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Original Research

Morphometric Characteristics of Ponies Reared by Bakarwals in Sonamarg and Pahalgam Regions of Jammu and Kashmir

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Abstract

A study was conducted to investigate morphometry of ponies maintained by Bakarwal community in Sonamarg and Pahalgam regions of Jammu and Kashmir so as distinguish it as a distinct equine breed. Morphometry was recorded for 200 ponies and after compilation of data analysis was done. The results revealed that chestnut (29.50%) was predominant coat color and Star (34.50%) was most predominant marking. Considerable number of animals (70.00%) were having convex forehead followed by flat (27.50%) and only meager proportion of animals (2.50%) were having concave forehead. The withers height of Ponies 126.01±0.37 cm, height at rump120.79±0.35cm, body length 124.71±0.43cm, chest girth144.96±0.46cm, and adult body weight 243±2.14kg. However, significant difference ($p<0.05$) was observed in terms of face width, hock, knee, shank and throat latch between equines of Jammu division and Kashmir division. So, almost all ponies were having similar morphometric characters in both the regions with differences only in face width, hock, knee, shank and throat latch.

Keywords: Bakarwal, Coat Color, Markings, Morphometry, Ponies

Introduction

Equine species such as horses, ponies, donkeys and mules have contributed to human civilization throughout the world since time immemorial. In developing countries, equids are mostly used as working animals often carrying tasks in harsh environmental conditions. They support people's livelihood in a wide range of sectors including agriculture, construction, tourism, mining and public transport. Population of horses and ponies in Jammu and Kashmir is 0.63 lakh and it also ranks second in India (Anonymous, 2019). Bakarwal community forming the pastoralist section of Jammu and Kashmir, are mainly associated with equine rearing. This community mainly uses equines as pack animals during yearly migration. As Kashmir valley bone of the top consumer of mutton, which is usually produced by these Bakarwal communities. As these nomads need to move over long distances through difficult terrains these ponies are play very important role in it. So, these animals are important part of their livelihood and unfortunately these equines have got less consideration from authorities (Fazili and Kirmani, 2011). Besides these ponies have remained unexplored in various aspects and for sustainable use of genetic resources characterization of breed is the most important thing apart from focusing on the managemental issues. Thus, the study was conducted to evaluate morphometry characteristics of ponies in Jammu and Kashmir as no study has been conducted in the particular field.

Materials and Methods

The present study was conducted with aim to investigate various morphometric traits of the ponies reared by the Bakarwal community focusing in two areas i.e., Pahalgam and Sonamarg falling in district Anantnag and Ganderbal of Jammu and Kashmir. The Bakarwals maintain ponies some ponies remain with them in Jammu regions and some are kept in Kashmir valley. For annual livestock migration ponies from different regions are used. A total of 200 equines were selected using grab sampling technique, from Pahalgam 80 ponies and from Sonamarg 120 ponies were selected. The measurements were done using measuring rod and measuring tape and Vernier calipers. The morphometric parameters were recorded as per prescribed format of NBAGR (2016). Body weight was calculated using body measurements according to Gina (2010).

Statistical Analysis

The data collected during the period of study was coded, tabulated and compiled systematically and descriptive statistical analysis was done and for further statistical analysis standard procedures were used (Snedecor and Cochran, 1994).

Results and Discussion

Body Coat Color of Ponies

Chestnut was most predominant color (found in 29.50% of animals) followed by Bay (22.50%), Brown (20.00%), Roan (13.00%), Dun (10.50%) and Grey (4.5%). These findings are similar to Alam *et al*. (2016) who reported predominant color as Chestnut (42%), Bay (42%), Grey (12%), Pseudo albino (2%), Black (1%), Chestnut Roan (1%) and the Bay Roan (5%).

Table 1: Body coat color of Ponies

Type of color	Region		Total
	Kashmir (n=41)	Jammu (n=159)	(N=200)
Dun	6 (14.63)	15 (9.43)	21 (10.50)
Chestnut	9 (21.95)	50 (31.44)	59 (29.50)
Bay	9 (21.95)	36 (22.64)	45 (22.50)
Roan	7 (17.07)	19 (11.94)	26 (13.00)
Brown	10 (34.38)	30 (18.86)	40 (20.00)
Grey	0 (0.00)	9 (5.66)	9 (4.5)
Chi square test	Chi square =5.32, P =0.378		

*Figures in parenthesis indicate percentage; Statistical tests reflect the results between regions and * (asterisk) indicate significant difference at 5 percent level of significance*

A study by Yilmaz and Ertugrul (2012) reported that frequencies of body coat colour of the sampled horses for Bay colour was 34.6%, Chestnut 30.8%, Black 25%, and Gray 9.6% respectively. Whereas Pundir (2001) in Spiti Horses found the body colours were Grey, Brown, Black and Piebald Table 1, Fig. 1, Fig. 2, Fig. 3 and Fig. 4.

