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## Physical traits of sheep in Anantnag and Pulwama districts of Jammu and Kashmir

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### Abstract

The study was conducted to observe the physical traits in 513 sheep (289 & 224 sheep) in Anantnag and Pulwama districts of Jammu and Kashmir. Results revealed that head profile in majority of sheep was narrow & long with convex nasal bridge (49.48% & 54.47%), horn orientation was curved backward forward and outward (61.37% & 58.34%) and ear shapes was broad and slightly droopy (46.72% Vs. 43.75%, respectively), coat colour was white (94.12% Vs. 93.75), polled (84.78% Vs. 84.38) and horns oriented were curved backward forward and outward (61.37% Vs. 58.34%), respectively, in Anantnag and Pulwama districts and morphometric traits of head length, ear length and tail length between temporary teeth to 8-tooth stage ranged (18.93±0.58 to 25.50±0.23 cm), (12.37±0.75 to 15.75±1.10 cm) and (22.26±0.70 to 36.78±0.32 cm), respectively.

**Keywords:** Physical traits, morphometric traits, anantnag, pulwama

### Introduction

Sheep and goat being well conformed and stress resilient animals thrives better in the hilly and other inaccessible areas where it is difficult for other livestock to cope the adversities of terrain and harsh environment, warrants food and economic security of the poor communities (Khan *et al*, 2013) [1]. The Jammu and Kashmir being a hilly and temperate state is ideally suited for rearing of sheep and goat owing to its favourable agro-climatic and topographical conditions and richness in natural fodder resources in the form of pastures, orchards, aquatic vegetation etc. (Tomar and Sharma, 2002) [4]. The state of Jammu and Kashmir is native to about 9.23 million livestock except poultry with a population of 5.42 million small ruminants. Sheep population of the state (3.38 million) represents approximately 5.21% of the sheep population of India (65 million) and approximately 37% of the total livestock population (9.2 million) of the state, standing at rank 5<sup>th</sup> in country (Anonymus, 2012) [1]. The state in general, districts Anantnag and Pulwama in particular are ideally suited for sheep and goat rearing owing to its agro-climatic conditions and plenty of grasslands, lush pastures and orchards available. More than 70% population of the districts is rural with agriculture and horticulture being main occupation which is quite symbiotic and eco-friendly with sheep rearing. Sheep and goat rearing as secondary occupation has played an important role in boosting the economy of these rural people. As crossbreeding has webbed the indigenous breeds from last four decades, attempt was made to find the effect of exotic blood through evaluation of morphometric and performance traits.

### Material and Method

The study was conducted in Anantnag and Pulwama districts of Jammu and Kashmir. The districts are located at an altitude of 1500 to 2000 meters above mean sea level with longitude of 74.89° -75.14° and latitude of 33. 87° -33.72°. Owing to proximity of peer panchal range, which stretches in its South and South-East, the districts has Temperate cum Mediterranean type of climate in summer and relatively cold in winter than other districts of the valley. In the higher reaches, the temperature remains low throughout the year. Average minimum and maximum temperature varies from -5 °C to 32 °C. Data pertaining to physical traits, a total of 513 sheep, 289 in Anantnag and 224 in Pulwama were observed for head profile, beard, ear

shape, horn presence/absence, horn orientation, coat colour, head length and ear length.

### Statistical analysis

The data was subjected to standard procedures using SPS 20.0 version software and results were expressed as mean  $\pm$  SE and differences between means were considered significant at  $p < 0.05$ .

