

A Monthly e Magazine
ISSN:2583-2212

Monograph

October 2024 Vol.4(10), 3920–3943

Kashir goat, an unexplored goat genetic resource of Jammu and Kashmir

¹Mubashir Ali Rather, ²Safer Alam, ³Syed Shanaz, ⁴Olympica Sarma

¹Sr Epidemiologist Disease Investigation Laboratory Nowshara Srinagar

²Senior Scientist, ³Profeser and Head Department of Animal Genetics and Breeding, Sher-e-Kashmir University of Agriculture Sciences and Technology, Kashmir, Jammu and Kashmir, India.

⁴Olympica Sarma (Department of Animal Genetics and Breeding, College of Veterinary & Animal Science, G B Pant University of Agriculture & Technology, Pantnagar, Uttarakhand, Indi)

<https://doi.org/10.5281/zenodo.14000894>

Introduction

Goat is an important species in the small ruminants and second largest species in livestock category which contributes in milk production after cattle and buffaloes (Waiz et al., 2018). Goats are ideal livestock for small-scale farmers due to their ease of management and adaptability to diverse agro-climatic conditions. Their small size enables maintenance in limited areas, making them suitable for marginal farmers and landless laborers (Wani et al., 2023). Goats significantly contribute to the agrarian economy and ensure livelihood security for small-scale farmers. They efficiently utilize a wide range of vegetation, including grasses, weeds, herbs, bushes, shrubs, tree leaves and crop residues and convert them into valuable resources viz; milk, meat, skin, manure and fiber.

Sheep and goat rearing have been integral to Jammu and Kashmir's culture and economy since ancient times (Rather et al., 2021). Goat rearing has deep roots in Jammu and Kashmir, with archaeological evidence and historical records (Lawrance, 1895) highlighting its significance. Goats provide milk, meat, hides, and fertilizer, playing a crucial role in the socio-economic empowerment of marginalized communities, including Gujjars and Bakerwals, earning them the nickname "poor man's cow." Despite their significance, Jammu and Kashmir has only a one recognized goat breed, i.e. Bhakarwal Malra (Rather et al., 2024). However, many unclassified goat genetic resource of J and K are still unidentified. However, a substantial population of milk-producing goats remains unidentified and unclassified in Shopian, Kulgam, Budgam, Baramullah, and Kupwara districts, of Kashmir. To harness the genetic potential of these goats, it is essential to document and characterize their phenotypic



variations. As, this knowledge is vital for classification, characterization, effective selection and designing improvement programs. To address this knowledge gap, a study was conducted in Budgam District to investigate the physical, morphological, and performance traits of local goats, including physical characteristics, morphological features and performance indicators. They significantly contribute to the agrarian economy and livelihood security of small and marginal farmers, landless laborers, and tribal communities. Goats efficiently convert sparse vegetation, wide variety of grasses, herbs etc into milk, meat, manure, and fiber. Their small size allows maintenance in limited areas, making them ideal for rural masses.

Importance of Animal Genetic Resources of Jammu and Kashmir

Native animal genetic resources have garnered significant interest from the livestock industry and scientific community due to their exceptional adaptability to harsh environmental conditions. They possess a range of valuable attributes, including heat and cold tolerance, natural disease resistance, and the ability to thrive on low-input methods for feed, fodder, housing, and healthcare. The native animal genetic resources can efficiently convert low-quality feeds and fodder into high-value animal products such as meat, milk, and eggs, making them ideal for sustainable livestock production. Their drought tolerance and versatility enable them to work effectively in challenging environments, as exemplified by breeds like the yak, double-humped camel, and Zanskari horse.

Furthermore, native breeds often exhibit unique traits, such as the exceptional fiber fineness of the Changthangi goat. This remarkable combination of characteristics makes them an invaluable resource for farmers seeking to optimize productivity while minimizing costs and environmental impact. By leveraging the natural advantages of native breeds, farmers can develop more resilient and sustainable farming systems, better equipped to withstand the challenges of climate change and environmental uncertainty. These remarkable characteristics make native animal species an invaluable resource for sustainable livestock production, particularly in challenging environments. The Kashmiri goat, a treasured native breed of Jammu and Kashmir, embodies the resilience and beauty of India's indigenous livestock. This majestic goat has adapted to the harsh Himalayan environment, making it an invaluable resource for the region. This booklet showcases the remarkable attributes and significance of the Kashmiri goat, highlighting its unique characteristics, economic importance, and conservation status. The key aspects covered include: its adaptability to harsh environment conditions, where it thrives in extreme temperatures and challenging terrain. Its distinctive physical traits, such as its coat coloration, horn structure, and sturdy build along with production capability with respect. This booklet introduces a remarkable goat genetic resource



of Jammu and Kashmir, the Kashmiri goat (Kashir Chawij), its status and conservation efforts to safeguard it for future

Geographical distribution and breeding tract:

The Kashir goat is primarily found in the Kashmir valley of the Indian subcontinent. The goat found in the karevas of Shopian, Kulgam, Budgam, Baramullah, and Kupwara. The geographical distribution of Kashir goat is presented in Table 1.

Table .1. The geographical of breeding tract of Kashir goat

Parameters	Shopian	Kulgam	Budgam	Baramulla	Kupwara
Location	South Kashmir	South Kashmir	Central Kashmir	North Kashmir	North Kashmir
Latitude	33.72°N	33.63°N	33.99°N	34.20°N	34.53°N
Longitude	74.83°E	75.07°E	74.77°E	74.37°E	74.25°E
Elevation	2,146 m (7,041 ft)	1,739 m (5,705 ft)	1,610 m (5,280 ft)	1,592 m (5,223 ft)	1,577 m (5,174 ft)
Bordering districts:	Pulwama, Kulgam, Anantnag, and Poonch	Shopian, Pulwama, Anantnag, and Ramban	Pulwama, Anantnag, Baramulla, and Ganderbal	Kupwara, Bandipora, Ganderbal, Srinagar, and Pakistan-administered Kashmir	Baramulla, Bandipora, Ganderbal, and Pakistan-administered Kashmir

Key Features: of Budgam: Budgam is centrally located District of the valley. It is bounded by District Baramulla in the North–West, by District Srinagar in North–East and by District Pulwama in the South–East. The Pir Panchal Range separates the District from Poonch District on its southwest side.

Topography: Budgam district in Jammu and Kashmir exhibits a diverse topography, combining mountainous and plain areas.

