

Chitarangi sheep: A new carpet type ovine genetic resource of north-western India

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India is blessed with rich repository and diversity in sheep genetic resources and possesses wealth of flora and fauna spread all over the sub-continent. Sheep husbandry is an important activity from temperate to tropical ecology of India characterized by feed scarcity, marginal land and poor economic conditions of sheep farmers (Mishra and Kumar 2012). There are 43 distinguished sheep breeds registered in India. These sheep breeds are well-adapted to specific environment and sustainably producing in specific agro-climatic regions of the country. The Indigenous sheep are rich in variability and are endowed with many positive traits like superior disease resistance, better tolerance to high heat and humidity etc. It has also been noted that indigenous breeds are more efficient in feed conversion. They generally perform better than exotic breeds under low input conditions, climatic stresses and especially during times of draught. As per breed wise Livestock census report (2013) the sizable populations (41.08%) of sheep are non-descript. There are some populations in India which deserves for registration (Mishra *et al.* 2016) as breed but due to lack of systematic study they are classified as non-descript and Chitarangi sheep is one of them. Scanty information is available on Chitarangi sheep, hence there is a need to characterize and document this valuable ovine germplasm. Keeping this in view, the present study was conducted to characterize this sheep population in its breeding tract.

The present study was conducted in 20 villages belonging to Fazilka and Muktsar of Punjab and Sri Ganganagar and Bikaner districts of Rajasthan, India. A total of 56 sheep flocks were surveyed during the study from August 2015 to September 2017. The body biometric traits, viz. body length (BL), height at wither (HW), chest girth (CG), paunch girth (PG), ear length (EL), face length (FL), face width (FW), tail length (TL) and body weight (BW) were recorded from 371 adult animals (72 male and 299 females). Body weights of 205 lambs belonging to different age groups from

birth to 12 months were also recorded. The body weight was recorded using weighing balance and biometric traits were recorded using measuring tape after making the animal to stand squarely on even ground. The data on other physical traits, viz. head profile, ear orientation, color pattern, production performance; reproduction traits etc. and management practices were collected by personnel observations and interviewing sheep farmers as per the standard performa for phenotypic characterization of sheep genetic resources. The data were statistically analyzed as per standard statistical techniques (Snedecor and Cochran, 1989). The results obtained are given below.

Distribution: Chitarangi is a carpet quality wool type sheep population, distributed in Fazilka, Muktsar districts of Punjab, Sriganganagar districts of Rajasthan and nearby areas. *Shamaki wali*, a more prevalent synonym for this sheep among the farmers, is derived from Shamaki village of Ghadsana mandi tehsil of Sriganganagar district. It is also known as *Ratani* sheep. Farmers reported rearing this sheep since more than last 40–50 years.

Phenotypic characteristics: Chitarangi animals are medium to large in size. The coat colour and face is white with tan colour patches around eyes, muzzle and distal end of the ear pinna. The light brown, chocolate and black colour patches were also seen in flocks. Ears are large in size and leafy. Serrations of different shape and depth are available on distal end of ear pinna in all the animals, which is a characteristic feature of this breed. The length of ear ranges from 12 to 24 cm. Both the sexes are polled, however, horns were observed in few males. Tail is medium in length (Fig. 1 and 2) and thin. The udder is medium sized and developed



Fig. 1. Chitarangi Male

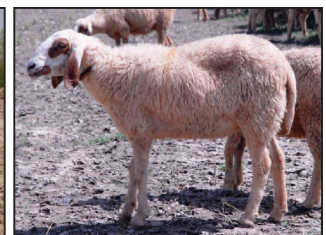


Fig. 2. Chitarangi Female

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Table 1. Body weight (kg) and biometry (cm) of adult Chitarangi sheep