Figure 1: Piebald

Figure 2: Bay

Figure 3: Gray

Figure 4: Chestnut

Head Markings Observed in Ponies

Star (34.50%) was the most predominant head mark, followed by no marking (18.50%), Star, Stripe conjoined with Snip (9.50%), Snip (7.50%), Star and Stripe (7.00%), White muzzle (5.50%) Blaze (4.50%), Interrupted Stripe (4.00%), Stripe along with Snip (3.00%), Stripe (3.00%), and Star and Snip (3.00%) (Table 2; Fig. 5, Fig. 6, Fig. 7, Fig. 8 and Fig. 9). Insignificant literature was available with us regarding head markings.

Table 2: Head markings observed in Ponies

Type	Region		Total (N=200)
	Kashmir (n=41)	Jammu (n=159)	
No marking	9 (21.95)	28 (17.61)	37 (18.50)
Star	12 (29.26)	57 (35.84)	69 (34.50)
Snip	2 (4.87)	13 (8.17)	15 (7.50)
Blaze	3 (7.31)	6 (3.77)	9 (4.50)
Interrupted stripe	3 (7.31)	5 (3.14)	8 (4.00)
Star and Strip	4 (9.75)	10 (6.28)	14 (7.00)
Stripe and Snip	1 (2.43)	5 (3.14)	6 (3.00)
White muzzle	2 (4.87)	9 (5.66)	11(5.50)
Star, Stripe and Snip	4 (9.75)	15 (9.43)	19 (9.50)
Star and Snip	1 (2.43)	5 (3.14)	6 (3.00)
Stripe	0 (0.00)	6 (3.77)	6 (3.00)

*Figures in parenthesis indicate percentage; Statistical tests reflect the results between regions and * (asterisk) indicate significant difference at 5 percent level of significance*

Figure 5: Star

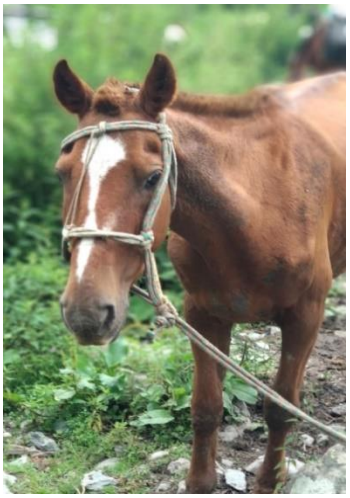

Figure 6: Star and stripe

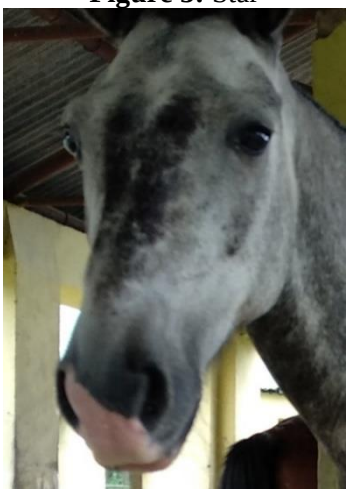

Figure 7: Snip

Figure 8: No marking

Figure 9: Star, Stripe and Snip

Observed Characteristics of Head, Ear and Eyes

Considerable number of animals (70.00%) were having convex forehead followed by flat (27.50%) and only meager proportion of animals (2.50%) were having concave forehead. The overall majority of animals (88.00%) had erect ears while only (12.00%) had drooping ears. The overall (85.00%) had bright eyes and (15.00%) had dull eyes (Table 3, Fig 10, Fig 11, Fig 12). However, Pundir (2001) observed that the Spiti Horses were having alert attitude, the face (forehead) was convex, the ears were erect and the eyes were black. The difference in eyes might be due to breed difference.

