



Livestock and poultry breeds of Jammu and Kashmir and Ladakh

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ABSTRACT

Livestock is one of the most important sectors in the economy of Jammu, Kashmir and Ladakh. The livestock and poultry population of Jammu and Kashmir (J&K) and Ladakh is 8.32 million and 7.37 million respectively as per the 20th Livestock Census. The contributions of sheep, cattle, goat and buffalo to the total population of J&K and Ladakh are 36.84%, 30.41%, 21.93% and 8.03% respectively. J&K and Ladakh stand 6th with regard to the population of sheep. J&K ranks 1st with respect to yak population, 2nd in the population of horses and ponies and 3rd with regard to mules. J&K also has the 6th highest population of donkeys in India. Despite this, the indigenous breeds are under constant threat of dilution and even extinction. Considering the importance of livestock and poultry breeds in this region of India, the paper comprehensively reviews the indigenous sheep, goat, horse, cattle, buffalo, poultry, camel, yak breeds of J&K and Ladakh.

Keywords: Animal Genetic Resources, Indigenous breeds, Livestock, Poultry

Livestock is an important sector in the economy of Jammu and Kashmir (J&K) and Ladakh. It has played an important role in the socio-economic development of this region (Parveen *et al.* 2012). Nearly 80% of the population lives in rural areas and 60% revenue is generated from the agriculture and animal husbandry sector (Parveen *et al.* 2012, Lal and Ahamad 2016). Livestock rearing is practiced in J&K from times immemorial (Lawrence 1895). Being agro-climatically and topographically suited for livestock rearing with lush green pastures, meadows, plenty of water bodies (Rather *et al.* 2019a) and common grazing grounds in and around the villages and arable land. The livestock of this region is also a source of subsistence for the people of this region (Anonymous 1998). Livestock products are in incessant demand.

The livestock and poultry population of J&K and Ladakh is 8.32 million and 7.37 million (20th Livestock Census). The contributions of sheep, cattle, goat and buffalo to the total population of J&K and Ladakh is 36.84%, 30.41%, 21.93% and 8.03% respectively. J&K ranks 1st with respect to yak population, 2nd in the population of horses and ponies and 3rd with regard to mules. J&K also has the 6th highest population of donkeys in India (Anonymous 2020a).

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Kashmir is home to many important breeds of livestock and poultry. These indigenous breeds are indispensable to the UTs of J&K and Ladakh. Local breeds being better adapted to the climatic conditions have high potential and thus it is crucial to preserve them. They also play a significant role in the rural economy and most households are associated with livestock which constitute mostly the indigenous breeds (Parveen *et al.* 2012). The local breeds of livestock in the State are elaborated below.

Sheep breeds

Conducive agro-climatic conditions and ample pastures make the Kashmir Valley fit for sheep and goat rearing. It is therefore the core activity of rural masses of the J&K. Sheep also play a great role in the socio-economic upliftment of the weaker and marginalized sections of the society, viz. Chopans, Gujjars, Gaddies, Changpas and Bakerwals. Table 1 depicts the breeding tracts, total population, female population and status of Gurez, Gaddi, Kashmir Valley, Karnah, Bhakarwal, Changthangi, Poonchi, Ghidord Phamphri, Punchi, Bakerwali, Bani and Karnahi. Tables 2-4 present important growth, wool and reproduction traits of the sheep breeds.

The north temperate region has a diversity of apparel and superior carpet type wool breeds, viz. Gaddi, Rampur Bushair, Bhakarwal, Poonchi, Karnah, Gurez, Kashmir Merino and Changthangi. However, large-scale crossbreeding from the last 25 years is threatening to endanger these indigenous breeds. In J&K alone, about 80% of the native breeds of sheep are being crossbred with exotic fine wool breeds. Nearly 43% sheep have already been converted into crossbred.

Table 1. Breeding tracts, total population, female population and status of various sheep breeds (thousands)