## Results and Discussion

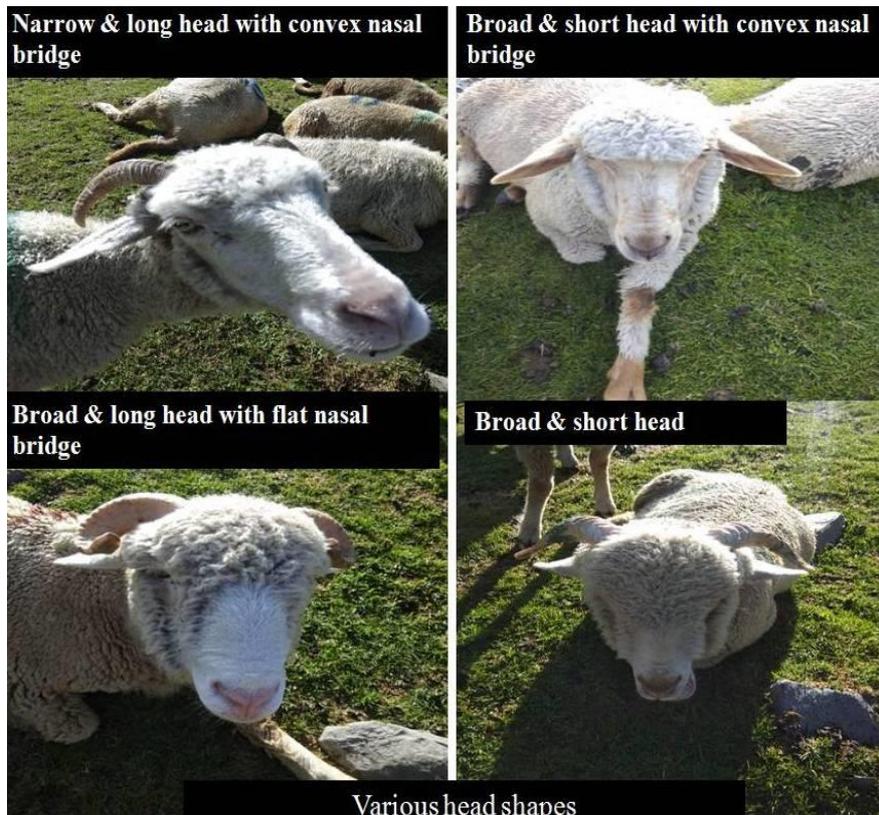
### Physical traits/General description and morphometric traits of sheep.

Results revealed that in Anantnag and Pulwama districts, the head profile in majority of sheep (49.48% & 54.47%, respectively) was narrow & long with convex nasal bridge followed by broad & short with convex nasal bridge (23.88% & 25.45%, respectively), broad & long with convex nasal bridge (19.38% & 15.18%, respectively), broad & short with flat nasal bridge (7.27% & 4.91%, respectively) (table 1 & fig. I). The observations of the present study were in agreement with the findings of Ganai *et al.* (2011)<sup>[6]</sup> in Changthangi sheep and Want (2016)<sup>[16]</sup> in Kashmir Merino, who reported that majority of sheep had convex head with a long tapering face. Ahmad *et al.* (2009)<sup>[2]</sup> reported slightly convex nasal bridge in Kutta sheep breed. Musavi *et al.* (2013)<sup>[12]</sup> reported a straight nose with flat forehead in most of the cases (95.5%) and slightly convex nose (4.5%) in Hazaragie sheep of Afghanistan. Thus observation on head profile revealed different head shapes with convex nasal bridge being dominant followed by slightly convex and flat, respectively. Beard was not found in any of the sheep. Ear shapes in majority of sheep (46.72% & 43.75%, respectively) were broad and slightly droopy followed by narrow and slightly droopy (28.03 & 30.81%, respectively), broad and erect (14.19% & 10.72%, respectively), narrow and erect (9.69% & 13.84%, respectively) and tubular and triangular (1.39% & 0.9%, respectively) in Anantnag and Pulwama districts, respectively (table 2). Similar findings were observed by Traore *et al.* (2008)<sup>[15]</sup> and Ganai *et al.* (2010)<sup>[7]</sup>, Dass (2008)<sup>[5]</sup> and Musavi *et al.* (2013)<sup>[12]</sup>, who reported droopy ears in Burkina Faso sheep and in Changthangi sheep, tubular ears in Pugal sheep, long pendulous ears in Hazaragie sheep of Afghanistan, respectively. Similarly Gupta, (1994b)<sup>[9]</sup> reported long, broad & drooping ears in Bhakerwal sheep. Contrary to the present findings Traore *et al.* (2008)<sup>[15]</sup> reported vertical and curled ears in Sudan sheep. Thus ears possess different shapes and orientation depending on breed, age and region of origin. Majority of sheep were polled (84.78% & 84.38, respectively) whereas 15.23% and 15.62% were horned in Anantnag and Pulwama districts, respectively. In Anantnag district among the males majority (94.28%) of sheep were horned while as 5.72% were polled and in female category majority (95.67%) were polled while as 4.33% were horned. In Pulwama district among the males majority (88.88%) of sheep were horned while as 11.12% were polled and in female category majority (97.89%) were polled while as 2.11% were horned (table 3). Similar findings were observed by Ahmad *et al.* (2009)<sup>[2]</sup>; Arora *et al.* (2010)<sup>[3]</sup>; Ganai *et al.* (2010)<sup>[7]</sup> and Want (2016)<sup>[16]</sup>, who reported majority of the females and males of Kutta sheep, Ganjam sheep, Gurez sheep and Kashmir Merino were polled and horned, respectively. Majority of horned sheep have curved backward forward & outward (61.37% & 58.34%, respectively) followed by curved backward forward & inward (20.46 & 22.23%, respectively), curved backward forward &

