult females.

The village based data were extrapolated to estimate the total number of goats in the whole Attappady area. The overall total goat population in the Attappady Block was

estimated to be 23 346, and of them only 9 351 (40%) were Attappady Black goats

### Socio-economic status

The total human population in the Attappady Block is 67 672 [Development report of Attappady Block Panchayets, (2002-2007)]. Of this 42% are Scheduled Tribe (ST), 7% are Scheduled Caste (SC) and the rest 51% belong to Other Community (OC). Among the households surveyed 73% of goat owners (904) belonged to the ST community indicating that the goat rearing is mainly in the hands of the tribal communities of the area. The total human population in the 1 234 households was 5 016 consisting of 2 530 males and 2 486 females. The overall average family size of goat farmers in the Attappady Block was 4.06. The information collected revealed that 56% of the total members were illiterate. The monthly income of most (80%) of the tribes was less than Rs.1000 (22 \$). Most of the men were working as labourers or engaged in agricultural crop cultivation and very few (13%) men were interested in goat husbandry. Therefore goat rearing was mainly in the hands of women (48%) and aged people. Of the farmers, 27% were landless.

The percentages of farmers with below 1 acre, 1-2 acres and above 2 acres of land were 8, 35 and 30%, respectively. Even though 73% of the goat owners owned agricultural land, most of these lands did not have irrigation facilities and hence were not used for the cultivation of agricultural crops. Only 14% of the land-holding farmers had irrigation facilities from bore wells, canals or rivers. The agricultural lands on the banks of the Bavani and Siruvani rivers are well irrigated.

### Goat management practices

Tribes in the Attappady area mainly maintain the Attappady Black breed of goat.

Generally, 10-20 goats constitute a herd owned by a single owner. All the herds in the area were stationary and maintained entirely on an extensive grazing/browsing system. Concentrate feeding was not practiced at all. Goats were taken to the nearest forest land and hilly areas during day time for grazing. Community grazing was also a common practice. Two to three flocks were taken out together for grazing.

Goat sheds were constructed just to keep the goats in during night time. Around 62% of the goat owners constructed the goat sheds separately away from their houses while 38% housed their animals either in a part of their own house or in sheds sharing a common wall with the residence. The majority (52%) of the goat houses were on the ground and the remaining (48%) houses were on raised platforms. The floor and the sidewalls were constructed using bamboo or other locally available wooden materials and in most households coconut or other tree leaves were used as the roofing material.

## Breed Characteristics

### Physical characteristics

The morphological characters of Attappady Black goats (Figure 2 and 3) such as the colour of the coat, skin, muzzle, eyelids, hooves and tail switch; body conformation; orientation of ears; horn pattern; tassel/wattle pattern; presence of beard; type and shape of tail; hair characters; udder and teat conformation, etc are presented in Tables 1 and 2.

The colour of animals is black. Rarely white spots were noticed on the forehead. The skin was either light black or grey. Tassels/wattles were noticed in some of the goats. In most of the adult goats horns were present and they were curved laterally upwards and backwards. Ears were medium length (13.5 cm), drooping over the lateral side of the face. The hair was glossy and straight. The tail was of a curved bunchy type.



*Figure 2. Adult female of Attappady black goat.*

Table 1. Physical characteristics of Attappady black goats at different ages.