Breed	Habitat	Total Population	Female population	Status
Gurez	Gurez Tehsil of Kashmir (Anonymous, 2016a)	17,207 (Anonymous 2014)	10,690 (Anonymous 2014)	Endangered (Bhatia and Arora 2005)
Gaddi	Kistwar and Baderwah, Jammu and Kulu, Chamba and Kangra, Himachal Pradesh (Anonymous 2016a)	92,194 (Anonymous 2014)	69,226 (Anonymous 2014)	Normal (2012)*
Kashmir Valley	Kashmir Valley at an altitude of 5000-6000 (Anonymous 2016a)			Normal (2012)*
Karnah	Karnah Tehsil at an altitude of 1200-4600 meters (Anonymous 2016a)	2,946 (Anonymous 2014)	2,252 (Anonymous 2014)	Endangered (Bhatia and Arora 2005) Vulnerable (2012)*
Bakerwal	High ranges of Pirpanchal mountains, Kashmir Valley and other low lying hills of Jammu and Kashmir (Anonymous 2016a)	24,575 (Anonymous 2014)	17,890 (Anonymous 2014)	Endangered (Bhatia and Arora 2005) Normal (2012)*
Changthangi	Changthang Sub Division of Leh district (Anonymous 2016a)	65,115 (Anonymous 2014)	38,627 (Anonymous 2014)	Endangered (Bhatia and Arora 2005) Normal (2012)*
Poonchi	Poonch and surrounding places situated at a high elevation in the State (Anonymous 2016a)	2,643 (Anonymous 2014)	1,864 (Anonymous 2014)	Endangered (Bhatia and Arora 2005) Vulnerable (2012)*
Ghidord Phamphri		0	0	Extinct (Puri 2007)
Punchi Bakerwali		0	0	Extinct (Puri 2007)
Bani		0	0	Extinct (Puri 2007)
Karnahi		0	0	Extinct (Puri 2007)

*Status of breeds is derived as per Tomar (2009).

Table 2. Growth traits of sheep breeds of Jammu and Kashmir

Breed	Population	BW (kg)	WW (kg)	SMW (kg)	NMW (kg)	12MW (kg)	18MWT (kg)	References
Gurez	Male	2.54±0.18	8.73±0.08	21.28±0.25		28.60±0.28		Ganai <i>et al.</i> (2010)
	Female	2.47±0.01	8.70±0.05	21.54±0.19		28.59±0.19		
Gaddi		3.33±0.17	15.74±0.61	20.25±0.66	24.02±0.69			Gupta (2000)
Bhakarwal		3.18±0.17	13.46±2.88	33.00±2.88			29 to 36	Anonymous (2004)
Changthangi	Male	2.54±0.67	10.59±0.06	15.69±0.06	23.86±0.38	44.38±0.56		Ganai <i>et al.</i> (2011)
	Female	2.46±0.63	10.44±0.06	15.67±0.06	23.89±0.36	35.60±0.62		
Kashmir Merino		3.27±0.03	11.38±0.16	16.30±0.45	19.54±0.23	24.23±0.27	32.43±0.41	Rather <i>et al.</i> (2020)

Sheep breeds of Jammu and Kashmir

Gurez: Gurez is a well-known, registered (with NBAGR) sheep breed (Anonymous 2020b). It is found only in Gurez and Tulail Tehsils of the Bandipora district. The breed is well adapted to the low input management practices of area and is reared mainly by the 'Dardi' tribe of this region (Ganai *et al.* 2010). The breed is well-known for its adaptability, disease resistance sturdiness (Rather *et al.* 2020) and good-quality mutton (Ganai *et al.* 2010).

It is the biggest sheep breed of Kashmir and yields coarse wool. They are generally white and polled. The animals of this breed are also dairy animals. The sheep are mainly hornless. However, more than two horns (Polyceros condition) have also been observed within some animals of this breed (Anonymous 2016a). The animals have short ears, and the wool is mostly white. Different shades of wool with black and brown as major shades are also produced by this breed (Ahanger *et al.* 2020, Ganai *et al.* 2010).

Table 3. Wool traits of sheep breeds of Jammu and Kashmir

Breed	GFY (kg)	FD (μ)	CWY (%)	SL	Medulation (%)	Crimps/inch	References
Gurez	1.25 to 1.50	28.31 $\pm$ 0.17	76.10 $\pm$ 0.13	4.48 $\pm$ 0.07	9.29 $\pm$ 0.39	5.37 $\pm$ 0.10	Ahanger <i>et al.</i> (2020)
Gaddi	0.77 $\pm$ 0.07 ^a 2.1 $\pm$ 0.10 ^b 2.64 $\pm$ 0.12 ^c	24.95 $\pm$ 0.90		6.06 $\pm$ 0.42		4.11 $\pm$ 0.86	Gupta (2000)
Kashmir Valley		28 to 34		8 to 10			
Karnah	1.00 to 1.25 ^a	29.70		9.36			
Changthangi	1.42 ^a						
Poonchi		24.99 $\pm$ 0.13	63.14 $\pm$ 0.23	3.82 $\pm$ 0.07	2.22 $\pm$ 0.19	8.67 $\pm$ 0.18	Taggar <i>et al.</i> (2018)
Purgi							
Kashmir Merino		20.04 $\pm$ 0.002	67.19 $\pm$ 0.02	4.03 $\pm$ 0.02	0.10 $\pm$ 0.00	4.35 $\pm$ 0.02	Baba <i>et al.</i> (2020)
	0.82 $\pm$ 0.03 ^a	20.33 $\pm$ 0.05		3.86 $\pm$ 0.14			Rather <i>et al.</i> (2019)
	0.80 $\pm$ 0.02 ^b						

A, Average wool yield; a, b and c, greasy fleece yield of first, second and third clips, respectively.