downward (4.55% & 6.82%, respectively) and curved backward forward orientation (13.64% & 9.09%, respectively) (table 4). Results of the present findings were in agreement with the findings of Ahmad *et al.* (2009)<sup>[2]</sup> and Arora *et al.* (2010)<sup>[3]</sup>; and Ganai *et al.* (2011)<sup>[6]</sup> who reported majority of Kutta and Ganjam rams were horned with orientation backward and outward somehow spirally in mature males and ewes were polled; and curved horns in majority (79%) and straight in (21%) of Changthangi sheep, respectively. Majority of the sheep were white coated (94.12% & 92.41) followed by black (2.77% & 5.36%, respectively) and white with coloured patches (3.12% & 2.24%) in colour in Anantnag and Pulwama districts, respectively (table 5). Similar findings were observed by Ganai *et al.* (2011)<sup>[6]</sup> and Hassan *et al.* (2011)<sup>[10]</sup> who reported colours ranged from complete black to white and brown, however, white colour was predominant in Changthangi sheep of Ladakh locally known as Changluk and in coastal areas sheep of Bangladesh. Contrary to the present findings, Traore *et al.* (2008)<sup>[15]</sup> reported black and brown colour patterns in Burkina-Sahel sheep. Similarly, Want (2016)<sup>[16]</sup> reported only white colour in Kashmir Merino sheep. In present study there were both white and black coloured sheep, though white were dominant, black might be due to the local blood. Head length (cm) of male sheep at temporary teeth, 2-tooth, 4-tooth, 6-tooth and 8-tooth in Anantnag and Pulwama districts measured were (19.64 $\pm$ 0.64, 18.93 $\pm$ 0.58), (23.71 $\pm$ 0.52, 23.75 $\pm$ 0.79), (22.25 $\pm$ 1.10, 24.33 $\pm$ 1.05), (23.66 $\pm$ 0.88, 23.75 $\pm$ 0.85) & (24.33 $\pm$ 1.20, 25.33 $\pm$ 0.66), respectively, while head length (cm) among the female group at temporary teeth, 2-tooth, 4-tooth, 6-tooth, and 8-tooth in Anantnag and Pulwama districts recorded were (19.90 $\pm$ 0.49, 19.73 $\pm$ 0.48), (19.68 $\pm$ 0.28, 20.13 $\pm$ 0.33), (25.50 $\pm$ 0.23, 23.14 $\pm$ 0.39), (21.12 $\pm$ 0.30, 21.42 $\pm$ 0.26) & (22.13 $\pm$ 0.25, 22.32 $\pm$ 0.23), respectively (table 6 & fig. II). Results in earlier studies revealed medium sized head in Kutta sheep breed (Ahmad *et al.* 2009)<sup>[2]</sup> and higher head length in males than in females in indigenous sheep of Jamuna region of Bangladesh (Pervage *et al.* 2009)<sup>[13]</sup>. Ear length (cm) of male sheep at temporary teeth, 2-tooth, 4-tooth, 6-tooth and 8-tooth in Anantnag and Pulwama districts measured were (14.22 $\pm$ 0.34, 13.53 $\pm$ 0.58), (14.14 $\pm$ 1.37, 12.37 $\pm$ 0.75), (13.25 $\pm$ 2.49, 15.33 $\pm$ 1.89), (14.25 $\pm$ 0.85, 15.75 $\pm$ 1.10) & (14.66 $\pm$ 0.88, 15.33 $\pm$ 1.76), respectively, while ear length (cm) among the female group at temporary teeth, 2-tooth, 4-tooth, 6-tooth, and 8-tooth in Anantnag and Pulwama districts recorded were (13.08 $\pm$ 0.29, 13.43 $\pm$ 0.38), (12.78 $\pm$ 0.20, 13.31 $\pm$ 0.31), (14.21 $\pm$ 0.20, 13.71 $\pm$ 0.43), (14.06 $\pm$ 0.28, 13.77 $\pm$ 0.57) & (14.30 $\pm$ 0.32, 14.47 $\pm$ 0.39) (table 7 & fig. III). The present findings were in close with those of Ahmad *et al.* (2009)<sup>[2]</sup> in Kutta sheep breed (average ear length of 10.5  $\pm$  0.22 cm); Arora *et al.* (2010)<sup>[3]</sup> in adult Ganjam sheep (average ear length 12.0  $\pm$  0.55 cm); Ganai *et al.* (2010)<sup>[7]</sup> in Changthangi sheep breed (11.28 $\pm$ 0.26 cm in females, 10.58 $\pm$ 0.26 cm in males); Ganai *et al.* (2010)<sup>[7]</sup> in Gurez sheep (average ears length in males and females were 12.15 $\pm$ 0.53 and 11.92 $\pm$ 0.44 cm); Chandran *et al.* (2014)<sup>[4]</sup> in Shahabadi lambs (average ear length at birth pooled over sexes were 9.01 $\pm$ 0.08 cm); Dass, (2008)<sup>[5]</sup> in different sex and age groups in Pugal sheep (ear length ranged from 6.35  $\pm$  0.08 cm to 9.41  $\pm$  0.20 cm). Thus ear length varied among different age groups of sheep in both districts of south Kashmir without any significant difference ( $p < 0.05$ ) and was close to the ear length of other breeds.