- Elevation: Average elevation of 5,281 ft (1,610 m) above sea level
- Mountains: Average height of 1,610 m
- Terrain:
 - Southern and southwestern parts: Hilly
 - Eastern and northern parts: Plain
- **Forest Cover:** 477 sq km (24.5% of total area)

Climate:

- Temperate climate
- Cold winters (–2°C to 10°C)
- Mild summers (15°C to 30°C)
- Average annual rainfall: 1,000 mm
- **Himalayan mountain ranges:** Part of the Pir Panjal Range, with peaks like Tatakooti Peak, which is 4,760 meters
- **River:** Sukhnag, Shaliganga, Doodganga and Nali Aahige the tributaries of Jahalim



- **Forests, valleys, and meadows:** Forests, including the Budgam Forest, and valleys like the Sukhnag Valley
- **Snow-capped peaks and glaciers:** Snow-capped peaks in the Pir Panjal Range, with some glaciers at higher elevations

Administrative Divisions:

- 8 Tehsils: Budgam, Beerwah, Chadoora, Charar-i-Sharief, Khag, Khansahib, Magam, and Narbal
- C.D. blocks: 17 C.D. blocks: Chadoora, Budgam, Beerwah, Khansahib, Khag, B.K Pora, Narbal, Nagam, Soibugh, Waterhail, Parnewa, Surasyar, Charisharief, Pakherpora, Sukhnag, and Ratsun.
- For administrative convenience, these blocks are further divided into 281 panchayats.
- 460 inhabited villages and 12 uninhabited villages

Soil: The soil in Budgam, Jammu and Kashmir, is generally made up of three types of soil: loamy soil, karewa soil, and poorly developed mountain. Soil nutrient status: The soil in Budgam is slightly acidic to slightly alkaline, and ranges from shallow to deep. The texture of the soil varies from loam to clay loam.

- **Loamy soil:** is highly fertile and ideal for paddy cultivation. Its high humus content enriches soil fertility, minimizing the need for heavy manuring. However, over-manuring can make the soil too strong, leading to excessive vegetative growth in rice crops.
- **Karewa soil or Wudur soil:** This soil comprises various sediments, including sand, clay, silt, shale, mud, lignite, and loess.
- **Mountainous soils or Tand soil:** Tand soil are found on reclaimed forest slopes. Initially, Tand soil yields impressive crops of maize, pulses, and fodder for a couple of years. However, soil erosion can rapidly degrade the land, causing it to lose its natural strength and productivity (ENVIS Newsletter. 2015).

Grasslands of Budgam: There are many grasslands in the Budgam district of Jammu and Kashmir, including Yusmarg, Tosa Maidan, and Doodhpathri

- **Yusmarg:** Yusmarg is a tourist attraction with long stretches of green pastures.
- **Tosa Maidan:** A famous pasture in the Himalayan range, Tosa Maidan is surrounded by dense forests. It's said that shepherds from neighboring countries visited the pasture in ancient times.
- **Doodhpathri:** A sloping grassy landscape in the Pir Panjal Range, Doodhpathri is covered with snow in the winter and wildflowers in the spring and summer.
- **Chanz, Achitar, Gadtar, Kurag, Disekhal etc are some main high land pastures.**



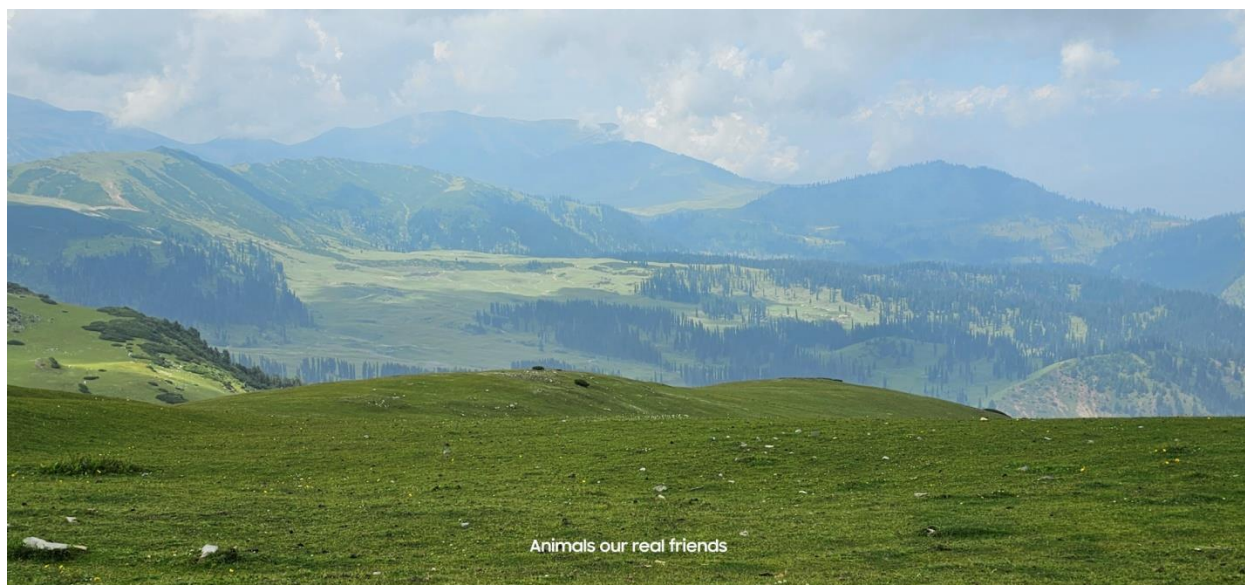


Figure-1. Grasslands of Kashmir



Figure-2. Grasslands of Kashmir

Brief history of goat rearing in Kashmir: Goat rearing has been an integral part of Jammu and Kashmir's culture and economy since ancient times (Rather et al., 2020; Alam et al., 2023, Sarma et al., 2024). Archaeological evidence supports this claim, with the discovery of bone tools from domestic sheep and goats during excavations at Gufkral, Pulwama, located 35.54°N and 75.60°E, 41 km from Srinagar (Anonymous, 1984). This finding suggests that sheep and goat domestication in Kashmir predates the second millennium BC. Historical records also highlight the significance of goat rearing in the region. In his book, Lawrence (1895) mentions that goat skins were valued at one rupee in the mountains, while taxation on summer grazing in Kashmir was nominal, at just Rs 5 per hundred goats. In recent times, efforts have been made to upgrade the local non-descript goat population by importing various breeds to bridge the demand-supply gap for meat and milk. This initiative aims to enhance the productivity and sustainability of goat rearing in Jammu and Kashmir. However, the



crossbreeding efforts have been started with limited success in Bandipora. Also, recently artificial insemination in goats has been started in same district by Department of Sheep Husbandry Kashmir (Wani et al. 2023; Ahanger et al. 2024).