Gaddi: These sheep are small in size but have sturdy legs with short ears and tails. Fleece is mostly white and brown hair is present on the face. Ewes are hornless and rams horned. Wool yield is ~0.817 kg/year and medium fine is produced with the mean fiber diameter of 34.90 μ and staple length of 10.10 cm (Anonymous 2016a). The wool is lustrous and under-coat is used for producing *Kulu* shawls and blankets.

Sheep breeds of Kashmir Valley

These animals are small and produce coloured fleece, yielding an admixture of medium, fine and coarse wool. They have short tails and males have small horns. Wool yield is about 0.860 kg/year. Wool quality consists of an admixture of coarse and medium fine. Fiber diameter and staple length fluctuate from 28-34 μ and 8-10 cm respectively (Anonymous 2016a).

Karnah: Karnah sheep is distributed in Karnah tehsil (Kuparwa district) of Kashmir valley (Anonymous 2020b). The breed produces of good-quality carpet wool with the fibre diameter and staple length of 9.36 cm and 29.70 μ respectively (Anonymous 2020b). The animals are robust, medium to large with a deep body, pendulous ears (Anonymous 2020a). They also possess long faces and prominent noses (Anonymous 2020b). Rams are horned and ewes are polled (Ganai *et al.* 2009).

The important breed is under the threat of extinction due to random cross breeding with Kashmir Merino. Wool

yield varies from 1.00-1.25 kg /year. The wool is medium fine in quality. The mean fiber diameter is 29.70 μ and staple length is 9.36 cm. Karnah yields long and white fleece which can be hand spun as well as machine spun (Anonymous 2016d). This breed also possesses the unique ability of walking long distances in hilly tract.

Bhakarwal: This migratory sheep breed is reared mainly by the nomadic tribe called the *Bhakarwals*. These sheep live in the open all year round. They are hardy and are good climbers despite their bulky bodies. The males are usually horned, but ewes are hornless. The horns are curled backward and downwards. Some animals are fat tailed. The ears are generally long, broad, and dropping. These sheep produce coloured coarse wool, used for the manufacture of *lohis* (small blankets). Average wool yield is around 1.600 kg/year (Anonymous 2016d). The wool is coarse.

Changthangi: The animals of this breed are large and yield coloured coarse wool. They are useful as transport animals in the mountains. Changthangi sheep are reared in the highlands (Anonymous 2016d). Wool yield is 1.5 kg / year and it is coarse and long. This breed is very well adapted to the bitter winters of this region. The Changthangi sheep of Ladakh are locally known as Changluk (Ganai *et al.* 2011). The coat colour ranges from complete black to white and brown. However, the colour white is predominant. The head is convex in majority (80%) of the animals. However, 13% of the animals have straight and some have a concave

Table 4. Reproduction traits of sheep breeds of Jammu and Kashmir

Breed	AFS (Y)	AFL (days)	ILP	ALS/ILP	References
Gurez	1.5 to 2	730 to 913		1.06	Ganai <i>et al.</i> (2010)
Gaddi		1232.91 $\pm$ 119.43	305.94 $\pm$ 76.9		Gupta (2000)
Changthangi	1.5-2.5	830 $\pm$ 13		1%	
Poonchi					
Purgi					
Kashmir Merino		1090.22 $\pm$ 19.45	401.45 $\pm$ 22.30	1.08 $\pm$ 0.03	Rather <i>et al.</i> (2020)

AFM, age at first mating; ILP, inter-lambing period; AFL, age at first lambing; ALS, average litter size, incidence of lambing percentage.

head. In general, the Changthangi sheep have long tapering faces and pendulous ears. Both horned and polled animals are present but the females are mostly polled.

Poonchi: The body length of these animals is long, and they are mostly hornless. They have short tails which are thick at the base. Ears are generally short and colour is mainly white. These sheep are best known for wool production. Poonchi breeds are raised on summer pastures and are stall fed during winter on stored grasses and fodders. The wool yield is around 1.6 kg/year (medium fine) with a mean diameter of 32 μ . The sheep is primarily reared for both mutton and wool production. The farming practices are migratory. Poonchi breed is small-medium sized with white, black and/or different shades of white and black body colours.