Trait	N	BW	BL	HW	CG	PG	FL	FW	EL	TL
Overall	371	48.13±0.51	72.54±0.24	73.70±0.22	86.52±0.31	88.66±0.38	20.25±0.07	9.48±0.04	18.03±0.09	22.19±0.17
Sex		**	**	**	**	**	**	**	**	**
Male	72	56.27±1.28	76.65±0.56	78.78±0.47	90.60±0.73	92.03±0.91	21.78±0.17	10.26±0.10	18.63±0.20	23.63±0.41
Female	299	46.16±0.50	71.56±0.28	72.47±0.19	85.54±0.32	87.85±0.40	19.88±0.59	9.29±0.04	17.89±0.10	21.84±0.18
Range										
M		39–95	68–90	71–88	78–107	79–109	18–25	8–12	14–23	12–32
F		26–74	59–87	64–89	68–99	73–107	17–23	7–16	12–24	12–32

** Significant at $P \leq 0.01$; figures within parentheses are number of observations.

Table 2. Body weight of Chitarangi lambs (kg)

Age	1–3 months	3–6 months	6–9 months	9–12 months
Overall	19.53±0.56 (89)	26.99±0.90 (66)	28.71±0.75 (21)	35.00±1.39 (24)
Sex	*	**	NS	**
Male	20.29±0.72 (49)	29.16±1.26 (41)	28.00±1.39 (7)	38.36±1.75 (11)
Female	18.61±0.85 (40)	23.44±0.75 (25)	29.07±0.90 (14)	32.15±1.80 (13)
Range	10–36	15–45	24–35	22–51

*Significant at $P \leq 0.01$; **Significant at $P \leq 0.05$; figures within parentheses are number of observations.

with medium teats. Majority of farmers reported that twinning varied from 1 to 2%. Fleece is of good carpet quality and not very dense. The fibre diameter (micron), medulation % and staple length (cm) were 42.22 ± 0.10 , 56.60 ± 4.22 and 5.90 ± 0.32 respectively which indicates that wool is of good carpet type. Mehta *et al.* (2004) reported fibre diameter and medulation% as $32.41 \pm 0.28 \mu$ and 36.68 ± 1.59 , respectively in organised farm of Magra sheep.

Biometry and body weight: The average body weight and biometry of adult Chitarangi sheep and average body weight of lambs are given in Table 1 and 2, respectively. There is significant difference between male and female for all the biometric traits under study. The body weight of Chitarangi sheep is higher than that reported for Magra sheep (Anonymous 2013), a contemporary carpet type sheep breed of North-western India. Mishra *et al.* (2016) characterized Kajali sheep of Punjab (India) and reported average body weight of males and females as 56.98 kg and 43.23 kg, respectively. Body weight of lambs in the age groups of 1–3, 3–6 and 9–12 months ranged between 5–17, 10–36, 15–45 and 22–51 kg, respectively. The body weight of lambs is higher than the body weight of Malpura lambs (Mishra *et al.* 2005) at 6 months of age. Malpura is a famous mutton type sheep inhabiting in Rajasthan. The study also reveals that 68.05% adult males weighed more than 50 kg and 70.03% adult females weighed from 40 to 60 kg. The body biometry and adult body weight observed in Chitarangi sheep under the present study reflects that animals of Chitarangi are quite large in size.

Flock size and management: The flocks of Chitarangi

are large in size with average of 93.37 animals. The flocks consisted of 91.19 Chitarangi and 2.18 other sheep (mainly Magra). Chitarangi sheep flocks comprised of 2.80 rams, 64.98 ewes and 23.41 lambs. The sheep are primarily maintained on grazing however 55.36% farmers provided concentrate especially during scarcity period, breeding season, pregnancy and to lambs. Some farmers (7.14%) offered concentrate round the year. 87.5% farmers also provided fodder to sheep during scarcity period (from January to March when wheat crops are in field) and in rainy season. The major fodder was *Gwar bhusa*.