**Table 1:** Head profile of sheep in Anantnag and Pulwama districts.

Shape of head	Anantnag (289)	Pulwama (224)
Narrow long head with convex nasal bridge	143 (49.48%)	122 (54.47%)
Broad short head with convex nasal bridge	69 (23.88%)	57 (25.45%)
Broad long head with convex nasal bridge	56 (19.38%)	34 (15.18%)
Broad short head with flat nasal bridge	21 (7.27%)	11 (4.91%)



**Fig I:** Various head shapes of sheep in Anantnag and Pulwama districts of J&K

**Table 2:** Ear shape of sheep in Anantnag and Pulwama districts.

Shape of ears	Anantnag (289)	Pulwama (224)
Broad and slightly droopy	135 (46.72%)	98 (43.75%)
Narrow and slightly droopy	81 (28.03%)	67 (30.81%)
Broad and erect	41 (14.19%)	24 (10.72%)
Narrow and erect	28 (9.69%)	31 (13.84%)
Tubular and triangular	4 (1.39%)	2 (0.9%)

**Table 3:** Presence or absence of horns

Number of Sheep	Anantnag		
	Parameter	Frequency	Percentage
289	Polled	245	84.78
	Horned	44	15.23
Sex wise breakup of horned/polled			
Male (35)	Polled	2	5.72
	Horned	33	94.28
Female (254)	Polled	243	95.67
	Horned	11	4.33
Number of Sheep	Pulwama		
	Parameter	Frequency	Percentage (%)
224	Polled	189	84.38
	Horned	36	15.62
Sex wise breakup of horned/polled			
Male (36)	Polled	4	11.12
	Horned	32	88.88
Female (189)	Polled	185	97.89
	Horned	4	2.11

**Table 4:** Horn orientation of sheep in Anantnag and Pulwama districts.

Orientation of horns	Anantnag (35)	Pulwama (36)
Curved backward forward and outward	27 (61.37%)	21 (58.34%)
Curved backward forward and inward	9 (20.46%)	8 (22.23%)
Curved backward forward and downward	2 (4.55%)	3 (6.82%)
Curved backward forward	6 (13.64%)	4 (9.09%)