Purgi: Purgi is an indigenous, small-sized sheep breed of the Kargil area of Ladakh. It is mostly white with long pointed head, short and slightly tubular ears and horns which are curved downwards. Males and females attain body weights of 17.64 and 18.52 kg at 2-tooth, 20.67 and 21.87 kg at 4-tooth, 23.51 and 24.81 kg at 6-tooth and 25.81 and 26.69 kg at full-mouth. Purgi is reared under range system in summers and semi-intensive system in winters. The Purgi breed is hardy, and is able to withstand harsh winters.

Goat breeds

Goat husbandry is a traditional practice in the UT of J&K. The tribals, viz. *Bakarwals*, *Gaddies* and *Changpas* are highly skilled in sheep and goat rearing. Goat is principally reared for milk, meat, fiber (Pashmina and Mohair), hide and skin. The skin is specially used for the leather industry. This helps the locals earn considerable export earnings.

Goat commonly called 'the poor man's cow' plays a

vital role in improving the socio-economic status of poor rural masses. Landless farmers rear goats as a source of livelihood. Table 5 indicates the breeding tract, total population, female population and status of Changthangi, Gaddi, Bhakarwal Goat, Kaghani, Lubdi, Gurziya, Belori, Lamdi, Goodri and Kilan. Tables 6 and 7 represent important traits of the goats of Kashmir.

Gaddi: This breed is mainly used for the purpose of meat, fiber and work. It is named after the - *Gaddi* tribe which rears these animals. Gaddi is also known as the White Himalayan goat and is found in western temperate Himalayas, viz. Himachal Pradesh, Jammu and Kashmir and Uttarakhand (Archana 1982). These animals are well adapted to migratory system being sure footed. They can also transport up to 8.0 kg merchandise (Anonymous 2016d). White is the dominant colour however, black coloured animals are also present. Horns are long, directed upward and backward, and occasionally twisted. Skin is covered with coarse long hair measuring 17 to 25 cm and is very tough. Ears are pointed and drooping (12 cm). During summer, Gaddi goats move to higher altitudes where lush green grass is available.

Changthangi: The breed is mainly reared for the precious fiber, Pashmina and meat. The breed is named after its natural habitat in Ladakh and is adapted to cold desert area. Changthangi is known for its quick movement. It is predominantly white but admixtures of brown and black are also seen. Horns are large and corkscrew-like, turned outward, upward and inward in form of a semi-circle. The animals are medium sized animals and sturdily built. Ears are small, erect and stumpy. It is known for the production of good quality woven garments, commonly called '*Cashmere wool*' (Anonymous 2008). Changthangi goats produce pashmina, internationally known as

Table 5. Breeding tracts, total population, female population and status of various goat breeds

Breed	Breeding tract	Total population	Female population	Status
Changthangi	Leh, Kargil (Anonymous 2016d)	1,96,179 (Anonymous 2014)	1,28,967 (Anonymous 2014)	Normal (2012)*
Gaddi	Himachal Pradesh (Chamba, Kullu, Kangra, Shimla), Jammu & Kashmir (Jammu) (Anonymous 2016d)	71,011 (Anonymous 2014)	55,971 (Anonymous 2014)	Normal (2012)*
Bhakarwal goat	Hilly tracts of Shopian, Kulgam, Tral, Budgam, Kupwara (Anonymous 2016a)			
Kaghani	J&K (reared by Bhakarwals)			Verge of extinction (Puri 2007)
Lubdi	J&K (reared by Bhakarwals)			Verge of extinction (Puri 2007)
Gurziya		0	0	Extinct (Puri 2007)
Belori		0	0	Extinct (Puri 2007)
Lamdi		0	0	Extinct (Puri 2007)
Goodri		0	0	Extinct (Puri 2007)
Kilan	J&K (reared by Bhakarwals)			Verge of extinction (Puri 2007)

*Status of breeds is derived as per Tomar (2009).

Table 6. Growth traits of goats of Jammu and Kashmir

Breed	Sex	BW (kg)	WW (kg)	SMW (kg)	NMW (kg)	12MW (kg)	18MWT (kg)	References
Bhakarwal								
Changthangi	Male	2.11±0.3	13.8±1.2		20.0±2.10			Bhattacharya <i>et al.</i> (2004)
	Female	2.06±0.2	13.1±1.1		18.7±1.9			
Gaddi								
Purgi		1.2 to 1.4	3.45 to 3.96	6 to 8.50		8.50 to 10.75	18.5 to 23.5	Alam <i>et al.</i> (2019)
Kashmiri								

Table 7. Reproduction traits of goats of Jammu and Kashmir (days)

Breed	AFS	AFK	IKP	LS	References
Bhakarwal					
Changthangi	550.33±7.20	699.44±10.23	366.45±3.43	1.02±0.50	Shanaz <i>et al.</i> (2020)
Gaddi					
Purgi	310 to 332		280 to 299		Alam <i>et al.</i> (2019)
Kashmiri (months)	9.10±0.28	15.26±0.38	9.33±0.25	1.48±0.06 /46.59	Rather <i>et al.</i> (2020)