General Animal Husbandry in Jammu and Kashmir: The population dynamics of J&K is presented in **Table 2**. The livestock population in Jammu and Kashmir is experiencing a decline across all farm animal types, as shown in Table 2. Several factors contribute to this downward trend, including:

- **Pasture Degradation:** The quality of grazing lands is deteriorating, affecting the livelihood of livestock farmers.
- **Shrinking Grazing Areas:** The rapid conversion of grasslands to tourist sites poses a significant threat to sustainable livestock farming in Jammu and Kashmir. This alarming trend has led to shrinking grazing areas, resulting in reduced pasture land, decreased livestock carrying capacity, and impacted livestock populations.
 - ✓ Over the past decade, vast grasslands have been converted to tourist infrastructure, which resulted in drastic reduction in available grazing area per animal. Consequently, livestock numbers have declined by over 15% between 2003 and 2020.
 - ✓ To mitigate these impacts, sustainable solutions are essential. Conservation of grasslands through community-led initiatives and sustainable tourism practices can help protect these vital ecosystems. Additionally, diversified livestock systems, rotational grazing and improved pasture management can enhance farm resilience. This integrated approach ensures a resilient and productive livestock sector in Jammu and Kashmir.
 - ✓ The availability of grazing areas is decreasing, making it challenging for livestock to find sufficient fodder.
- **Alternate Livelihood Activities:** The emergence of alternative livelihood options is drawing people away from traditional animal husbandry.
- **Construction of Roads:** Infrastructure development is leading to the conversion of grazing lands into roads and other infrastructure.
- **Conversion of grassland to tourist sites:** The rapid conversion of grasslands to tourist sites is a primary contributing factor in the decline of livestock populations in Jammu and Kashmir. This transformation has severe consequences.

Table 2. Livestock population of Jammu and Kashmir in thousands (Livestock Censuses 2003, 2007, 2012 and 2019)

Livestock Census	Livestock species in thousands					
	Cattle	Buffaloes	Sheep	Goat	Pig	Horse



2003	3084	1039	3411	2055	2	172
2007	3443	1050	4127	2068	1	167
2012	3015	788.9	3420	1813	0.878	144
2019	2533	691	3248	1730	1.43	6.3
Livestock Census	Livestock species in thousands					
	Mules	Donkeys	Camel	Yak	Mithun	Poultry
2003	40	24	103	47	24	5568
2007	42	24	NA	62	0.02	6683
2012	NA	17	150	54	0.0057	6360
2019	1.7	0.96	466	26.22	26 no's	7366

Distribution of goat population of Kashmir: The Table 3 provides an overview of Kashmir's goat population and distribution. As illustrated, Kashmir's goat population stands at 225,555. Budgam district represents a significant share, housing 33,187 goats, which accounts for 14.71% of the valley's total goat population.

Table 3. Distribution of goat population of Kashmir (19th livestock senses)

District	Male	Female	Total	Genetic groups (Available research on the	
Anantnag	2860	8000	10860	0.63	Kashir goat, Kagani
Budgam	2878	13315	16193	0.94	Kashir goat, Kagani
Bandipore	4314	12910	17224	1.00	Kagani, Crossbreds, Beetal
Baramulla	7140	33928	41068	2.37	Kashir goat, Kagani
Doda	14614	53547	68161	3.94	Kagani, Gaddi
Ganderbal	1859	7984	9843	0.57	Kashir goat, Kagani
Jammu	25252	104888	130140	7.52	Kagani
Kargil	19030	44680	63710	3.68	Changthangi, Purgi
Kuthua	50814	170401	221215	12.79	Kagani
Kishtwar	17342	57130	74472	4.30	Kagani, Gaddi
Kulgam	1163	2428	3591	0.21	Kashir goat, Kagani
Kupwara	6736	48276	55012	3.18	Kashir goat, Kagani
Leh	70302	106094	176396	10.20	Changthangi,
Poonch	18322	95957	114279	6.60	Kagani, Beetal
Pulwama	956	2931	3887	0.22	Kashir goat, Kagani
Rajori	51178	234898	286076	16.53	Kagani
Ramban	3795	22142	25937	1.50	Kagani
Reasi	33085	126471	159556	9.22	Kagani
Samba	10646	46869	57515	3.32	Kagani
Shopian	399	1409	1808	0.10	Kashir goat, Kagani
Srinagar	459	1687	2146	0.12	Kagani, Crossbreds, Beetal
Udampur	39036	152093	191129	11.05	Kagani
Overall	382180	1348038	1730218		

- **An overview of research on goat genetic resources of Jammu and Kashmir:** Jammu and Kashmir, located in the northern part of India, is home to diverse goat genetic resources



that play a crucial role in the region's agriculture and economy. An overview of research on goat genetic resources of Jammu and Kashmir is presented in Table 4:

Table 4. An overview of research on goat genetic resources of Jammu and Kashmir

S. NO	Title of study	Referance
1.	An unidentified goat breed of Kargil	Zarger et al. (2017)
2.	Studies on different traits of bakerwali goats at birth	Alam et al. (2019)
3.	A Brief Overview of Goat Rearing in Jammu and Kashmir	Rather et a., (2020 a)
4.	Morphological , Phenotypic , Performance Traits of Nondescript Goats in Budgam District of Kashmir	Rather et al., (2020 b)
5.	<i>Changthangi</i> :The pride of Jammu and Kashmir. Indian Farming.	Shanaz et al., (2020)
6.	Socio-economic and phenotypic parameters of Purgi goats of Laddakh, India	Alam et al. (2020)
7.	Status of farm animal genetic resources of Jammu and Kashmir-A Review	Rather et al. (2020)
8.	Growth Performance of Purgi Goats under Field Conditions in Kargil District (Ladakh)	Alam et al. (2021)
9.	Socio-economic and management features of Purgi goat and their contribution in rural livelihood security	Alam et al. (2021)
10.	Zoo-technical characteristics of Koshur goat : An unexplored goat genetic resource of Kashmir	Rather et a., (2021)
11.	Prediction of Body Weight from Linear Body Measurements in Kashmiri (Kashir) Goat	Rather et a., (2022)
12.	Study of morphometric and growth traits of Bakerwal (Kagni) goat at birth in an organized farm of Kashmir	Bukhari et a., (2022)
13.	Bakerwal goat: The robust goat breed of Jammu and Kashmir	Rather et a., (2022)
14.	Artificial insemination in backyard goat farming: A new prospect for scientific Goat breeding in changing scenario of Kashmir	Wani et al., (2023)
15.	Artificial Insemination: A New Horizon for Scientific Goat Breeding in Kashmir's Backyard Farming Sector.	Ahanger et al., (2024)
16.	Morphological, phenotypic and performance traits of bakerwal goats in poonch district of Jammu and Kashmir	Sarma et al., (2024)
17.	Goat and Sheep Genetic Resources of Jammu and Kashmir: A Review	Rather et al., (2024)