Table 3: Observed characteristics of head, ear and eyes

Body part	Type /Shape	Region		Total (N=200)
		Kashmir (n=41)	Jammu (n=159)	
Head	Convex	28 (68.29)	112 (70.44)	140 (70.00)
	Concave	1 (2.43)	4 (2.51)	5 (2.50)
	Flat	12 (29.26)	43 (27.04)	55 (27.50)
	Chi square test	Chi square value=0.08, P =0.96		
Ears	Erect	35 (85.36)	141 (88.60)	176 (88.00)
	Drooping	6 (14.63)	18 (11.32)	24 (12.00)
	Chi square test	Chi square value=0.34, P =0.56		
Eye	Bright	32 (78.00)	138 (86.79)	170 (85.00)
	Dull	9 (21.00)	21 (13.2)	30 (15.00)
	Chi square test	Chi square value=1.95, P =0.16		

Figures in parenthesis indicate percentage; Statistical tests reflect the results between regions

Figure 10: Convex

Figure 11: Concave

Figure 12: Flat

Characteristics of Back, Hoof and Tail

The results revealed that overall (71.00%) of animals were having straight back and concave (29.00%). A considerable number of animals were having white hoof (48.50%) followed by black hoof (37.00%), stripped (12.50%) and all the animals were having low and bushy tail in both regions.

Body Measurements of Ponies

The mean (±SE) observed for adult body weight of the ponies was observed 245.62 ± 5.14 and 243.35±2.34kg from Kashmir and Jammu regions respectively. Earlier Singh *et al.* (2002) studied breed characteristics of Marwari and Kathiawari horses and reported that average body weight of Marwari horses at one year, two years and three years were 173.7±9, 294.5±5 and 319.4±12.1 kg respectively while as in Kathiawari horses it was 164±9.5, 281.4±13.0 301.4±19.8 kg respectively. Thus, the body weight observed in the present study was less than that of Marwari and Kathiawari horses. This might be due to breed and type of horse differences. The mean (±SE) observed height at wither in ponies was 125.29 ± 0.87 and 126.19 ± 0.41 cm from Kashmir and Jammu regions, respectively. The mean (±SE) observed height at croup in ponies was 120.31 ± 0.80and 120.91 ± 0.39 cm in Kashmir and Jammu regions respectively. The mean (±SE) observed body length was 124.07 ± 1.04and 124.91 ± 0.473cm from ponies of Kashmir and Jammu regions respectively. The mean (±SE) observed face length of ponies was 47.48 ±1.00 and 45.37 ±0.53 cm from Kashmir and Jammu regions, respectively. The mean (±SE) observed for face width was 13.24 ± 0.15 and 12.68 ±0.07 cm in Kashmir and Jammu regions respectively. The mean (±SE) observed ear length of ponies was 14.49± 0.26 and 14.04±0.15 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed ear width was 5.92±0.19 and 5.87±0.09 cm from Kashmir and Jammu regions, respectively (Table 4, Fig. 13, Fig. 14 and Fig. 15).

Table 4: Body measurements of ponies

Parameter	Region		P Value	Total (N=200)
	Kashmir (n=41)	Jammu (n=159)		
Adult body weight (kg's)	245.62 ± 5.14	243.35±2.34	0.689	243±2.14
Height at wither(cm)	125.29 ± 0.87	126.19 ± 0.41	0.354	126.01±0.37
Height at croup(cm)	120.31 ± 0.80	120.91 ± 0.39	0.507	120.79±0.35
Body length(cm)	124.07 ± 1.04	124.91 ± 0.473	0.405	124.71±0.43
Abdominal girth(cm)	159.34 ± 1.18	160.12 ±0.53	0.547	159.96±0.49
Chest girth(cm)	145.87 ± 1.06	144.72 ± 0.51	0.336	144.96±0.46
Pelvic girth(cm)	140.46 ± 0.99	139.88 ± 0.50	0.601	140±0.44
Face length(cm)	47.48 ±1.00	45.37 ±0.53	0.06	45.80±0.47
Face width(cm)	13.24 ± 0.15	12.68 ±0.07	0.002*	12.80±0.07
Ear length(cm)	14.49± 0.26	14.04±0.15	0.152	14.13±0.13
Ear width(cm)	5.92±0.19	5.87±0.09	0.835	5.88±0.08
Space between eyes(cm)	14±0.12	14.06±0.06	0.636	14.05±0.05
Length upto shoulder(cm)	83.53±0.60	82.53±0.32	0.148	82.74±0.28
Height at hock(cm)	52.12±0.24	50.16±0.66	0.005*	50.56±0.52
Height at knee(cm)	41.18±0.32	39.17±0.61	0.004*	39.58±0.04
Fetlock to coronet(cm)	16.96±0.12	17.29±0.07	0.02	17.22±0.06
Shank(cm)	49.12±0.80	44.91±0.56	0.0002*	45.77±0.46
Throatlatch(cm)	63.63±0.34	59.99±0.21	0.000*	60.74±0.19
Poll-wither(cm)	54.09±0.83	55.48±0.44	0.148	55.20±0.39
Wither-croup(cm)	84.34±0.64	84.59±0.48	0.759	84.54±0.41
Croup-tail head(cm)	35.70±0.45	36.22±0.22	0.313	36.12±0.20
Tail length(cm)	73.54±1.01	73.59±0.44	0.958	73.58±0.40