“cashmere”, a fine luxury fibre. The breed is managed by Changpa nomads in Changthang region of Ladakh. Changthangi goats are sometimes also called Changra goats. Pashmina yields of 402 ± 19 g, 248 ± 14 g, 255 ± 12 and 280 ± 16 g, in bucks, does, male hoggets and female hoggets, respectively has been reported. The fibre length of 4.25 ± 1.2 cm in males and 4.02±1.5 cm in females while fibre diameter of 12.9±2.6 µ and 13.0±3.0 µ, respectively (Bhattacharya *et al.* 2004).

Bhakarwal goat: Bakarwal goats are large and robust, with long, upward and laterally directed spiral horns. These goats have a body coat of long coarse hairs. The common colours of this breed include black, brown, white, black and white, and brown and white. Most of the goats are horned (both sexes). Ears are long and drooping. Beard is present in most animals while wattles are seen only in some. Adult goats attain appreciable body weight which is wonderful under low input systems (War 2012).

Purgi goat: The Purgi goats are small sized with adult's body weight of 15.5-23.5 kg and are being used for meat and fibre production (Alam *et al.* 2019). This is adopted to Kargil Ladakh.

Kashmiri goat: The goat is mostly reared under mixed crop-livestock farming system using a mixture of grazing and stall feeding (during early spring and late autumn), stall feeding alone during winter. The goat has high variability with respect to morphological and production (milk and meat) traits.

Breeds of cattle and buffalo

The UT has 1.76 million non-descript indigenous cattle. In addition, there are 1.05 million buffaloes out of which 25% have been upgraded.

The local breeds of Jammu and Kashmir have not been characterized so far. Throughout its history, the state has witnessed the continuous influx of several types of cattle which has ultimately resulted in the development of its

non-descript type of cattle. The Aryans are presumed to have brought with them the animals with white body coat; the Sindhi cattle are thought to have been introduced by the Pathans whereas Sikhs are believed to be responsible for bringing in Haryana and Sahiwal cattle (Kaloo 2002). Walter Lawrence describes the non-descript Kashmiri cattle as small, hardy and conservative in habits, superior in quality in the tracts around Wular [Lake] and in the Northwest of the valley than those in the South. The characteristics of indigenous cattle include a distinct hump, small stature and polled head (Fig. 10). The superior cows were locally called as *parimgao* and the special features they possessed were attributed to the presence of Punjabi blood (Lawrence 1985).

R.S. Pura, Jammu is said to be the natural breeding tract for Nilli Ravi, a valued dairy breed of buffaloes (Anonymous 2016c). Most buffalos are migratory, with majority in Jammu region.

Horse breeds

Horses are domestic farm species of specific importance to certain areas, especially the trans-Himalayan region of Ladakh (Leh and Kargil). They are valued for their abilities to survive extreme climate, for thriving on coarse feed and fodder and for working as beasts of burden in difficult topographies. Table 8 indicates the breeding tract, total population, female population and status of Zanskari, Kaliani, Jaskardi, Yarkandi (Bakerwali), Nukra, and Bharssi.

Zanskari: These are used for the purpose of draught, transport, riding and sporting (polo). These horses are recognized for their hardiness and ability to work at high altitude and are adapted to cold arid region. Common body colours include grey, black and copper. These animals are alert, well built, medium in size, wide faced. They have uniform gait and predominant eyes. Tail is long and heavy almost touching the ground. Body hairs are glossy, fine and

Table 8. Breeding tracts, total population, female population and status of various horse breeds

Breed	Breeding tract	Total population	Female population	Status
Zanskari	Leh, Ladakh	9702	3,464	Vulnerable (2012)*
Kaliani	J&K			On the verge of extinction (Puri 2007)
Jaskardi	J&K			On the verge of extinction (Puri 2007)
Yarkandi (Bakerwali)	J&K	0	0	Extinct (Anonymous 2013)
Nukra	J&K	0	0	Extinct (Anonymous 2013)
Bharssi	J&K	0	0	Extinct (Anonymous 2013)

*Status of breeds is derived as per Tomar (2009).

long. In view of the dwindling populations of this breed, a Zanskari Horse Breeding Farm has been established at Leh by the Department of Animal Husbandry, Jammu & Kashmir.

Donkey breeds

The indigenous donkey population has not been characterized yet. The population of indigenous donkeys as per the 20th livestock census stands at 10,245 animals.

Pig breeds

Non-descript pigs are found in the state of Jammu and Kashmir. However, pigs are only found in the Jammu division of J&K and not in Kashmir division.