Sl. (No.)	Particulars	Age groups in months							
		0-3		4-6		7-12		Above 12	
		No.	%	No.	%	No.	%	No.	%
1.	<i>Head</i>								
	a) Forehead								
	Convex	201	99.02	251	98.82	368	97.10	586	9.49
	b) Tassels								
	Present	45	22.06	45	17.79	86	22.81	123	20.99
	c) Beard								
	Absent	202	99.51	247	99.60	371	98.41	545	93.16
2.	<i>Horns</i>								
	Present	77	37.75	203	79.92	304	79.79	469	79.49
	a) Shape								
	Straight	41	80.39	133	80.61	154	52.20	58	12.61
	Curved	10	19.61	32	19.39	141	47.80	402	87.39
	b) Orientation								
	Lateral	18	100.00	94	98.95	253	98.44	430	94.71
	Upward	50	89.29	172	97.18	279	93.00	329	70.60
	Backward	12	92.31	67	87.01	183	75.31	357	79.33
3	<i>Ears</i>								
	Orientation								
	Horizontal	188	98.43	246	98.40	366	97.34	581	98.81
	Pendulous	2	1.05	3	1.20	6	1.60	4	0.68
	Erect								
4	<i>Tail</i>								
	a) Type								
	Slender	128	64.00	24	9.45	2	0.53	4	0.68
	Bunchy	72	36.00	230	90.55	376	99.47	583	99.32
	b) Shape								
	Straight	---	---	1	0.90	3	0.80	7	1.20
	Curved	199	100.00	251	99.60	372	99.20	575	98.80
5	<i>Udder characters</i>								
	a) Shape								
	Bowl	---	---	---	---	7	26.92	296	72.02
	Round	---	---	---	---	5	19.23	55	13.38
	Trough	---	---	---	---	14	53.85	55	13.38
	Pendulous	---	---	---	---	---	---	5	1.22
	b) Teat Shape								
	Cylindrical	---	---	---	---	2	8.70	4	0.98
	Funnel	---	---	---	---	21	91.30	393	95.85
	Pear	---	---	---	---	---	---	13	3.17

Table 2. Physical characteristics of Attappady Black goats.

Particulars	Age groups in months							
	0-3		4-6		7-12		Above 12	
	No.	%	No.	%	No.	%	No.	%
<i>Color</i>								
a) Coat								
Black	206	100.00	255	100	381	100	590	100
b) Skin								
Light black	98	47.57	204	80.00	304	79.79	484	82.03
Gray	108	52.43	51	20.00	77	20.21	106	17.97
c) Forehead								
Black	179	86.89	234	91.76	350	91.86	553	93.73
White spot	27	13.11	21	8.24	31	8.14	37	6.27
d) Ears								
Black	196	99.49	239	98.35	364	98.91	545	98.73
Gray	1	0.51	3	1.24	4	1.09	7	1.27
White spots			1	0.41				
e) Muzzle								
Black	204	99.51	253	99.22	377	98.95	589	99.83
White spot	1	0.49	2	0.78	4	1.05	1	0.17
f) Eyelids								
Black	204	99.03	254	99.61	381	100.00	589	99.83
Others	2	0.97	1	0.39	---	---	1	0.17
g) Iris								
Bronze	196	95.1	247	97.25	372	97.64	580	98.47
Yellowish brown	10	4.9	7	2.75	9	2.36	9	1.53
h) Hooves								
Black	206	100	225	100	381	100	589	99.83
Others	---	---	---	---	---	---	1	0.17
i) Tail switch								
Black	206	100	254	99.61	380	99.74	587	99.49
White	---	---	1	0.39	1	0.26	3	0.51
<i>Hair Characters</i>								
a) Sheen								
Glossy	184	91.54	177	69.69	322	84.96	535	90.83
Dull	17	8.46	77	30.31	57	15.04	54	9.17
b) Curl								
Curly	19	9.50	63	24.80	89	23.54	132	22.41
Straight	181	90.50	191	75.20	289	76.46	457	77.59

Average body measurements of Attappady Black goats of different age groups are given in table 3. Attappady goats are medium sized. The data shows that the height at rump of these animals, except in the case of adult males (>18 months), is more than the height at withers. Raghavan and Raja (2004) have reported the overall average body length, height at withers, chest girth and paunch girth of Malabari goats of one year of age reared by the farmers as 61, 60, 69 and 76 cm, respectively. The comparison of the measurements of these two Keralan breeds shows that Attappady Black is taller than the Malabari.

The average birth weight of 78 male kids was 1.7 kg and of 72 females was 1.6 kg. Birth weights are comparable to those of Malabari kids, as reported by Mathew *et al.*, (1994) and Raghavan and Raja (2004). The average body weights of these goats in different age groups are also given in table 3.

## Reproductive performance

Even though there was no particular season of breeding, the incidence of kidding was greater during the months from September to March and it was at its highest in the month of November. The overall age at first mating, age at first kidding and gestation length of 150 female goats were  $260 \pm 2.6$ ,  $413 \pm 2.6$  and  $153 \pm 0.5$  days, respectively. The overall average service period was  $77.2 \pm 1.9$  days and the average inter-kidding interval was  $247.3 \pm 2.5$  days.