- **Socio personal/ economic indicators of Kashir goat farmers:** Different aspects of socio personal/ economic indicators of the Kashir goat farmers are reflected in (Table-5). The average land holding of goat farmers were 0.54 hectare with 0.21 irrigated and 0.33 non-irrigated. Out of this only 0.03 hectare were used for fodder cultivation. Mostly the goat farmers were illiterate (30 %). The average family size of farmers was 6.6 persons.
- **Category of the farmers:** Only Marginal or landless farmers were observed responsible for rearing for Kashir goat in Budgam. There was no farmer having 50 or more kanals of land rearing this valuable genetic resource in the study area (Table-5).



- **Education level of the farmers:** The education level of the farmers rearing Kashmir goat is presented in Table-5. The highest population engaged with goat rearing was illiterate (30 %) followed by primary standard (20%), 12+2 standard (8%), middle standard (16 %), Metric standard (14 %), PG (6 %) and Graduate (6%).
- **Community responsible for goat rearing:** All Kashmir goat farmers were Muslims in the surveyed area. The casts engaged with sheep rearing in surveyed area of Budgam are presented in Table-3. Among different casts Baba was 18 % followed by Rashi (18 %) and Dar (14 %).
- **Land holding:** Table-5 indicates that the average land holding size of the farmers of Kashmir goat in Budgam was only 0.54 hectare, out of total land holding 38.89 % land was irrigated and 61.11 % was non-irrigated.
- **Other livestock specie reared by farmers:** Farmers rearing Kashmir goat also rear other livestock species viz; cattle, sheep and poultry and infrequently ponies.

Table- 5. Block-wise information of Kashmir goat owners

Socio personal/ economic parameters	N = 50	%
Average land holding (Hac)	0.54	
Average Irrigated land (Hac)	0.21	38.89
Average non-irrigated land (Hac)	0.33	61.11
Farmers category		
Landless (%)	3	6
Marginal (%)	47	94
Education level of farmers		
Illiterate	15	30
Primary standard	10	20
Middle standard	8	16
Matric standard	7	14
Post matric	4	8
Graduate	3	6
Post Graduate	3	6
Mean Family Size	6.6	
Cast responsible for sheep rearing		
Shairgogri	1	2
Chopan	2	4
Bhat	2	4
Wani	2	4
Mir	2	4
Khan	2	4
Zargar	3	6
Beigh	3	6
Sheikh	4	8
Dar	7	14



Rather	5	10
Reshi	9	18
Baba	9	18
Average land used for fodder production (Hac)		0.03

Management practices in rearing of Kashmir goat

- Housing and Sanitation:** The housing pattern in the survey area is presented in Table- 4. The detailed classification of goat owners was done on the basis of type of housing, type of roofing, roofing pattern, housing area, housing length, and ventilation provided to the goats and the results are as followed. In the studied area, farmers typically housed their goats alongside other livestock species in the same dwelling, known locally as a "Gaan". However, within this shared structure, separate compartments were designated for specific groups, such as young ones, sheep, and goats. This compartmentalization allowed for some segregation within the shared living space. Interestingly, a separate, specialized house called a "Teer Woor" was used exclusively for sheep, calves, and young goats. This distinct housing arrangement reflected the farmers' recognition of the unique needs and requirements of these particular animals.
- The traditional housing system, comprising *Gaan* and *Teer Woor*, showcased the resourcefulness and adaptability of local farmers in optimizing their livestock management practices.

 - ✓ Key features of this system included:
 - ✓ Shared housing for multiple species
 - ✓ Compartmentalization within the Gaan for separate groups
 - ✓ Specialized housing (*Teer Woor*) for specific animals
 - ✓ Resource-efficient and adaptive livestock management

This indigenous knowledge and practice highlighted the importance of contextualized and locally relevant solutions in sustainable livestock production.



Figure-3. Housing of Kashmir goat





Figure-4. Housing of Kashmir goat



Figure-5. Housing of Kashmir goat

- **Type of housing:** Overall 38 % farmers had Kacchha house whereas 62 % had Pucca house in Budgam (Table 6).
- **Type of roofing:** Roofing materials of sheep houses was also studied in the studied area. All houses were roofed with corrugated galvanized iron (CGI) sheets supported by wooden frame (Table- 6).
- **Roofing pattern:** The study observed that the roofing pattern prevalent in the surveyed area consisted exclusively of fully covered, pitched or king post roofs, characterized by a ridge at the peak (Table- 6).
- **Housing time:** The sheep were housed for 24 hours from December to April whereas animals were housed during night hours from December to April (Table 6).



- **Ventilation:** The study examined ventilation systems in animal houses within the surveyed area, revealing varying levels of effectiveness:
 - a. 26% of houses had poor ventilation systems
 - b. 36% had average ventilation systems
 - c. 38% had good ventilation systems
 - d. Notably, cross-ventilation systems were absent in the entire surveyed area.

Table- 6: Housing systems adopted for goats

S.No.	Housing practices	N	%
1	Type of Housing		
	Katcha (%)	19	38
	Pucca (%)	31	62
2	Type of roofing		
	CGI sheets (%)	50	100
3	Roofing Pattern		
4	Housing Area per sheep (Sq.ft.)		
5	During May to November	Only Night time	
	From December to April	Both Day and Night	
6	Ventilation (%)		
	Good (%)	19	38
	Average (%)	18	36
	Poor (%)	13	26

Breeding: The Kashmiri goat exhibits a non-seasonal breeding pattern, displaying estrus throughout the year. Although breeding can occur at any time, most conceptions take place from late August to January, triggered by decreasing daylight. This flexible breeding schedule allows for:

1. Year-round reproductive activity
 2. Increased productivity and efficiency
 3. The continuous breeding season of Kashmiri goats is a valuable trait, enhancing fitness i.e. increased the number of kids born per goat
 4. Boosting overall productivity
 5. The Kashmiri goat's unique breeding habits significantly contribute to its value as a versatile and productive livestock, making it an attractive choice for farmers.
- **Breeding method:** Random natural mating using inferior males, a common practice among farmers, primarily due to the early sale of high-quality males for meat. This trend raises serious concerns, as farmers seemed unaware of the importance of scientific breeding practices. The sale of superior males at a young age for meat production resulted in:
 1. Inferior genetics being passed on to future generations



2. Limited opportunities for selective breeding and genetic improvement
3. Compromised livestock productivity and quality
4. Addressing this issue is crucial, as it highlights the need for:
5. Educating farmers on scientific breeding principles
6. Implementing selective breeding programs
7. Promoting the use of high-quality breeding stock
8. Encouraging conservation of superior genetics
9. To improve livestock productivity and sustainability, it is essential to bridge the knowledge gap and adopt best practices in animal breeding.