Camel breed

The camels were widely used as important source of transport when the silk route was in operation before 1950. Table 9 describes the breeding tract, population, female population and status of the Double Humped Camel.

Double humped camel: It is believed that these camels belong to a stock originally native to Gobi Desert of Asia and were introduced by Yak traders through the silk route. These camels are suitable for cold desert areas. They produce superior quality hairs which are used in cottage industries.

Yak breed

Yak is the lifeline for the people living in one of the most hostile climates, besides providing the basic subsistence in terms of milk, meat and fibre. It is the only mode of transportation through snow bound mountains. Yak has been domesticated from wild Yak (*Poephagus mutus*).

It has the ability to utilize small blades of grasses on altitude pasture and is well accustomed to travel long distances on snow-bound passes. It is pure black, pure white or piebald in colour. Shades of brown, black and white are also found. It has a heavy head with a wide convex forehead.

Yak stay most of the time in grazing areas; only lactating

and pregnant cows and young calves are provided with enclosures. During winter they consume ice to fulfill their water requirements. Salt is provided once in two days in summer, everyday in winter and twice a day in extremely bad weather conditions. Hair are used for making ropes and tents. Dung is the main source of fuel for herders. Table 10 describes the breeding tract, population and status of the Yak.

Dog breed

The Bakharwal dog is one of the most fascinating dog breeds originating in Jammu and Kashmir. This breed of dog is rare and unusual as it acts as a livestock guardian. It originated with nomadic tribes in the Himalayas hundreds of years ago. While this breed is very friendly with most humans, it is not so with other dogs and can get aggressive. Unlike most dogs, Bakharwal do not eat meat. They only eat bread, milk, and dairy products. This dog breed is exceedingly rare and difficult to breed.

Poultry breeds

Poultry species reared locally include chicken, ducks and geese.

Kashmir favorella (Fowl): This bird is reared mainly for eggs and meat. It is an inter-breeding group of many distinctive genotypes. Three important ones are naked neck, normal feathered and gul hapuch (bottle jawed). These birds are admirably adapted to hostile climatic conditions and are disease resistant.

The plumage shades include black, green, red, gold; the plumage may be solid, striped, spotted, patchy or barred. Comb type is single, skin white and shanks yellow. The eggshell colour is light brown. The other important physical traits are feathered shanks, tuft of feathers over earlobes, silky frizzle, naked neck and multiple spurs. There also is a feathered cap on head. Mainly seen in backyard management system, it is found scavenging with some supplemental feeding. After harvesting, the birds are let free in the fields and are housed only during night. The

Table 9. Breeding tracts, total population, female population and status of Camel

Breed	Breeding tract	Total population	Female population	Status
Double Humped Camel	Nubra valley of Jammu and Kashmir	102 (Anonymous 2016d)		Critical*

*Status of breeds is derived as per Tomar (2009).

Table 10. Breeding tracts, total population, female population and status of Yak

Breed	Breeding tract	Total population	Status
Yak	Chamba, Spiti, Kinnaur, Lahul (Himachal Pradesh), Leh, Kargil, Ladakh (J&K), Sikkim, Arunachal Pradesh, Pithoragarh, Uttarkashi (Uttarakhand) 3000- 6000 M. above sea level	61910 (Bhoosreddy 2015)	Normal*

*Status of breeds is derived as per Tomar (2009).

breeding tract of Kashmir Favorella includes Baramulla, Srinagar, Budgam, Anantnag, Kupwara, Pulwama districts of Kashmir Valley.

Local duck of Kashmir: The average adult body weight of adults is 1.70 kg (Bihaqi *et al.* 2013). Four types of bill colours are seen in local ducks, viz. pinkish black, black (mosaic), greenish, yellow and greenish yellow mosaic. Grey or brown eye colours are present whereas shanks are mostly orange coloured. Shell colours are green and white.

Kashmir geese: Two strains of Kashmir Anz are found in the Valley (Hamadani *et al.* 2020). This is the first and the only recognized geese breed in India. These include 'Safed Anz' and 'Katchur Anz'. Adult body weight of Kashmir Geese is 3.9 kg and ganders weigh more than the female geese (Hamadani *et al.* 2014, 2016, 2017). Goslings on an average weigh 89.2 g. Age at sexual maturity, average clutch size and hatchability of eggs is 13.7 months, 9.445 eggs and 83.37% (Hamadani *et al.* 2016). The incubation period of goose eggs is about 30-32 days. The breeding tract of Kashmir geese includes areas in and around the waterbodies of the Kashmir Valley.

