Journal of Wildlife and Ecology (2025). 9(4):404-411
ISSN: 2663-4600

Research Paper **Open Access**

Diversity and Ecology of Mammals of Barkhan, Balochistan, Pakistan

Ghulam Din[1*], Adil Riaz[2], Muhammad Zohaib[1] and Usman Zia[3]

1. Department of Zoology, University of Lahore, Sargodha campus, Pakistan
2. Department of Zoology, University of Kotli, Azad Jammu and Kashmir, Pakistan
3. Institute of Forest Sciences, The Islamia University of Bahawalpur, Pakistan

***Corresponding author e-mail:** gdin3381@gmail.com

SUMMARY

Barkhan, located in Balochistan, serves as the district headquarters. Its landscape features a mix of plains, valleys, and mountains. The region experiences a hot semi-arid climate, characterized by extremely hot summers and mild winters. The primary objectives of this research are to investigate the diversity, geographic distribution, and richness of mammal species in Barkhan, Balochistan, Pakistan. Data on wild mammalian diversity were collected using both direct and indirect methods. The study identified 22 mammalian species belonging to 17 genera, 10 families, and 4 orders. Diversity indices indicate a high level of biodiversity in the area, with a Shannon-Wiener diversity index of 2.2396, a richness index of 5.45, and an evenness index of 0.73. The research found that the House Rat is the most abundant species, with a relative abundance of 0.134922, while the Indian Crested Porcupine had the lowest relative abundance at 0.017315 in Barkhan's natural habitats.

Keywords: Abundance, Diversity, Mammals, Richness

Citation: Din, G., A. Riaz, M. Zohaib, and U. Zia. 2025. Diversity and Ecology of Mammals of Barkhan, Balochistan, Pakistan. Journal of Wildlife and Ecology. 9: 404-411.

Received 11 November, 2025	Revised 19 November, 2025	Accepted 28 November, 2025	Published 30 December, 2025

INTRODUCTION

Mammals face population decrease and extinction. Many species need rapid conservation assistance. However, creating reliable leading indicators of demographics, communal, and change in the environment is critical to our ability to identify and intervene successfully in declining species (Butti et al., 2022). Foraging, patch utilization, and habitat selection are all excellent examples of conservation-friendly behaviors. Comparisons of giving-up densities obtained in simulated resource patches can accurately show the impact of foraging predation costs, habitat quality, coexistence, and richness (Hamm et al., 2024). Behavioral changes are anticipated to occur more rapidly than changes in population size. While these indicators are significant for administrators and environmentalists, similar behaviors can emerge from various causes. Additionally, a quick return to fitness may lead to the fast evolution of linked physiological and morphological traits (Zhang et al., 2023).

The investigation of diversity and ecological processes is critical for understanding and maintaining our natural world. As a result, tracking species richness and abundance is becoming an increasingly important tool for environmental

research and conservation. Changes in habitat and use throughout time have a significant impact on species variety, geographic distribution, and population strength. Effective biodiversity monitoring and management tactics, as well as recognizing wild demography, are crucial for achieving sustainable conservation results (Jacob et al., 2024).

Pakistan is a crucial country for faunal diversity, having 195 species of mammals. Wildlife biologist are working to conserve and manage the diversity of the class Mammalia. However, anthropogenic impacts are badly impacts on the diversity, density, distribution and abundance of the mammalian species. Therefore, understanding the variations in mammalian diversity, distribution, and abundance is essential for implementing environmentally friendly land-management strategies (Roberts, 1997; Bolaane, 2004; Altaf et al., 2014; Green et al., 2024).