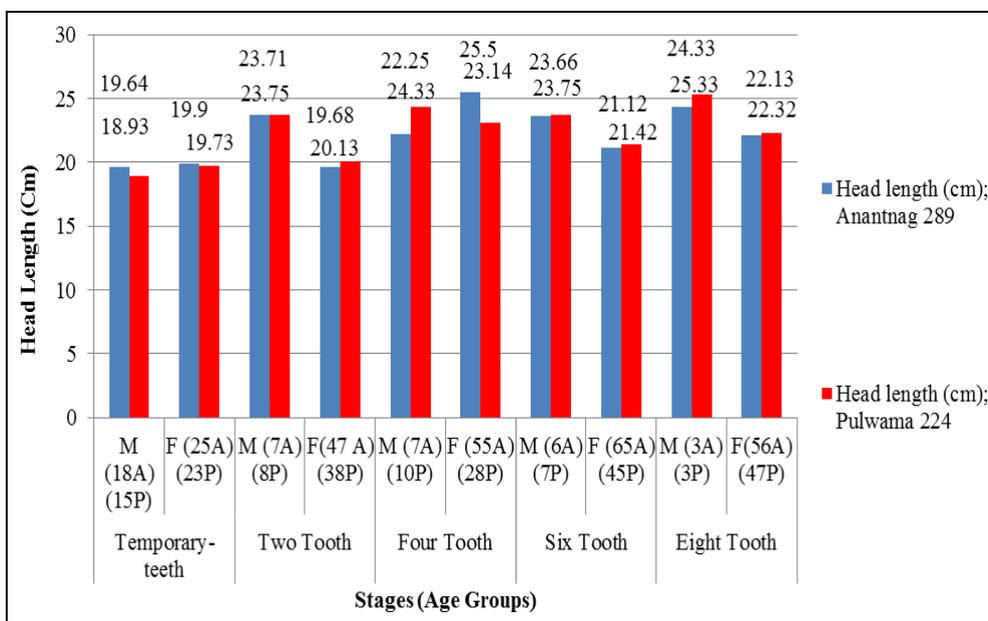
**Table 5:** Coat colour of sheep in Anantnag and Pulwama districts.

Colour	Anantnag (289)	Pulwama (224)
White	272 (94.12%)	207(92.41)
Black	8 (2.77%)	12 (5.36%)
White with coloured patches	9 (3.12%)	5 (2.24%)

**Table 6:** Head length (cm) of sheep in different age groups in Anantnag and Pulwama districts.

Age group	Sex	Anantnag (289)*		Pulwama (224)*	
Temporary- teeth	Male	19.64±0.64 (18)	Max.=23 Min.=17	18.93±0.58 (15)	Max.= 23 Min.=16
	Female	19.90±0.49 (25)	Max.=24 Min.=16	19.73±0.48 (23)	Max.= 23 Min.=17
Two Tooth	Male	23.71±0.52 (7)	Max.=26 Min.=22	23.75±0.79 (8)	Max.= 26 Min.=19
	Female	19.68±0.28 (47)	Max.= 23 Min.=16	20.13±0.33 (38)	Max.= 24 Min.=16
Four Tooth	Male	22.25±1.10 (7)	Max.= 25 Min.= 20	24.33±1.05 (10)	Max.= 28 Min.= 21
	Female	25.50±0.23 (55)	Max.=29 Min.=22	23.14±0.39 (28)	Max.=26 Min.=19
Six Tooth	Male	23.66±0.88 (6)	Max.=25 Min.=22	23.75±0.85 (7)	Max.=26 Min.=22
	Female	21.12±0.30 (65)	Max.=27 Min.=18	21.42±0.26 (45)	Max.=25 Min.=18
Eight Tooth	Male	24.33±1.20 (3)	Max.= 26 Min.=22	25.33±0.66 (3)	Max.=26 Min.=24
	Female	22.13±0.25 (56)	Max.= 25 Min.=17	22.32±0.23 (47)	Max.= 25 Min.=19

\* Figures in parenthesis indicate number of animals.

