



Research Article

STATUS OF SOCIAL ADOPTION, WOOL PRODUCTION AND PHENOTYPIC CHARACTERISTICS OF PURIK SHEEP OF LADAKH

ALAM S.^{*1}, KAUR J.², RATHER M.A.³, KHAN N.N.¹, SHANAZ S.¹, RUKHSANA M.¹ AND HAMDANI A.¹

¹Division of Animal Genetics & Breeding, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar, 190006, Jammu and Kashmir, India

²Extension Education Institute, Nilokheri, 132117, Chaudhary Charan Singh Haryana Agricultural University, Hisar, 125004, Haryana, India

³Department of Sheep Husbandry, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar, 190025, Jammu and Kashmir, India

*Corresponding Author: Email - safeeralam1@gmail.com

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Abstract: Field survey was undertaken during 2017 in the breeding tract of Purik sheep. The data was collected from 5 villages, deliberately selected owing to high concentration of Purik sheep. The data on key socio-economic indicators (land holding size, livestock holding, education, age, category, herd size, annual income of farmers and flock size and structure) of farmers along with the other important indicators of sheep farming like veterinary care, and housing feeding, breeding practices, management, reproductive performance and disease prevalence were recorded analyzed using statistical tools like frequency and percentage for logical conclusion. The data were pertaining to growth traits classified based on age and sex analyzed by SPSS statistical software. The breed is dual purpose breed much prized for flavor and delicacy of mutton and production of fine quality wool used for manufacturing shawls. Most of the breeders belong to the age group of 40-60 years and were literate having education level of primary to matric standard. All 74 (100 %) farmers belonged to Schedule Tribe and Muslims community. The overall average land holding/ farmer was 24.63 ± 0.44 kanals with range of 19-55 kanals and irrigated size per farmers was 10.59 ± 0.27 with range of 0-20 kanals whereas non-irrigated land was 14.04 ± 0.32 with range of 0-22 kanals. The average birth weight (BW), weaning weight (WW), six months weight (6MW), yearling weight (12 W), 36 months weight (36 MW), 48 months (48MW) and above 48 (48 MW) were 1.01 ± 0.01 (kg), 3.13 ± 0.14 (kg), 6.31 ± 0.34 (kg), 6.31 ± 0.34 (kg), 15.04 ± 0.29 (kg), 18.42 ± 0.33 (kg), and 21.61 ± 0.43 (kg), respectively. The average annual wool yield of 1.04 ± 0.05 kg was observed in purik sheep in the present study. It is concluded that the Purik sheep is a dwarf, dual purpose breed, adapted to harsh climatic conditions of Kargil.

Keywords: Breeding tract, Purik sheep

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Introduction

Sheep rearing is a traditional occupation in Jammu & Kashmir. Nature has bestowed Jammu and Kashmir with varied agro-climatic and geo-physical conditions. The agro climatic conditions varied from tropical in Jammu, temperate in Kashmir to Arid in Ladakh. The farm animal biodiversity in the J&K also follows the geographical diversity closely. Due to this variation in agro-climatic and geo-physical condition along with natural selection, large number of ovine genetic resources has evolved. The ovine genetic resources of J and K include both registered viz; Bhakarwal, Changthangi, Gaddi, Gurez, Karnah and Poonchi and unregistered viz Malluk, Purgi [1], Purik [2] etc sheep breeds. Among these, Purik is an important sheep breed distributed in Kargil district of Ladakh also known as luvak. The breed is dual purpose breed much prized for flavor and delicacy of mutton and production of fine quality wool used for manufacturing shawls. The present study was undertaken to study the physical, morphological and performance traits of sheep in Purik sheep

Materials and Methods

Data collection: Field survey was undertaken during 2017 in the breeding tract of Purik sheep and two CD blocks (Kargil and Chikten) villages were deliberately selected owing to high concentration of Purik sheep. Kargil is the second largest town in Ladakh after Leh, scattered over an area of 14,086 km². The human population of Kargil is 143,388 numbers with average literacy rate of 74.49%. Over 90% of population is busy livestock rearing. Kargil is situated at 2,676m ASL and bounded located 204km to east of Srinagar and 234km west of Leh to east.