Barkhan, located in Balochistan, Pakistan, has a diversified biological terrain with dispersed native plants. This biological variety maintenances a diverse range of taxa, many of which are understudied due to narrow research and increasing anthropogenic impacts. However, issues such as habitat fragmentation, agricultural growth, and human-mammal interaction and (Altaf et al., 2017; Altaf et al., 2018; Altaf et al., 2021a; Altaf et al., 2021b; Bashir et al., 2021; Faiz et al., 2022; Bashir et al., 2023) conflict (Schell et al., 2021) pose major threats to indigenous mammalian species. As a result, a thorough understanding of the abundance, and biological importance of mammals in this ignored area is critical for creating successful protection initiatives to maintain natural equilibrium. The primary goals of this research are to investigate the diversity, geographic distribution, and richness of mammalian species in Barkhan, Balochistan, Pakistan.

MATERIALS AND METHODS

STUDY AREA

Barkhan acts as the district headquarters (Figure 1). Barkhan district is situated in Balochistan, in east Punjab, in west Kohlu, northwest Loralai to the, and in north Musakhel be present. Barkhan's geography includes of plains, valleys, and mountains. Barkhan has a hot semi-arid climate, with extremely hot summers and mild winters. Precipitation is divided into two periods: mild to moderate rain in late winter from February to April (early spring), and heavy rain from June to September (during the monsoon season). In 2023, 99 percent of the population spoke Balochi, while other specak Saraiki, and Pashto.

DATA COLLECTION

Data were collected from November 2024 to October 2025, by using both direct and indirect methods (dead bodies, parts of mammalian species like hair and bones, roosting area documented and meeting with local people) to study species of mammals. Linear count method was applied during the survey and collection of mammalian species data from the study area. While field guides were used for identification of taxa of Barkhan (Roberts, 2005a; Roberts, 2005b).

STATISTICAL ANALYSIS

The parameters of diversity indices of Barkhan mammalian species were analyzed and graphs were designed with the use of Software known as PAST (Version 5.1) and MS Excel (2010).