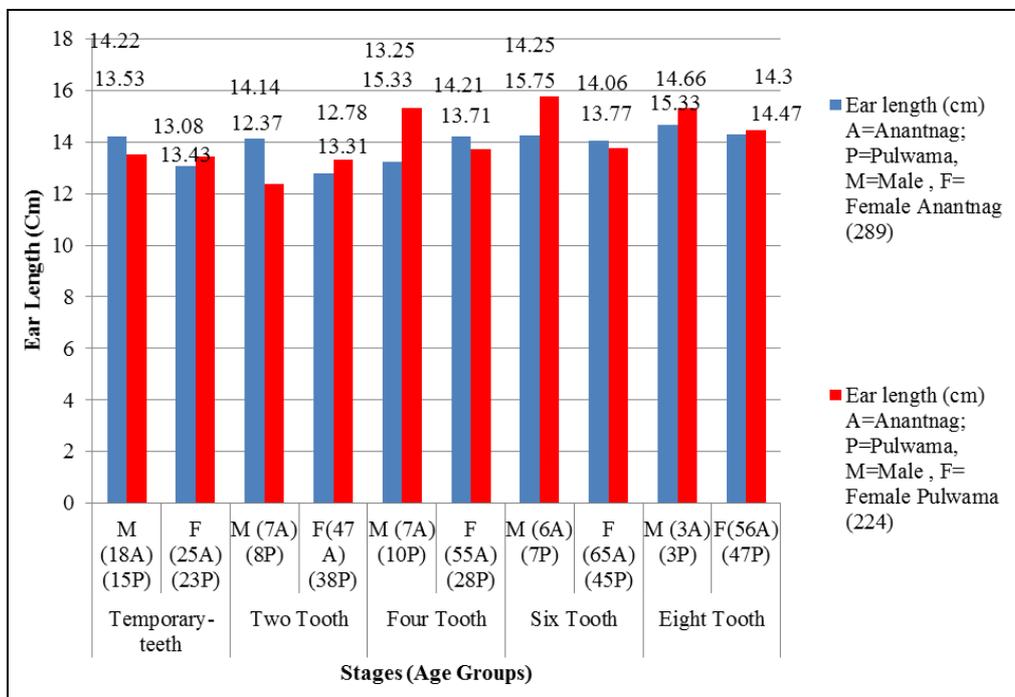


**Fig II:** Head length (cm) of sheep in different age groups in Anantnag and Pulwama districts.

**Table 7:** Ear length (cm) of sheep in different age groups in Anantnag and Pulwama districts.

Age group	Sex	Anantnag (289)*		Pulwama (224)*	
Temporary- teeth	Male	14.22±0.34 (18)	Max.=17 Min.=12	13.53±0.58 (15)	Max.= 17 Min.=9
	Female	13.08±0.29 (25)	Max.=16 Min.=10	13.43±0.38 (23)	Max.= 17 Min.=10
Two Tooth	Male	14.14±1.37 (7)	Max.= 19 Min.=9	12.37±0.75 (8)	Max.= 16 Min.=10
	Female	12.78±0.20 (47)	Max.=16 Min.=10	13.31±0.31 (38)	Max.= 17 Min.=10
Four Tooth	Male	13.25±2.49 (7)	Max.= 22 Min.=11	15.33±1.89 (10)	Max.=13 Min.=11
	Female	14.21±0.20 (55)	Max.= 17 Min.=11	13.71±0.43 (28)	Max.= 17 Min.=9
Six Tooth	Male	14.25±0.85 (6)	Max.= 19 Min.=15	15.75±1.10 (7)	Max.=22 Min.=17
	Female	14.06±0.28 (65)	Max.= 22 Min.=11	13.77±0.57 (45)	Max.= 26 Min.=10
Eight Tooth	Male	14.66±0.88 (3)	Max.= 16 Min.=13	15.33±1.76 (3)	Max.= 18 Min.=12
	Female	14.30±0.32 (56)	Max.= 24 Min.=10	14.47±0.39 (47)	Max.= 23 Min.=10

\* Figures in parenthesis indicate number of animals.



**Fig III:** Ear length (cm) of sheep in different age groups in Anantnag and Pulwama districts.

**Conclusion**

Physical traits of sheep in Anantnag and Pulwama districts revealed that head profile in majority of sheep was narrow & long with convex nasal bridge. Ear shapes in majority of sheep in both districts were Broad and droopy. Majority of female were polled and male sheep were horned in both districts. Majority of horned sheep were curved backward forward and outward. Majority of the sheep were white coated in both districts.

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