The grazing management practices are given in Table 3. In the native tract the majority of farmers grow wheat which resulted in non-availability of local grazing land, especially during *Rabi* season which is main reason for the sheep farmers to walk long distance in search of grazing area. The present findings were in agreement with earlier reports of Mishra *et al.* (2016) and Yadav *et al.* (2010). The sheep graze on natural pastures and feeding on tree lopping is quite common. The majority (89.29%) of farmers kept sheep in open area fenced with local material. Some farmers constructed separate houses with *katcha* and *pucca* type roofs. Marketing age of male lambs was reported as 6 months by 66.07% of the sheep farmers and the price of surplus lambs was reported as ₹ 3,000 to 6,000 by 55.36% farmers. The price of adult/old aged ewes varied from ₹ 2,000 to 5,000 as reported by majority of the farmers. The price of surplus animals depended upon condition of individual animal. Almost all the farmers sold their animals to traders or butchers. However, the price of breeding ewes ranged from ₹ 6,000 to 30,000 and price of breeding rams was reported upto ₹ 50,000. The mortality is reported to be < than 5% (Table 3) in adult (85.71% farmers) and less than 10% in lambs (50% sheep farmers). The sheep are generally shorn thrice a year in the months of February–March, June–July and October–November. The majority of farmers reported average annual greasy wool production ranging from 1.5 to 2 kg. The sale price of Feb–March clip wool was higher (₹ 80 to 230) followed by June–July (₹ 30–140) and October–November clip (₹ 20–100). February–March clip wool is white and rest is of canary colour.

The study reveals that Chitarangi sheep is phenotypically distinct from the other sheep breeds of the country and well adopted to the semi-arid region of north-western part of the country and farmers preferred it because of its heavy

Table 3. Management practices adopted by Chitarangi sheep farmers

Particulars	Item	% of sheep farmers
<i>Management</i>		
Grazing: Distance travelled	< 8 km	25.00
	8 to 10 km	55.36
	>10 km (upto 35 km)	19.64
Grazing hours	8 h	5.36
	8 to 10 h	78.57
	>10 h	16.07
Marketing age	4–6 months	16.07
	6 months	66.07
	>6 months	17.86
<i>Breeding practices</i>		
Age at first Breeding: Males	10–15 months	76.79
	15–24 months	23.21
Lambing (%)	70–80%	30.91
	80–90%	51.79
	>90%	18.18
Age at first lambing	17 months	5.36
	17–18 months	71.43
	> 18 to 28 months	23.21
Twinning (%)	1–2%	56.36
	2 to 10 %	38.18
	>10%	5.45
Age of disposal (females)	6–7 years	12.96
	7–8 years	38.89
	> 8 years to till death	48.15
<i>Health Management</i>		
Lamb Mortality	<5%	8.93
	5–10%	58.93
	10–20%	21.43
	>20%	10.71
Adult mortality	<5%	85.71
	(1–2% : 28.57%) > 5%	14.28

size, better growth rate and carpet quality wool. This new sheep population need to be considered for registering as a new breed at national level.

SUMMARY

Chitarangi, a lesser known carpet type wool sheep which inhabits Punjab and Rajasthan. The survey was conducted in order to characterize and evaluate the performance of this unexplored sheep population. The data on body biometry, phenotypic characters and other performance traits were collected based on personnel recording, observations and information provided by the sheep farmers. *Shamaki wali*, a more prevalent synonym for this sheep among the farmers, is derived from Shamaki village of Ghadsana mandi tehsil of Sriganganagar district. Farmers reported rearing this sheep since more than last 40–50 years. Chitarangi animals are medium to large in size. The coat colour is white. A red brown ring around eyes, patches on

muzzle, red brown colour of distal half of the ear pinna and serration of various shape and depth in distal part of the ear pinna are distinct and distinguishing phenotypic characteristic of this breed. The light brown and chocolate colours of these markings were also observed in some of the animals. Ears are large in size and leafy. Both the sexes are polled; however, horns were noticed in some rams. Tail is thin and medium in length. The average body weight of adult males and females were 56.27 ± 1.28 and 46.16 ± 0.50 kg, respectively which ranged from 39 to 95 kg in males and 26 to 74 kg in females. The overall body length, height at wither, chest girth, paunch girth, face length, face width, ear length and tail length were also estimated. Fleece is not very dense and of good carpet quality. The fibre diameter, medulation and staple length were $42.22 \pm 0.10 \mu$, $56.60 \pm 4.22\%$ and 5.90 ± 0.32 cm, respectively which indicate that wool is of good carpet type. The age at first breeding in rams and age at first lambing in ewes were 12 to 15 and 18 to 23 months, respectively. The results indicate that the Chitarangi sheep is phenotypically different from other sheep breeds of the region and famous for carpet type wool.

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