REFERENCES

- Ahanger S A, Sofi A H, Paul M A, Khalil M, Hamadani A, Khan N N, Baba M A, Shah M M, Baba J A, Kuthu B A and Rather M A. 2020. Wool characteristics of Gurez sheep. *Journal of Entomology and Zoology Studies* **8**(4): 603–04.
- Alam S, Kaur G and Ahmad N. 2019. Purgi-An unidentified goat. *Indian Farming* **69**(04): 45–47.
- Anonymous. 2004. Directorate of Sheep Husbandry Kashmir Division, Government of Jammu and Kashmir. <http://jksheephusbandrykashmir.net/sheep.html>.
- Anonymous. 1998. Report of the Committee on Economic Reforms for Jammu and Kashmir. Government of Jammu and Kashmir. pp. 133.
- Anonymous. 2008. Sheep Husbandry Department, Kashmir. Animal Husbandry Department Kashmir, J&K Government. <http://www.jkanimalhusbandry.net/sheep.htm#GoatDevelopment>
- Anonymous. 2013. 12 Species of Animals Extinct in J&K: Study. Outlook. <http://www.outlookindia.com/newswire/story/12-species-of-animals-extinct-in-jk-study/786879>
- Anonymous. 2016a. Sheep Breeds of Jammu and Kashmir. Directorate of Sheep Husbandry Kashmir Division, Government of Jammu and Kashmir. http://jksheephusbandrykashmir.nic.in/sheep_breeds.html
- Anonymous. 2016b. Goat Development. Directorate of Sheep Husbandry Kashmir Division, Government of Jammu and Kashmir. http://jksheephusbandrykashmir.nic.in/goat_production.html
- Anonymous. 2016c. Handbook of Right to Information. Sheep Husbandry Department, Government of Jammu and Kashmir.
- Anonymous. 2016d. Animal Genetic Resources of India. ICAR-National Bureau of Animal Genetic Resources, Karnal. www.nbagr.res.in.
- Anonymous. 2017. National Bureau of Animal Genetic Resources. 2017. Animal Genetic Resources, Karnal. www.nbagr.res.in.
- Anonymous. 2020b. National Bureau of Animal Genetic Resources. Animal Genetic Resources, Karnal. www.nbagr.res.in.
- Anonymous. 2020a. 20th Livestock Census-2012 All India Report. Department of Animal Husbandry, Dairying and Fisheries, New Delhi.
- Anonymous. 2020. Directorate of Sheep Husbandry Kashmir Division, Government of Jammu and Kashmir. <http://jksheephusbandrykashmir.net/sheep.html>.
- Acharaya R M. 1982. Sheep and goat breeds of India. Animal Production and Health Paper, Paper No 30. FAO, Rome.
- Baba M A, Ahanger S A, Hamadani A, Rather M A and Shah M M. 2020. Factors affecting wool characteristics of sheep reared in Kashmir. *Tropical Animal Health and Production* **20**:1–5.
- Baba F A, Musadiq K M, Ahmad I, Bamla N and Niyazul M. 2018. Phenotypic documentation and characterization of Purgi sheep. *Indian Journal of Small Ruminants* **24**(1): 35–49.
- Baba J A, Rather M A, Hamadani A, Shanaz S and Rather M A. 2020. Factors affecting wool characteristics of Corriedale sheep in temperate region of Jammu and Kashmir. *Indian Journal of Small Ruminants* **26**(2): 173–77.
- Bhatia S and Arora R. 2005. Biodiversity and conservation of Indian sheep genetic resources- An overview. *Asian Australian Journal of Animal Science* **18**(10): 1387–1402.
- Bhattacharya T K, Misra S S, Sheikh F D, Kumar P and Sharma A. 2000. Changthangi goats: A rich source of pashmina production in Ladakh. *AGRI* **35**: 75–85.
- Bhoosreddy S R. 2015. District wise Details of Livestock by Age, 2007 - Jammu and Kashmir. Details of Livestock (18th Livestock Census). https://data.gov.in/catalog/details-livestock-18th-livestock-census?title=&file_short_format=&page=1
- Bihaqi S F A, Bhat G A, Ganai T A S, Bihaqi S J and Hamadani H. 2013. Morphological and certain economic traits under rural conditions of local ducks of Kashmir. *Indian Journal of Animal Sciences* **84**(4): 431–35.
- Ganai T A S, Misra S S, Sheikh F D and Banik S. 2009. Characterization and evaluation of Karnah sheep of Kashmir. *Indian Journal of Small Ruminants* **15**(2): 172–77.
- Ganai T A, Misra S S and Sheikh F D. 2010. Gurez-A threatened sheep breed of Kashmir. *Indian Journal of Animal Sciences* **80**(8): 806–08.
- Gupta N. 2000. 'Genetic evaluations of exotic fine wool breeds (Rambouillet and Merino) and their crosses with indigenous sheep breeds of Northwestern Himalayan region.' M.V.Sc. thesis, Department of Animal Breeding, Genetics and Biostatistics. Himachal Pradesh Krishi Vishwavidyalaya Palampur, H.P., India.
- Hamadani H, Khan A A and Banday M T. 2020. Kashmir Anz geese breed. *World's Poultry Science Journal* **76**(1): 144–53.