Possible interventions:

1. Training programs for farmers on scientific breeding
2. Introduction of breeding programs with superior genetics
3. Incentivizing farmers to retain high-quality breeding stock
4. Developing community-based breeding initiatives

By addressing this critical issue, farmers can enhance their livestock's genetic potential, leading to improved productivity, profitability, and sustainability.

- **Artificial insemination:** AI was not practiced in studied area.
- **Castration:** Castration of bucks was not practiced in the studied area.
- **Mean age at weaning:** The weaning age in Kashmir goat is five to six months
- **Flock size:** The present survey revealed an average flock size of 4.06 ± 0.32 goats, ranging from 1 to 9 animals, with 40% of farmers having small flocks (1-3 goats), 38% having medium flocks (4-6 goats), and 22% having large flocks (7-9 goats). Also,
- 3.23% (1) of farmers consistently kept only goats
- 67.74% (21) continually combined goat and cattle farming
- 29.03% (9) maintained a steady mix of goats, cattle, and sheep
- **Slaughter age:** Farmers maintain small goat herds (1-9) for milk, selling males and surplus females to butchers at 1-2 years old for meat.



Figure-6. Breeding behavior



Table- 7 District wise Breeding and Kidding Pattern in Beetal goats in its breeding tract

Traits/District	N	%
Breeding season	Kidding is observed throughout year	
Breeding method		
i. Natural breeding (%)	50	100
ii. A.I. (%)	0	0
Type of lambing		
i. Single lambs (%)	44	52.38
	40	47.62
ii. Twins lambs (%)	0	0
iii. Triplets lambs (%)		
Average flock size	4.06±0.32	4.06±0.32
Range	1-3	40 %
	4-6	38 %
	7-9	22 %
Mean Age of weaning (Months)	4-5 months	--

Feeding: The majority of India's goat population is found in rural areas, primarily raised by socio-economically disadvantaged communities living below the poverty line. This trend was also observed in the surveyed area, where goat farmers typically possessed marginal land holdings. The systematic field survey revealed that the animals were mainly reared under a mixed crop-livestock farming system. The farmers were grazing the animals during summers during day whereas intensive feeding was practiced during winters and bad weather days.



Figure-7

Winter Feeding: The farmers were utilizing agriculture wastes for making feed and fodders for sheep in the area under study. Majority of farmers (88.31) and (87.01) reported that they used paddy straw and naturally growing grasses, respectively as fodder. Rice bran and wheat bran was reported by 90.91 and 87.01 5, farmers as ingredient of



feed. No farmer reported oil cakes as ingredient of feed for sheep. It is obvious from Table 8 that sheep was not fed balanced diet.

- **Grazing system:** "The grazing system studied consisted of natural grasses, shrubs, and tree leaves. The availability of these components varied by season. Acacia (Kikar) and Salix or willow (Vir) were abundant fodder trees.



Figure-9

- **Major fodder/ grasses:** Common fodder sources include cultivated crops like oats and Berseem, as well as naturally growing grasses.
- **Fodder type used:** Only dry fodder, comprising oat hay, paddy straw, maize stalks, tree leaves, and naturally dried grasses (harvested during late summer and early autumn), was used to sustain livestock during harsh winters
- **Supplementary feeds:** Concentrate supplements used during winters consisted of wheat, maize, oil cakes, and wheat bran. No additional fortification was provided.

Prophylaxis and disease control: Kashmiri goats, being hardy, rarely suffer from minor health issues such as diarrhea, mastitis, gid, parasites, respiratory problems, corneal opacity, liver fluke, orf, enterotoxaemia, and paralysis. Most farmers in the area are knowledgeable about vaccinations for prevalent diseases and practices such as drenching and dipping to control parasitic infestations. However, there is a significant knowledge gap regarding balanced feeding practices, and none of the farmers reported fortifying their feed with essential minerals. Expert veterinarians provide timely treatment to the animals as needed. Additionally, post-



parturient goats receive nutritious feed, including cooked turnips, wheat, and soya beans, to support their recovery and health."

Morphological traits: The morphological traits of Kashmir goat are presented in Table-8

Coat color: The predominant body colors observed in the goat population were:

- Brown (26.88%, n=50)
- Black (24.73%)
- White (15.05%)
- Additionally, spotted and mixed-colored goats were also observed. The distribution of these and other colors is presented in Table 8.



- **Nasal bridge:** The majority of goats (80.65%) had a convex nasal bridge, while 19.35% had a flat nasal bridge (Table-8).
- **Presence and absence of horns:** Most goats (90.32%) were horned, while 9.68% were polled (hornless) (Table-8).





Fig .

(Polled female and male)

- **Ear type:** The majority of goats (78.49%) had broad, long, and droopy ears, while 21.51% had rudimentary, short to tubular ears (Table-8).
- **Wattles:** Enhancing their natural beauty, Kashmiri goats occasionally display refined wattles, thin, hair-covered extensions or paired skin tags that elegantly hang from the throat or neck, spanning 2-10 cm (0.8-3.9 inches) and mirroring their coat color.
- **Beard:** Beard was present in the majority of adult goats (35.75 %) irrespective of sex.
- **Horn orientation and type:** Notable characteristic of Kashmiri goats is their flat, pointed, triangular horns that slope upwards and backwards, providing a clear visual distinction



from Kagani goats, recognizable by their spiral-shaped horns. The horns usually possess sharp edges on inner side and rounded edges on outer side.



- **Colour of muzzle:** The distribution of muzzle colors aligns with the overall coat color pattern, exhibiting a consistent relationship between the two traits.
- **Colour of hooves:** The colour of hooves was observed almost black or brown in all animals.