The length of oestrus cycle of Attappady Black goat does was  $20.5 \pm 0.2$  days and the overall duration of oestrus was recorded as  $39.8 \pm 0.7$  hours. The overall average of litter sizes from first parity to sixth parity was  $1.3 \pm 0.02$ . The incidence of singles was greater (73%) and the rate of twinning was 26%. The incidence of triplets (0.8%) and quadruplets (0.1%) was low. The incidences of multiple births was 11%, 36%, 47%, 47% and 36% in the first, second, third, fourth and fifth kidding, respectively.



Figure 3. Adult male of Attappady black goat.

Table 3. Average body weights and body measurements and their standard errors in Attappady Black goats.

Trait	Age groups on months				
	0-3	4-6	7-12	>12	>18
<i>Body weight (kg)</i>					
Male	4.8 ± 0.25 (103)	10.1 ± 0.28 (122)	15.7 ± 0.30 (149)	26.2 ± 0.71 (125)	34.5 ± 1.08 (69)
Female	5.28 ± 0.24 (95)	9.8 ± 0.26 (135)	14.6 ± 0.30 (227)	23.1 ± 0.25 (465)	31.3 ± 0.35 (329)
<i>Body length (cm)</i>					
Male	37.2 ± 0.66 (103)	46.4 ± 0.43 (122)	53.8 ± 0.42 (149)	63.8 ± 0.61 (125)	66.6 ± .83 (69)
Female	37.8 ± 0.59 (95)	46.5 ± 0.40 (135)	53.5 ± 0.33 (227)	61.3 ± 0.26 (465)	62.8 ± 0.35 (329)
<i>Height at withers (cm)</i>					
Male	40.8 ± 0.72 (103)	51.1 ± 0.49 (122)	58.3 ± 0.40 (149)	68.8 ± 0.63 (125)	79.5 ± 0.77 (69)
Female	42.8 ± 0.69 (95)	50.6 ± 0.40 (135)	57.7 ± 0.31 (227)	65.5 ± 0.22 (465)	66.8 ± 0.35 (329)
<i>Height at rump (cm)</i>					
Male	43.8 ± 0.79 (103)	54.5 ± 0.45 (122)	62.5 ± 0.40 (149)	73.2 ± 0.59 (125)	75.7 ± 0.76 (69)
Female	45.0 ± 0.76 (95)	54.6 ± 0.44 (135)	61.5 ± 0.32 (227)	69.8 ± 0.22 (465)	71.0 ± 0.32 (329)
<i>Chest girth (cm)</i>					
Male	40.1 ± 0.59 (103)	50.0 ± 0.40 (122)	58.2 ± 0.38 (149)	69.5 ± 0.64 (125)	71.0 ± 1.30 (69)
Female	40.5 ± 0.59 (95)	49.5 ± 0.44 (135)	57.8 ± 0.33 (227)	67.3 ± 0.26 (465)	68.9 ± 0.35 (329)
<i>Paunch girth (cm)</i>					
Male	42.7 ± 0.71 (103)	54.1 ± 0.47 (122)	63.5 ± 0.39 (149)	72.9 ± 0.69 (125)	74.7 ± 1.26 (69)
Female	42.6 ± 0.71 (95)	53.9 ± 0.54 (135)	62.8 ± 0.44 (227)	73.7 ± 0.34 (465)	75.0 ± 0.33 (329)

Note: Values in parenthesis are number of observations.



Table 4. Average body weights and body measurements and their standard errors in Attappady Black goats.