- Hamadani H, Khan A, Sofi A, Salahuddin M and Bihaqi S F A. 2016. Quality traits and grades of geese eggs produced under local conditions of Kashmir. *Indian Journal of Poultry Science* **51**: 192.
- Hamadani H, Khan, A A, Mir M S, Banday M T, Ganai T A S and Hamadani A. 2014. Morphometric characterization of local geese in the valley of Kashmir. *Indian Journal of Animal Science* **84**(9): 978–81.
- Hamadani H, Khan A A, Hamadani A and Rafiq A. 2017. Practical methods of gender identification in Kashmir Geese. *Indian Journal of Animal Sciences* **87**(5): 653–55.
- Hamadani H and Khan A A. 2016. Morphological characterization with special reference to colour variations in domestic geese (*Anser Anser Domesticus*). *Indian Journal of Animal Sciences* **86**(4): 78.
- Kaloo F A. 2002. Animal Husbandry in Retrospect. *Fifty Years of Animal Husbandry in Kashmir*, pp. 150. Animal Husbandry Department, Kashmir.
- Lal B and Ahamad S. 2016. Dairy Farming in J&K. Daily excelsior. <http://www.dailyexcelsior.com/dairy%ADfarming%ADin%ADjk/2/3>
- Lawrence W R. 1895. The Valley of Kashmir. Nabu Press, India.
- Puri L. 2007. Rare livestock breeds in Himalayan belt under threat. The Hindu. <http://www.thehindu.com/todays-paper/rare-livestock-breeds-in-himalayan-belt-under-threat/article1934090.ece>
- Qureshi M A, Khan S A, Shafique M, Sabir N and Ahmed G. 2013. Influence of genetic and non-genetic factors on quantity and quality of wool from sheep reared at Rawalakot Azad Jammu and Kashmir. *Journal of Animal and Plant Sciences* **1**: 20–25.
- Rather M A, Shanaz S, Ganai N A, Hamadani A, Alam S, N N Khan, Baba A, Raja T A and Bukhari S. Genetic and non-genetic factors affecting growth and reproduction traits in Kashmir Merino sheep. *Indian Journal of Animal Sciences* **90**(6): 125–28.
- Rather M A, Hamdani A, Ayaz A, Shanaz S, Mir S A and Nabi N. 2020. Morphological, phenotypic, performance traits of nondescript goats in Budgam district of Kashmir. *Ruminant Science* **8**(2): 137–40.
- Rather M A, Magray S, Ahanger S A, Baba M A, Shah M M and Rather T A. 2019. Effect of some non-genetic factors and Fec-B gene introgression on performance traits of Kashmir Merino Sheep. *International Journal Current Microbiology and Applied Science* **8**(8): 444–49.
- Rather M A, Shanaz S, Ganai N A, Bukhari S, Hamadani A and Khan N N. 2019. Genetic evaluation of wool traits of Kashmir Merino sheep in organized farms. *Small Ruminant Research* **1**(177): 14–17.
- Rather M A, Shanaz S, Ganai NA, Bukhari S, Hamadani A, Khan N N, Yousuf S, Baba A, Raja T A and Khan H M. 2020a. Genetic evaluation of wool traits of Kashmir Merino sheep in organized farms. *Small Ruminant Research* **177**(2020): 14–17.
- Shanaz S, Firdous, Alam S and Nusrat. 2020. Changthangi: The pride of Jammu and Kashmir. *Indian Farming* **70**(6): 38–40.
- Taggar R K, Chakraborty D, Kumar D, Vohra V, Tania M S and Sharma A. 2018. Wool characteristics of Poonchi sheep. *International Journal of Fauna and Biological Studies* **5**(2): 133–35.
- Tomar S S. 2009. Conservation of animal genetics resources. pp. 61–62. *Textbook of Animal Breeding*. Kalyani publishers.
- Want Q A. 2016. 'Documentation and characterization of Kashmir Merino sheep in Srinagar of Kashmir valley.' M.V.Sc. Thesis submitted to Sher-e-Kashmir University of Science and Technology-Kashmir, Jammu and Kashmir.
- War Z A. 2012. Another Darbar Move. Greater Kashmir. <http://www.greaterkashmir.com/news/gk-magazine/another-darbar-move/132652.html>.