Table 8. Morphological traits of Kashmir goat

Body characteristics	Attribute	Farmers flock	
		N	%
Body colour	Black body	46	24.73
	Brown body	50	26.88
	White body	28	15.05
	White body with black spots and patches	22	11.83
	Black body with white spots or patches	26	13.98
	White body with brown spots or patches	14	7.53
Nasal bridge	Convex	150	80.65
	Flat	36	19.35
Presence and absence of horns	Polled	168	90.32
	Horned	18	9.68
Ear type	Broad, long and droopy	146	78.49
	Rudimentary, short to tubular	40	21.51

Biometric traits of Kashmir goat: Biometric traits are quantifiable physical properties that uniquely identify and describe an individual or population within a species, encompassing characteristics such as morphology, anatomy, and physiological features. Animal biometrics are classified into growth traits, measuring size and development, and morphological traits, describing body shape and proportions.

- **Body measurements traits:** Body measurements provide valuable insights into meat quality characteristics and aid in developing effective selection criteria (Islam et al., 1991). Supplementing with body weights at different stages offers a more comprehensive description of an individual or population than traditional weighing and grading methods. Body measurements have been used to predict body weight by several researchers in many animal breeds (Prasad et al. 1990; Nayak et al. 2008; Salako and Ngere, 2002; Rather et al., 2021).



- ❖ **Ear length (EL):** Ear length refers to the measurement of ear from its base to its tip. As a quantitative trait is affected by genetic and environmental factors, therefore, varies between breeds, different age groups and sexes of same species. The average ear length of Kashmir goat is presented in Table 7. The Kashmir goat's average ear length (in cm) increased progressively with age, measuring: 10.16 ± 0.51 cm in kids, 12.40 ± 3.28 cm in 3 months age group, 13.23 ± 0.80 cm in 6 months age group, 13.43 ± 0.59 cm in 12 months age group, 13.92 ± 0.77 cm in 24 months age group and 14.08 ± 2.65 cm in older age groups (Table 9).
- ❖ **Body length (BL):** The overall mean (cm) for body height at birth, weaning, 6 months, 12 months, 2T (~24 months age), and >2T were 29.17 ± 1.24 , 35.86 ± 1.65 , 45.26 ± 2.14 , 52.8 ± 0.71 , 57.90 ± 1.04 and 60.96 ± 5.24 respectively in Kashmir goat. The overall body length of males was higher than females at all ages (Table 9).
- ❖ **Height at withers:** The overall estimates for height at wither (cm) in Kashmir goat were 35.78 ± 1.75 , 41.33 ± 3.23 , 46.11 ± 2.18 , 61.62 ± 1.11 , 69.43 ± 1.37 and 73.66 ± 7.75 in kids, weaning, 6 months, 12 months, 2T, and >2T, respectively. The male animals performed better as compared to females (Table 9).
- ❖ **Chest girth (CG):** The overall estimates for chest girth (cm) of Kashmir goat were 30.61 ± 1.33 , 35.77 ± 2.54 , 44.73 ± 3.08 , 44.73 ± 3.08 , 62.12 ± 1.18 , 76.58 ± 1.43 and 78.66 ± 7.54 in kids, weaning, 6 months, 12 months, 2T, and >2T, respectively. The males performed better as compared to females (Table 9).
- ❖ **Tail length:** The tail length varied between 8.71 ± 0.91 to 14.62 ± 1.91 in Kashmir goat in the present study (Table 9).

Table 9. Morphometric traits of Kashmir goat

Age	Sex		EL (cm)	BL	WH	CG	TL
KID	Overall	17	10.16 ± 0.51	29.17 ± 1.24	35.78 ± 1.75	30.61 ± 1.33	8.71 ± 0.91
	F	10	10.14 ± 1.65	29.32 ± 2.78	35.64 ± 3.06	30.40 ± 3.83	8.66 ± 1.91
	M	7	10.18 ± 1.35	29.32 ± 2.99	35.91 ± 2.75	30.81 ± 2.73	8.75 ± 1.80
MT3	Overall	15	12.40 ± 3.28	35.86 ± 1.65	41.33 ± 3.23	35.77 ± 2.54	11.02 ± 1.35
	F	8	12.10 ± 3.28	35.40 ± 3.71	40.64 ± 4.48	35.32 ± 3.05	10.80 ± 3.61
	M	10	12.70 ± 3.28	36.32 ± 3.01	42.01 ± 3.75	36.31 ± 0.99	11.23 ± 3.29
MT6	Overall	22	13.23 ± 0.80	45.26 ± 0.39	46.11 ± 2.18	44.73 ± 3.08	11.22 ± 0.78
	F	13	13.21 ± 1.90	45.26 ± 2.14	46.11 ± 3.16	44.73 ± 3.08	11.22 ± 0.78
	M	9	13.24 ± 3.28	46.18 ± 3.71	47.26 ± 5.48	45.03 ± 5.33	11.66 ± 1.35
MT	Overall	72	13.43 ± 0.59	52.8 ± 0.71	61.62 ± 1.11	62.12 ± 1.18	12.58 ± 0.22
	F	48	13.42 ± 0.66	53.29 ± 0.74	63.20 ± 1.10	62.69 ± 1.07	12.63 ± 0.27
	M	24	13.44 ± 0.99	52.42 ± 1.12	60.04 ± 1.65	61.54 ± 1.61	12.53 ± 0.41
2T	Overall	36	13.92 ± 0.77	57.90 ± 1.04	69.43 ± 1.37	76.58 ± 1.43	13.96 ± 0.40
	F	26	13.85 ± 0.49	57.40 ± 1.66	68.75 ± 0.82	74.92 ± 0.80	13.30 ± 0.20
	M	10	13.99 ± 1.47	58.39 ± 0.56	70.10 ± 2.45	78.23 ± 2.38	14.61 ± 0.60
>2T	Overall	64	14.08 ± 2.65	60.96 ± 5.24	73.66 ± 7.75	78.66 ± 7.54	14.62 ± 1.91
	F	64	14.08 ± 2.65	60.96 ± 5.24	73.66 ± 7.75	78.66 ± 7.54	14.62 ± 1.91



- **Body weight:** Body weight plays a pivotal role in animal production, as it underpins assessments of growth performance, feed utilization, and drives critical economic and management decisions that impact profitability and sustainability. The body weight estimated at different age reflect growth curve of animal. The body weights of Kashmir goats are reflected in Table 8 and discussed as follows:
- ❖ **Birth weight (BW):** Birth weight in goats refers to the body mass of a kid immediately after birth. It serves as an indicator of the prenatal growth rate of the kid, genetic potential of the sire and dam, and nutritional and health status of the dam. Several factors influence birth weight, including breed, genetics, nutrition, health, age and parity of dam, and sex of kid. Importantly, birth weight significantly affects kid survival, growth rate, and future productivity. The overall birth weight of kids of Kashmir goat was 2.49 ± 0.98 kg with 2.45 ± 1.07 and 2.52 ± 1.29 for female and males, respectively (Table 10).