Trait	Age in months			
	0-3	4-6	7-12	>12
<i>Ear length (cm)</i>				
Male	10.1 ± 0.18 (101)	11.8 ± 0.12 (121)	12.3 ± 0.19 (148)	13.4 ± 0.12 (124)
Female	10.0 ± 0.18 (95)	11.7 ± 0.14 (134)	12.6 ± 0.11 (227)	13.6 ± 0.06 (462)
<i>Horn length (cm)</i>				
Male	0.8 ± 0.66 (35)	1.9 ± 0.11 (102)	4.3 ± 0.19 (122)	9.2 ± 0.42 (101)
Female	0.6 ± 0.59 (25)	1.5 ± 0.09 (103)	3.7 ± 0.15 (179)	7.2 ± 0.18 (373)
<i>Eye to eye length (cm)</i>				
Male	6.6 ± 0.72 (103)	7.7 ± 0.08 (122)	8.4 ± 0.08 (149)	10.0 ± 0.13 (125)
Female	6.7 ± 0.69 (95)	7.6 ± 0.07 (135)	8.3 ± 0.06 (227)	9.4 ± 0.05 (465)
<i>Face length (cm)</i>				
Male	8.6 ± 0.15 (103)	10.7 ± 0.11 (122)	12.7 ± 0.13 (149)	14.0 ± 0.59 (125)
Female	8.6 ± 0.13 (95)	10.7 ± 0.09 (135)	12.1 ± 0.09 (227)	14.0 ± 0.22 (465)
<i>Face width (cm)</i>				
Male	14.5 ± 0.15 (103)	16.8 ± 0.18 (122)	18.7 ± 0.15 (149)	20.8 ± 0.23 (125)
Female	14.5 ± 0.13 (95)	16.5 ± 0.12 (135)	17.9 ± 0.14 (227)	19.4 ± 0.09 (465)
<i>Tail length (cm)</i>				
Male	9.2 ± 0.21 (103)	11.2 ± 0.12 (122)	12.5 ± 0.12 (148)	13.8 ± 0.14 (125)
Female	9.3 ± 0.28 (95)	11.0 ± 0.12 (134)	11.9 ± 0.09 (224)	12.6 ± 0.07 (465)

Note: Values in parenthesis are number of observations.

The age at first kidding and inter-kidding intervals of Attappady goats are comparable to those of Malabari goats in the field conditions reported by Raghavan and Raja (2004). However, Mukundan (1980) and Stephen and Rai (1993 and 1994) reported a higher age at first kidding and kidding intervals for Malabari goats under farm conditions.

### Milk yield

Milking of the does is not practiced by the tribes who rear them and it was difficult to assess the milk yield of Attappady Black goats. The entire milk production of the dams was left to the kids for suckling. With the cooperation of certain farmers, the milk yield of 23 goats was measured and the average daily milk yield was found to be only 170 ml in an average lactation period of 100 days. In comparison to Malabari which produces 0.5 to 1.5 litres of milk daily (Raghavan and Raja, 2004) the Attappady Black goats are very poor milk producers and therefore these animals can be utilized only for meat purposes. The average fat percentage of was observed to be  $4.11 \pm 0.06$ .

### Disease prevalence

It was observed that goats were mainly affected by respiratory tract infections and worm infestation. When the goats were sick, only 30% of the owners treated their goats. General methods of treatment were herbal (63%) followed by allopathic (36%) and very few used local treatments (1%).

### Importance of the Breed

Attappady Black goats, reared mainly by the tribes of the Attappady region for meat purposes have evolved over a long period adapting to the agro-ecological conditions of

the area and are resistant to many diseases. The body weight performance of these breeds reared entirely on grazing without any grains or concentrates is comparable to that of any meat breed of goat in India. These animals have a great potential to be developed as an excellent meat breed. The total number of this breed of goats is less than 10 000 and due to indiscriminate breeding with other types of bucks, the purity of this group is becoming increasingly diluted. Therefore there is an urgent need for the conservation and genetic improvement of this unique goat genetic resource of India.

### List of References

- Anonymous.** 1997. 16<sup>th</sup> Quinquennial Livestock Census, Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India
- Mukundan, G., P.N. Bhat & B.U. Khan.** 1983. Reproduction traits in Malabari goats and their half-breds with Saanen. *Indian Journal of Animal Science* 53: (1) 90-93
- Raghavan, K.C. & T.V. Raja.** 2004. Personal communication.
- Stephen M., A.V. Rai & M.G. Govindaiah.** 1994. Body weights at birth and three months of Malabari goats and its crosses with Alpine and Saanen breeds. *Current Research*, 23: 84-86
- Stephen, M. & A.V. Rai.** 1993. Age at first service, first kidding and weight at first kidding in Malabari goats and its crosses with Alpine and Saanen breeds. *Journal of Veterinary and Animal Sciences*. 24: 100-102
- Stephen, M. & A.V. Rai.** 1994. Service periods and kidding intervals of Malabari goats and its crosses with Alpine and Saanen breeds. *Journal of Veterinary and Animal Sciences*, 25: 164-165.