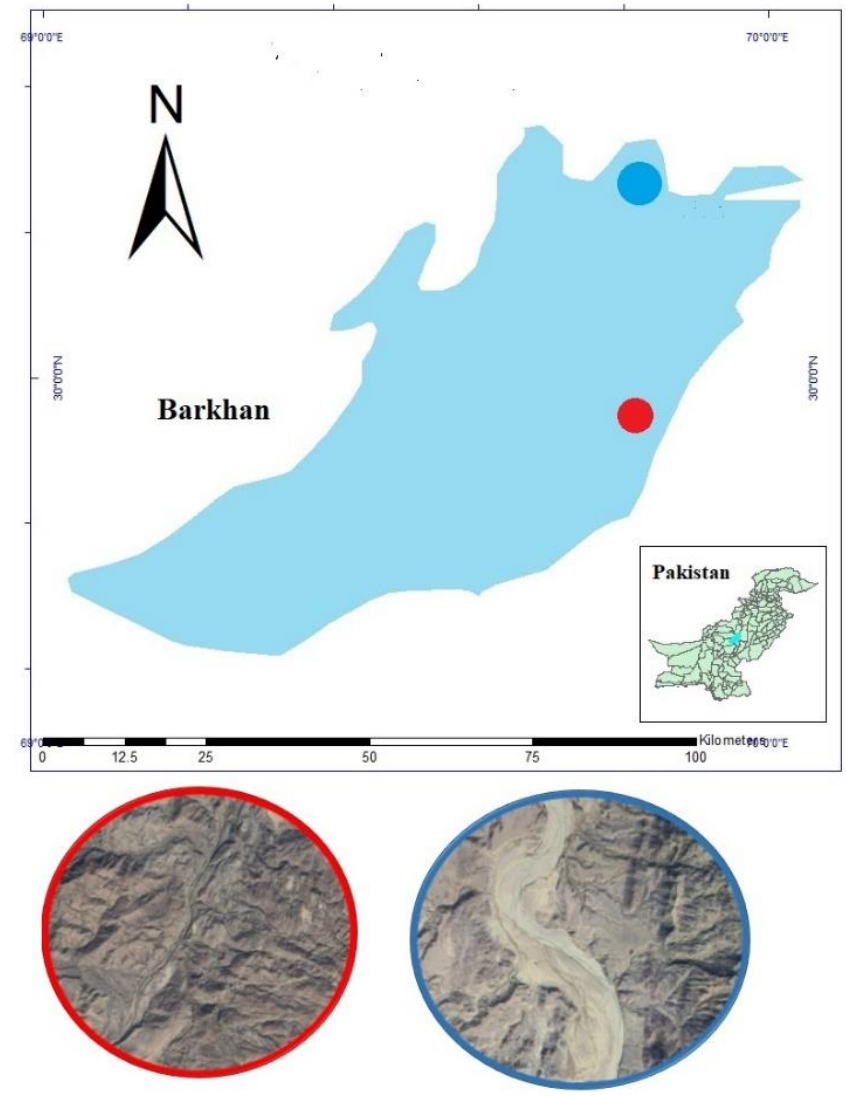

Figure 1: Map of Barkhan, Balochistan Pakistan.

RESULTS AND DISCUSSION

DIVERSITY

During the survey, 22 mammalian species (i.e. Indian Long-eared Hedgehog, Brandt's hedgehog, Asiatic Jackal, Indian Wolf, Jungle Cat, Sand cat, India Grey Mongoose, Indian desert cat, Red Fox, Common Red Fox, Indian Hare, Cape hare, Northern Palm Squirrel, Indian Crested Porcupine, Persian Jird, Sand colored rat, Little Indian Field Mouse, House Mouse, Short-tailed Mole Rat, House Rat, Indian Gerbil and Balochistan gerbil) of mammals (Table 1), belongs to 17 genera (i.e. *Canis*, *Felis*,

Vulpes, *Lepus*, *Mus*, *Hemiechinus*, *Paraechinus*, *Herpestes*, *Felis*, *Funambulus*, *Hystrix*, *Meriones*, *Millardia*, *Nesokia*, *Rattus*, *Tatera* and *Gerbillus*) (Figure 2), 10 families (i.e. Muridae, Erinaceidae, Canidae, Felidae, Canidae, Leporidae, Herpestidae, Felidae, Sciuridae and Hystricidae) (Figure 3), and 4 orders (i.e. Rodentia, Carnivora, Eulipotyphla and Lagomorpha) (Figure 4) from the study area. Roberts (1997) identified 29 mammalian species from Barkhan, Balochistan, while Altaf et al. (2014) documented 15 species and Sial (2024) observed 12 species of from Sutlej, Punjab, Pakistan respectively.

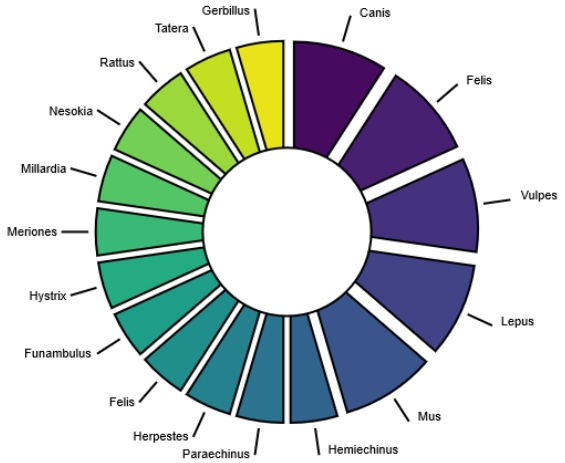

Figure 2: Genera of mammalian species in Barkhan, Balochistan Pakistan.