Kashir twin goat kids

- ❖ **Three months body weight:** At this age, kids primarily rely on suckling for nutrition. Consequently, variations in body weight largely reflect differences in mothering ability and inherent growth potential. The overall body weight of kids of Kashmir goat at around three months age was 7.25 ± 1.12 kg. Similarly, the body weights of male and female kids were observed as 7.50 ± 0.32 kg and 7.00 ± 2.32 kg, respectively (Table 10).
- ❖ **Six months body weight:** The overall body weight of animals of Kashmir goat at around 6 months age as 12.50 ± 4.11 kg with 12.90 ± 7.12 kg for males and 12.50 ± 4.11 for females.
- ❖ **Weight at yearling age:** Study on Kashmir goats revealed a mean yearling weight of 17.95 ± 1.20 kg. Sex-specific analysis showed a trend of males (18.51 ± 2.15 kg) outweighing females (17.40 ± 1.42 kg), indicating potential growth differences (Table 10).



❖ **Weight at 24 months:** The mean body weight of Kashmir goats at 24 months of age was 33.39 ± 2.06 kg. A sex-wise comparison revealed that males had a higher average body weight (34.00 ± 3.18 kg) than females (32.78 ± 1.07 kg) (Table 10).



❖ **Body Weight of over 24 months age:** In Kashmir goats, the body weight at ages exceeding 24 months averaged 35.00 ± 10.07 kg. Interestingly, no bucks above 24 months were observed in the study, as they are typically sold for meat purpose (Table 10)..

Table 10. Body weights of Kashmir goats at different ages

Sex	BW	3M	6M	12M	24M	>24M
Overall	2.49 ± 0.98 (17)	7.25 ± 1.12 (15)	12.50 ± 4.11 (22)	17.95 ± 1.20 (72)	33.39 ± 2.06 (36)	35.00 ± 10.07 (64)
F	2.45 ± 1.07 (10)	7.00 ± 2.32 (8)	12.50 ± 4.11 (13)	17.40 ± 1.42 (48)	32.78 ± 1.07 (26)	35.00 ± 10.07 (64)
M	2.52 ± 1.29 (07)	7.50 ± 0.32 (07)	12.90 ± 7.12 (09)	18.51 ± 2.15 (24)	34.00 ± 3.18 (10)	

Reproduction and production performance of Kashmir goat:

❖ **Age at first service (AFS):** The overall age at first service (AFS) of 9.10 ± 0.28 months was observed for Kashmir goat with minimum and maximum of 6 and 15 months, respectively (Table 11).

❖ **Age at first kidding:** The overall age at first kidding (AFK) of 15.26 ± 0.38 months was observed for Kashmir goat with minimum and maximum of 11 and 24 months, respectively (Table 11).

❖ **Inter-kidding period:** The overall inter-kidding period (IKP) of 9.33 ± 0.25 months was observed for Kashmir goat with minimum and maximum of 6 and 12 months, respectively (Table 11).

❖ **Litter size:** The overall litter size (AFS) of 9.33 ± 0.25 months was observed for Kashmir goat with range of 1 to 2, respectively (Table 11).

❖ **Lactation length:** The overall lactation length (LL) of 1.48 ± 0.06 months was observed



Pleuriparous goat with twin kids



for Kashmir goat with range of 6 to 12 months, respectively (Table 11).

- ❖ **Average Milk Yield:** The overall milk yield of 1.50 ± 0.10 kg per day was reported in Kashmir goat (Table 11). The popularity of goat milk tea over cow milk tea among farmers signals a lucrative business opportunity in the goat dairy industry.
- ❖ **Birth type/ Twinning:** Among 88 goats, 41 (46.6%) gave birth to twins, while 47 (53.4%) had singles (Table 11). Farmers reported twinning only in multiparous goats, not primiparous ones.

Table 11. Least square means of reproduction and production traits.

Trait	N	Minimum	Maximum	Average±SE	Reference
AFS-Age at first service (months)	112	6	15	9.10 ± 0.28	(Rather et al., 2020)
Age at first Kiding (months)	88	11	24	15.26 ± 0.38	
Inter Kiding Period (months)	72	6	12	9.33 ± 0.25	
Litter Size	88	1	2	1.48 ± 0.06	
Lactation Length (months)	72	6	12	8.22 ± 0.22	
Average Milk Yield (kg/day)	88	0.5	2.5	1.50 ± 0.10	
Twinning	41 /88			46.59	

Manure: The organic waste produced from goat droppings applied as a valuable fertilizer in agricultural settings, specifically for paddy cultivation and orchard gardening.

Diseases prevalence: Kashmiri goats, despite their natural resistance, are prone to various diseases, notably:

- Reproductive issues (Dystocia and abortions):
- Mastitis
- Nutritional deficiencies
- Parasitic infestations (ecto and endo) Mange
- Infectious diseases (Footrot, Contagious Ecthyma)
- Neurological disorders (Paralysis)
- Respiratory and liver diseases
- Toxicity (Salt poisoning)



Table 12. Diseases prevalence in Kashmir goat

Disease	N	%	Disease	N	%
Anorexia	5	2.81	Fever	2	1.12
Gid	3	1.69	Teat obstruction	2	1.12
Hoof deformity	4	2.24	Maggoted wound	2	1.12
Paralysis	29	16.29	Bottle jaw	2	1.12
Thymine defeciency	2	1.12	Fracture	2	1.12
Distocia	2	1.12	Cyst	2	1.12
Hernia	2	1.12	Fotrot	3	1.69
Urolathiasis	2	1.12	Teat rupture	1	0.56



Mange: Kashir goat suffering from mange.

Thiamine Deficiency in Goats: In Fig and two kids suffering from Thiamine (Vitamin B1) deficiency or Polioencephalomalacia (PEM), presenting symptoms of star gazing.