*Figures in parenthesis indicate percentage; Statistical tests reflect the results between regions and * (asterisk) indicate significant difference at 5 percent level of significance*



Figure 13, 14 and 15: Body measurement of ponies

However, Kawareti *et al.* (2017) reported that the average height at withers in age group I (7.53±0.36 years) and age group II (13.06±0.55 years) was 150.33 ± 0.77 and 149.46 ± 1.19 cm with the average body length of 152.1 ± 1.00 and 150.23 ± 1.29 cm, which is higher than present results. However, findings reported earlier by Alam *et al.* (2016) are slightly lower than present results who observed that wither height, croup height and ear length of indigenous horses in Bangladesh in the age group of 6-10 years was 115.35±0.96cm; 112.06±0.83 cm, 114.45±0.69cm; 114.45±0.69cm, of 16.27±0.70cm; 15.60±0.18 cm in stallion and mares, respectively. However,

Pundir (2001) in Spiti horses found 129 cm wither height, body length of 100 cm, a heart girth of 148 cm, an ear length of 15 cm and a face length of 50 cm these findings are similar to the present results except the body length. However, Singh *et al.* (2002) who observed that the croup height, as 152.91±0.31cm and 146.78±0.47 cm in Marwari and Kathiawari, respectively.

Thus, it revealed the animals under study may be categorized as pony since Marwari and Kathiawar are established horse breeds of India. The mean abdominal girth of ponies was observed 159.34 ± 1.18 and 160.12 ±0.53 cm from Kashmir and Jammu regions, respectively. The mean (±SE) observed chest girth of ponies was 145.87 ± 1.06 and 144.72 ± 0.51cm from Kashmir and Jammu regions, respectively. The mean (±SE) observed pelvic girth of ponies was 140.46 ± 0.99 and 139.88 ± 0.50 cm from Kashmir and Jammu regions, respectively. However, Singh *et al*., (2002) observed chest girth, as 169.21±0.54cm and 165.20±0.77 cm, were in Marwari and Kathiawari respectively. The difference may be as a result of breed and type of horse. The mean (±SE) observed for space between eyes in ponies was 14±0.12cm and 14.06±0.06 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed length up to shoulder in ponies was 83.53±0.60cm and 82.53±0.32 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed height at hock in ponies was 52.12±0.24cm and 50.16±0.66 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed height at knee in ponies was 41.18±0.32cm and 39.17±0.61 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed distance between fetlock to coronet in ponies was 16.96±0.12cm and 17.29±0.07 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed shank circumference in ponies was 49.12±0.80cm and 44.91±0.56 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed throatlatch in ponies was 63.63±0.34cm and 59.99±0.21 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed distance between poll to wither in ponies was 54.09±0.83cm and 55.48±0.44 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed distance wither to croup in ponies was 84.34±0.64cm and 84.59±0.48 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed distance croup to tail head in ponies was 35.70±0.45cm and 36.22±0.22 cm from Kashmir and Jammu regions respectively. The mean (±SE) observed tail length in ponies was 73.54±1.01cm and 73.59±0.44 cm from Kashmir and Jammu regions respectively. However, Alam *et al*. (2016) reported tail length in 6–10-year-old stallion and mare was 66.72±1.37cm; 66.34±1.01 cm respectively. The results of present study vary due the fact the animals under our study are maintained by pastoralist who do not focus much about grooming practices.

Conclusion

Majority of the ponies were having similar morphometric characters in both the regions under study with some difference for face width, height up to knee, height up to hock, shank circumference and throat latch.

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Conflict of Interests

There is no conflict of interest.

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