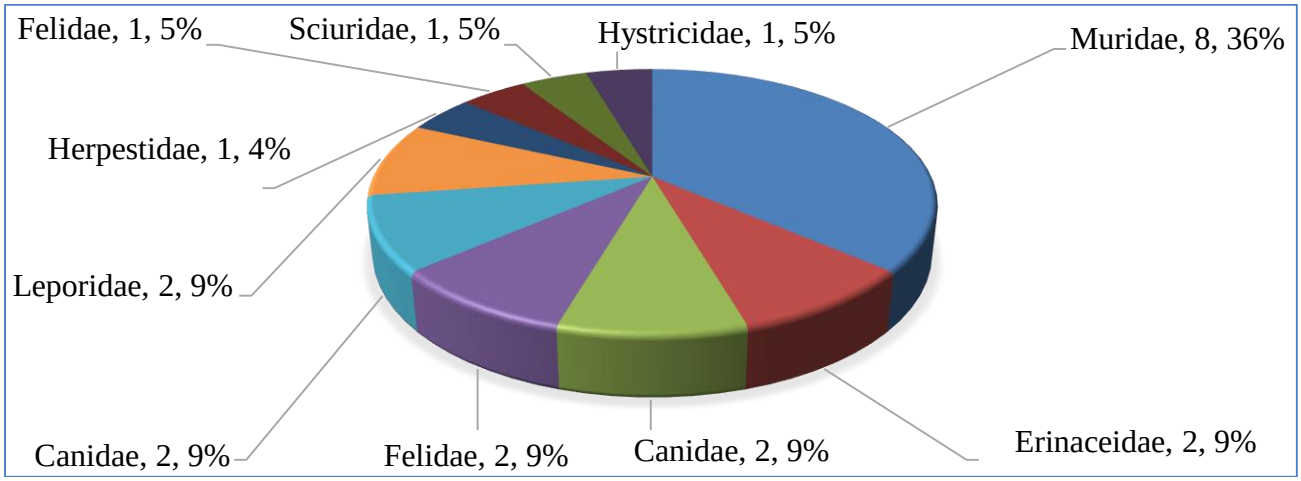

Figure 3: Families of mammalian species in Barkhan, Balochistan Pakistan.

The diversity indices demonstrate that the geographical region has an excellent and rich variety, as Simpson index is 0.9338, Shannon-Wiener diversity index (H') is 2.902, Richness index (R) is 2.5, Evenness index (E) is 0.8282, and Dominance index is 0.06625 (Table 2). Altaf et al. (2014) found that the Shannon-Wiener diversity index for mammalian species at Head Marala was 0.90. The species evenness was 0.20 at Head Marala. Additionally, Head Marala has a species richness of 7. Sial (2024) reported Shannon-Wiener indices of 2 for Sulmanki, 2 for Islam, and

2.45 for Panjnad. The species richness index was constant across all three sites, registering 1.61. In addition, the species evenness ratings for Sulmanki were 0.9, Islam 0.9, and Panjnad 1.

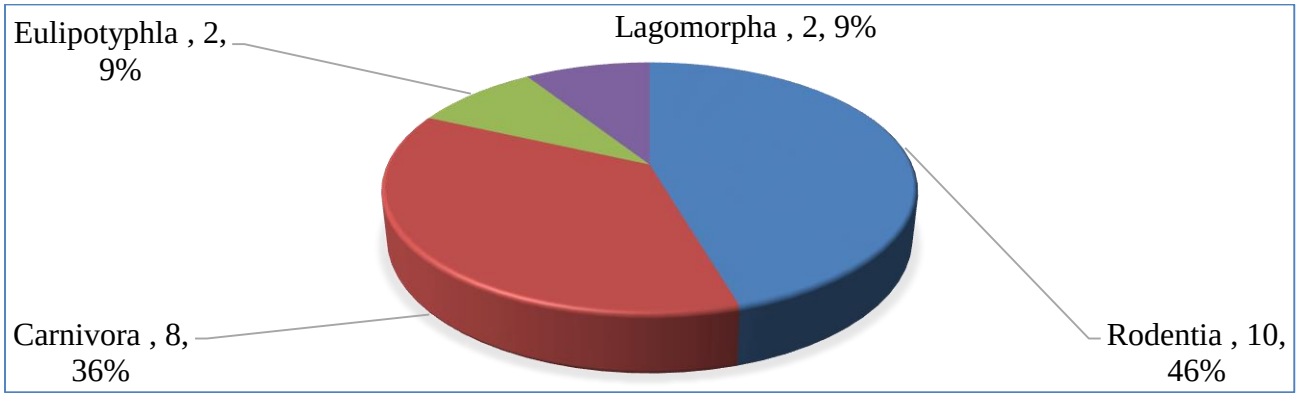

Figure 4: Orders of mammalian species in Barkhan, Balochistan Pakistan.