References

- Ahanger, S.A., Wani, U.Y., Rather, M.A., Khan, S.A. and Magray, S.N. 2024. Artificial Insemination: A New Horizon for Scientific Goat Breeding in Kashmir's Backyard Farming Sector. *Bhartiya Krishi Anusandhan Patrika*.
- Alam S, Kaur G and Ahmad N. 2019. Purgi – An unidentified goat breed of Kargil. *Indian Farming (ICAR)* 69 (04): 45-47.
- Alam S, Kaur J, Rather M A, Shanaz S, Mir S, Shah Rand Hamdani A. 2021. Socio-economic and management features of Purgi goat and their contribution in rural livelihood security. *The Pharma Innovation Journal* : SP-10(8): 1195-1197.
- Alam S, Rather M A, Nabi N, Kaur G, Shanaz S, Ahmad N, Shah R, Ahmad T, Ahmad M, Ambreen Hamadani (2021). Growth Performance of Purgi Goats under Field Conditions in Kargil District (Ladakh). *Asian Journal of Dairy and Food Research*. 10.18805/ajdfr.DR-1732
- Alam S, Rather M A, Nabi N, Kaur G, Shanaz S, Ahmad N, Ahmad T, Ahmad M S and Hamadani A. (2020). Socio-economic and phenotypic parameters of Purgi goats of Laddakh, India. *Indian Journal of Animal Sciences*, 93 (1): 105-111.
- Alam, S., Rather, M.A., Nabi, N., Kaur, G., Shanaz, S., Ahmad, N. and Hamadani, A. (2023). Socio-economic and phenotypic parameters of Purgi goats of Ladakh, India. *The Indian Journal of Animal Sciences*. 93(1): 105-111.
- Bukhari S, Ganai NA, S Shanaz, Khan HM, Alam, Rather M, Khan N, Showkat S, Shah R and Mir S. 2022. Study of morphometric and growth traits of Bakerwal (Kagni) goat at birth in an organized farm of Kashmir. *The Pharma Innovation Journal*; 11(12): 306-309.
- ENVIS Newsletter. 2015. SOILS OF JAMMU & KASHMIR J&K ENVIS Centre Department of Ecology, Environment & Remote Sensing Jammu & Kashmir
- Islam M.R., Saadullah M., Howlider A.R. and Huq M.A. (1991). Estimation of live weight and dressed carcass weight from different body measurements in goats. *Indian J. Anim. Sci.* 61, 460-461.
- Livestock Censuses 2003, 2007, 2012 and 2019. 17th, 18th, 19th and 20th Livestock Census published by Department of Animal Husbandry and Dairying, Ministry of Agriculture, Govt. of India.
- Nayak S., Sahu G. and Mohapatra A.K. (2008). Study on management practices, phenotypic and reproductive characteristics of Ganjam sheep under range conditions of Orissa. *SAARC J. Agric.* 6(2), 93-106.
- Rathar M A, Alam S, Shanaz S, Khan N N, Majid R, Ahmad T and Hamdan H. 2021. Zootechanical characteristics of Koshur goat. An unexplored goat genetic resource of Kashmir. *Indian Farming* 71(07): 19–22.
- Rathar M A, Alam S, Shanaz S, Khan N N, Majid R, Ahmad T and Hamdani A. 2021. Zootechanical characteristics of Koshur goat: An unexplored goat genetic resource of Kashmir. *Indian Farming (ICAR)*, 71 (07): 19-22.
- Rather M A, Bashir I, Shahnaz S Alam S, Shah R, Hamdani A, Ahanger A. and Mir S A, (2022). Prediction of Body Weight from Linear Body Measurements in Kashmiri (Kashir) Goat. *Bhartiya Krishi Anusandhan Patrika*, 37(3):281-284.



- Rather M A, Kuthu B A, Shanaz S, Shah M M, Ahanger S A and Baba M A.2020. A Brief Overview of Goat Rearing in Jammu and Kashmir. *Indian Farmer* 7(04): 368-372
- Rather M A, Sarma S, Maurya S and Barwal R S, S Shanaz. 2024. Goat and Sheep Genetic Resources of Jammu and Kashmir: A Review. *International Journal of Research in Agronomy*.7(8): 510-517.
- Rather M, Shanaz S, Ganai N and Hamadani A (2020). Status of farm animal genetic resources of Jammu and Kashmir-A Review. *International Journal of Livestock Research* 10(4):27.
- Rather MA, Bashir I, Hamdani A, Khan NN, Ahangar SA, Nazki M (2021). Prediction of body weight from linear body measurements in kashmir merino sheep. *Adv. Anim. Vet. Sci.* 9(2): 189-193. DOI | <http://dx.doi.org/10.17582/journal.aavs/2021/9.2.189.193>
- Rather, M. A., Shanaz, S., Ayaz, A. and Khan, N. N. (2020). Morphological , Phenotypic , Performance Traits of Nondescript Goats in Budgam District of Kashmir.. *Ruminant Science*, 8 (2), 137-140.
- Rather, M.A., Bukhari, S., Shanaz, S., Alam, S., Mir, S.A. and Hamdani, A. (2022). Bakerwal goat: The robust goat breed of Jammu and Kashmir. *The Science World a Monthly E Magazine*. 2(3): 300-307.
- Salako A.E. and L.O. Ngere. (2002). Application of multifactorial discriminant analysis in the morphometric structural differ- entiation of the WAD and Yankusa sheep in the humid south- west Nigeria. *Nig. J. Anim. Prod.* 29, 163-167
- Sarma, O., Rather, M.A. and Shanaz, S. (2024). Morphological, phenotypic and performance traits of bakarwal goats in poonch district of Jammu and Kashmir. *Biological ForumAn International Journal*. 16(4): 198-202
- Shanaz S, Firdous F, Alam S, Nusrat N. *Changthangi: The pride of Jammu and Kashmir*. *Indian Farming*. 2020;70(6):38-40.
- Waiz, H., Gautam, L., Nagda, R., & Sharma, M. (2018). Growth Performance of Sirohi Goats under Farm and Field Conditions in Southern Rajasthan. *International Journal of Livestock Research*, 8(6), 293-303. doi: 10.5455/ijlr.20171028071436
- Wani U Y, Ahanger A A, Khan S A, Rather M A, Magray S M, Baba J A and Shah M M. 2023. Artificial insemination in backyard goat farming: A new prospect for scientific Goat breeding in changing scenario of Kashmir. *The Pharma Innovation Journal*. 12(9): 1010-1012.
- Zarger MR, Kumar D, Taggar RK, Chakraborty D, Mahajan V, Kumar N. Studies on different traits of bakerwali goats at birth. *Progressive Research – An International Journal*. 2017;12(6):2422-2423.