It is located at 34° 33' 22.8060" East Longitude and 76° 7' 57.0252" North Latitude. The data on key socio-economic indicators (land holding size, livestock holding, education, age, category, herd size, annual income and flock size and structure) of farmers along with the other important indicators of sheep farming like veterinary care, and housing feeding, breeding practices, management, reproductive performance and disease prevalence were collected by personal interviews of randomly selected 74 farmers through face-to-face contact method, using a structured questionnaire. Data on body weight of 280 sheep and different body biometric parameters considering body length, chest girth, height at withers and paunch girth on 140 randomly selected Purik sheep were recorded. A flexible tape rule was used to measure the biometrical traits viz. body length (BL) (distance from point of shoulder to the point of tuber ischii), height at withers (HAW) (distance from the base of hoof to the highest point of withers), paunch girth (PG) (body circumference around the paunch and chest girth) (CG) and body circumference around the chest just behind the elbow joint. The data pertaining to socio economical profile were analyzed using statistical tools like frequency and percentage for logical conclusion. The data were classified based on age and sex. The data were analyzed by SPSS statistical software.

Results and discussion

Utility of breed and socio-economic status of Purik sheep breeders

The is dual purpose sheep breed much prized for flavor and delicacy of mutton and production of fine quality wool used for manufacturing of shawls.

Males had higher averages for all body weight and biometric traits at all ages

Trait	N	Female±SE (kg)	N	Male±SE(kg)	Overall±SE (kg)
BW (kg)	44	1.00±0.02	37	1.02±0.02	1.01±0.01
WW (kg)	35	2.93±0.21	23	3.33±0.27	3.13±0.14
6MW	33	6.19±0.53	26	6.43±0.75	6.31±0.34
12 MW	43	12.67±0.44	09	12.93±0.1.05	12.80±0.34
36 MW	22	15.04±0.29			15.04±0.29
48 MW	17	18.42±0.33			18.42±0.33
>48 MW	15	21.61±0.43			21.61±0.43
AWY	75	1.01±0.10	85	1.07±0.13	1.04±0.05

Most of the breeders belong to the middle age group ranging from 40-60 years and were literate having education level of primary to matric standard. All 74 (100 %) farmers belonged to schedule tribe and muslim community. The overall average land holding/ farmer was 24.63±0.44 kanals with a range of 19-55 kanals and the irrigated land size per farmers was 10.59±0.27 with range of 0-20 kanals whereas un-irrigated land size was 14.04±0.32 with range of 0-22 kanals. All farmers had good (more than 15 years) experience of sheep rearing and were managing sheep in Pucca houses. The number of sheep per household varied from 10 to 35 with an average flock sex ratio (Male/female) 9.30/10.43.

Population dynamics

The livestock herd/ flock size and land holdings possessed by Purik sheep farmers is presented in [Table-3]. It is concluded from most farmers had small to medium livestock flock/herd size ranging between 5-49 sheep, overall livestock herd size ranged 19-63 and poultry birds/ house hold was 5-20 number. Similar findings were also observed by Das (2003) and Sah (2005) [3]. The average land holding of Purik sheep farmers is similar to those for other farmers of Jammu and Kashmir [3-5] as shown in [Table-2]. Overall annual income from all sources of the Purik sheep per farmers' were Rs 1.29 ±0.04 lakhs which includes agriculture, livestock, sheep and other sources. Similar annual income of Purgi goat farmers of Kargil district from all these sources was reported by Alam *et al.* (2019) [6].

Table-1 Socio-economic profile of Purik sheep farmers (N=73)

Variable	Category	Frequency	Percentage (%)
Community	ST	215	100%
Age	Young (20-39)	4	4.05
	Middle (40-59)	47	63.51
	Old (60 and above)	24	32.43
Education	10+2	4	5.41
	Matric	15	20.27
	Under matric	31	41.89
	Primary	24	32.43
Animal house	Pucca	59	79.73
	Kuccha	15	20.27
Occupation	Agriculture & Others	69	93.24
	Agriculture	5	6.76
Farming experience	Good	74	100
Average land Holding (Kanal)	Irrigated	10.59±0.27 (0-20)	
	Non-Irrigated	14.04±0.32 (0-22)	
	Total	24.63±0.44 (19-55)	
Overall income		74	1.29±0.04 (0.6-2)
	Agriculture	74	0.53±0.02 (0.2-0.9)
	Livestock	74	0.33±0.02 (0.1-0.8)
	Sheep	74	0.20±0.01 (0.-10.4)
	other sources	74	0.23±0.01 (0-0.6)

Table-2 Average Livestock/flock size of Purik sheep breeders

	N	Sum	Mean±SE	Range
Livestock	74	3338	45.11±1.16	28-69
Buffalo	74	0	0.00±0.00	0-0
Cattle	74	310	4.19±0.19	2-7
Deshi	74	68	0.92±0.12	0-3
CB	74	230	3.11±0.15	0-6
Goat	74	434	5.86±0.50	0-15
Poultry	74	836	11.30±0.48	5-25
Pig	74	0	0.00±0.00	0-0
Sheep	74	1460	19.73±0.71	10-35
Female	74	772	10.43±0.59	4-22
Male	74	688	9.30±0.49	3-20
Adult	74	1106	14.95±0.60	3-28
Young	74	354	4.78±0.27	2-10

Management practices

Management

The Purik sheep were reared under semi-intensive feeding system and fed on an average 1 to 2 kg of Hay /bhusa/ dried alfa-alfa per head per day especially during chilling winters when temperature falls to -48° C at some places of Kargil and animals were managed indoors. No housing was required during summer, late spring and early autumn whereas during chilling winters animals were housed in Pucca houses. During summer animals were migrated to high land pastures. Want (2016) and Ganai *et al.* (2010) [7] also reported that semi-intensive system of feeding was practiced by farmers rearing Kashmir Merino sheep and Gurez sheep, respectively. All Purky farmers were housing sheep in Pucca houses. However, Kumar *et al.* (2006) [8] and Verma *et al.* (2007) reported that farmers were managing animals in Kuccha houses. The difference may be attributed to the variation in economic conditions of farmers. Rather *et al.* (2020) [9] reported that sheep were fed paddy straw, maize stubble, oats, dried tree leaves, hay prepared from natural growing grasses, pods and stock of soya, pea and beans were used as fodder whereas, maize, rice bran, wheat bran, oil cakes etc were used as a concentrate. Vaccination against FMD and PPR and drenching against ecto and endo parasites was regularly done. However, farmers were not feeding mineral mixtures and no fortification of feed and fodder was done except all were feeding sheep Lahori salt. The animals were treated by expert veterinarians from Sheep Husbandry Department as per morbidity. Stream and pond water was used for quenching of thirst of Purik sheep during summer and winter (buckets). However, watering was indoors during chilling winters. The dung produced by sheep was used as manure in agriculture lands. The breed was crossed with Kashmir Merino and Karakul. Males, surplus females (at around age of 1 to 1.5 years age) and culled stock was sold for mutton to bluchers. The mutton produced was locally used no export was observed. Similar findings were reported by Ganie *et al.* (2020). During winters animals were fed hay prepared during summer and early autumn.

General morphology

Purk is a medium sized breed. The white coat colour was predominant. However, black and brown animals were also prevalent. The head profile was convex with predominant nasal bridge. Male were horned whereas female sheep were polled. Ganai *et al.* (2010) in Guraz sheep also reported similar head profile in Gurez sheep. The horns were curved backward, forward and outward. The face of sheep was devoid of any wool like other native sheep breeds of Jammu and Kashmir. The ears were short and pendulous. Curved horns were common although some animals were also having straight horns. The population dynamics of in surveyed area is presented in [Table-2]. The average sheep flock size of 19.73 was observed in the present study. Purik sheep farmers also possess other livestock species with average herd/ flock size per (Table 2) household of 4.19±0.19, 0.92±0.12, 3.11±0.15, 5.86±0.50 and 11.30±0.48 of cattle, local cattle, crossbred cattle, Goats and back-yard poultry, respectively. Overall flock size of sheep of 19.73±0.71 was observed in the present study.

Biometric traits

The average estimates for biometric traits included in the present study with sex and age variation are present in [Table-3]. Similar estimates for these traits were also observed for Purky sheep by Khan *et al.* (2017). However, higher estimates for these traits were reported by Want (2016) and Rather *et al.* (2021) in Kashmir Merino sheep. Males had higher averages for all traits at all ages. Higher estimates for BH, BL, PG and CG in males were also reported by Want (2016), Khan *et al.* (2017) and Rather *et al.* (2021). Sexual dimorphism in favour of male was also reported by Hashemi (2014) [10] in Makuie sheep, Lalit *et al.* (2016) [11] in Harnali sheep, Kumar *et al.* (2018) in Harnali sheep.

Body weight traits of Purik sheep

The body weights of Purik sheep at different ages are presented in [Table-4]. Similar body weights were observed by Khan *et al.* (2017) in Purky sheep. However, Rather *et al.* (2021) and Want *et al.* (2016) reported higher estimates of body weights at different ages in Kashmir Merino sheep.

Table-3 Biometric traits of Purik sheep

	Sex	N	BH (cm)	BL	CG	PG
BW	Female	21	29.82±0.84	29.82±0.84	38.21±0.71	41.43±0.69
	Male	14	30.83±0.43	30.83±0.43	38.21±0.51	42.14±0.47
	Overall	35	30.43±0.44	30.43±0.44	38.21±0.41	41.86±0.40
WW	Female	22	38.75±0.80	38.75±0.80	43.75±0.74	50.18±0.72
	Male	15	40.36±0.62	40.36±0.62	45.60±0.55	50.83±0.60
	Overall	37	39.71±0.49	39.71±0.49	44.86±0.45	50.57±0.46
6M	Female	29	45.18±0.94	45.18±0.94	53.21±0.67	57.62±0.65
	Male	12	46.55±0.70	46.55±0.70	56.61±0.78	61.61±0.79
	Overall	41	46.00±0.56	46.00±0.56	54.57±0.51	59.21±0.50
12M	Female	44	53.45±0.74	53.45±0.74	59.29±0.73	64.17±0.68
	Male	22	58.13±0.97	58.13±0.97	63.75±0.80	70.00±0.72
	Overall	66	55.32±0.59	55.32±0.59	61.07±0.54	66.50±0.51
Adult	Female	43	61.37±0.82	61.37±0.82	64.52±0.76	70.95±0.71
	Overall	43	61.37±0.82	61.37±0.82	64.52±0.76	70.95±0.71

The results indicated that the Purik sheep is a small breed with good mutton confirmation [12,13].

Wool yield

The animals were shorn twice a year, in spring (March- April) and autumn (September- October). On an average 1.05±0.07 of wool was produced annually. The males produced significantly higher fleece than females [Table-4]. The average wool production from males and females were 1.01±0.10 and 1.07±0.1, respectively. The results were in consonance with the reports of Ganai *et al.* (2010) in Guraz sheep. However, higher wool yield of 2.72 kg was observed by Rather *et al.* (2021) in Kashmir Merino sheep.

Table-4 Body weight and wool traits of Purik sheep

Trait	N	Female±SE (kg)	N	Male±SE(kg)	Overall±SE (kg)
BW	44	1.00±0.02	37	1.02±0.02	1.01±0.01
2-4 months	35	2.93±0.21	23	3.33±0.27	3.13±0.14
5-12 months	33	6.19±0.53	26	6.43±0.75	6.31±0.34
13-24 months	43	12.67±0.44	09	12.93±0.105	12.80±0.34
25-36 months	22	15.04±0.29			15.04±0.29
37-48	17	18.42±0.33			18.42±0.33
>48	15	21.61±0.43			21.61±0.43
AWY	75	1.01±0.10	85	1.07±0.13	1.04±0.05

Disease management

The prevalent diseases were of viral, bacterial, protozoal and parasitic origin, like pneumonia, diarrhoea, PPR, footrot, ORF, sheep pox, fascioliasis, etc. Vaccination against PPR, sheep pox, FMD, Enterotoxemia and rabies besides dosing against endo and ecto parasites and dipping against mange and ectoparasites were a routine practice carried out by Department of Sheep Husbandry. Sheep were treated by expert veterinarians. Similar observations regarding disease management were reported by Gani *et al.* (2010).

Reproduction traits" Like all sheep of the hilly and mountainous region Purik sheep exhibits marked seasonality in its reproductive behavior. The sheep exhibited estrus during spring (April-May) and (September-November). However, the major breeding season with 60 % of ewes exhibiting estrus was autumn. Only natural random mating was practiced in breeding tract of Purik sheep. The ewes were bred in village flock varies between 100 and 350 animals. Unfortunately, the breed is being crossed with Kashmir Merino for improving wool quality, yield and body weight traits. The age at first mating, weight at first mating, and gestation interval of 481 days, 13.86 kg and 149 days, respectively. However, the age in first mating in males was 1 to 1.5 years. The age at first lambing of 630 days was observed in the present study. More or less similar findings were observed in Gurez sheep by Ganai *et al.* (2010). Spring was major lambing season and 1.5 % ewes produced twins.

Conclusion

It is concluded that the Purkey sheep is a dwarf, dual purpose breed, adapted to harsh climatic conditions of Kargil.

Application of research: The Purkey sheep is a dwarf, dual purpose breed, adapted to harsh climatic conditions of Kargil

Research Category: Sheep Husbandry

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University: Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar, 190006, Jammu and Kashmir, India
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Study area / Sample Collection: Kargil

Breed name: Purik Sheep of Kargil

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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