Table 1: Species of mammals in Barkhan, Balochistan Pakistan.

Sr.	Order Family	Common name	Scientific name	Species authority	IUCN
1	**Eulipotyphla**	Indian Long-eared Hedgehog	*Hemiechinus collaris*	Gray, 1830	LC
2	Erinaceidae	Brandt's hedgehog	*Paraechinus hypomelas*	(Brandt, 1836)	LC
3	**Carnivora**	Asiatic Jackal	*Canis aureus*	Linnaeus, 1758	LC
4	Canidae	Indian Wolf	*Canis lupus*	Linnaeus, 1758	LC
5	Felidae	Jungle Cat	*Felis chaus*	Schreber, 1777	LC
6		Sand cat	*Felis margarita*	Loche, 1858	LC
7	Herpestidae	India Grey Mongoose	*Herpestes edwardsii*	(É. Geoffroy Saint-Hilaire, 1818)	LC
8	Felidae	Indian Desert Cat	*Felis silvestris*	Schreber, 1777	LC
9	Canidae	Red Fox	*Vulpes vulpes griffthi*	Linnaeus, 1758	LC
10		Common Red Fox	*Vulpes vulpes pusillus*	Blyth, 1854	LC
11	**Lagomorpha**	Indian Hare	*Lepus nigricollis*	F. Cuvier, 1823	LC
12	Leporidae	Cape Hare	*Lepus capensis*	Linnaeus, 1758	LC
13	**Rodentia** Sciuridae	Northern Palm Squirrel	*Funambulus pennantii*	Wroughton, 1905	LC
14	Hystricidae	Indian Crested Porcupine	*Hystrix indica*	Kerr, 1792	LC
15	Muridae	Persian Jird	*Meriones persicus*	Blanford, 1875	LC
16		Sand coloured Rat	*Millardia gleadowi*	(Murray, 1886)	LC
17		Little Indian Field Mouse	*Mus booduga*	Gray, 1837	LC
18		House Mouse	*Mus musculus*	Linnaeus, 1758	LC
19		Short-tailed Mole Rat	*Nesokia indica*	Gray, 1830	LC
20		House Rat	*Rattus rattus*	Linnaeus, 1758	LC
21		Indian Gerbil	*Tatera indica*	Hardwicke, 1807	LC
22		Balochistan Gerbil	*Gerbillus Nanus*	Blanford, 1875	LC

During the research noted that, the most abundant species with the highest relative abundance is as 0.134922 for House Rat from Barkhan. On the other hand the

lowest relative abundance is noted as; 0.017315 for Indian Crested Porcupine) in the natural habitats of Barkhan. It is documented that House Mouse, Indian Wolf, Red Fox, Jungle Cat and Indian Long-eared Hedgehog are also abundant (i.e. RA) as 0.112435, 0.094895, 0.069485, 0.062289 and 0.05172 respectively. Common Red Fox (0.044974), Persian Jird (0.044974), Asiatic Jackal (0.039802), Brandt's hedgehog (0.037329), Indian Gerbil (0.033731), Little Indian Field Mouse (0.032381), Balochistan gerbil (0.032381), Sand colored rat (0.029908), Indian Hare (0.027434), Cape hare (0.026085), Sand cat (0.023162), Short-tailed Mole Rat (0.022487), India Grey Mongoose (0.022262), Northern Palm Squirrel (0.020238) and Indian desert cat (0.019789) are less documented in the Barkhan, Pakistan (Figure 5). Roberts (1997) and Altaf et al. (2014) documented that Indian wild boar were the most distributed and common in Punjab, Pakistan.

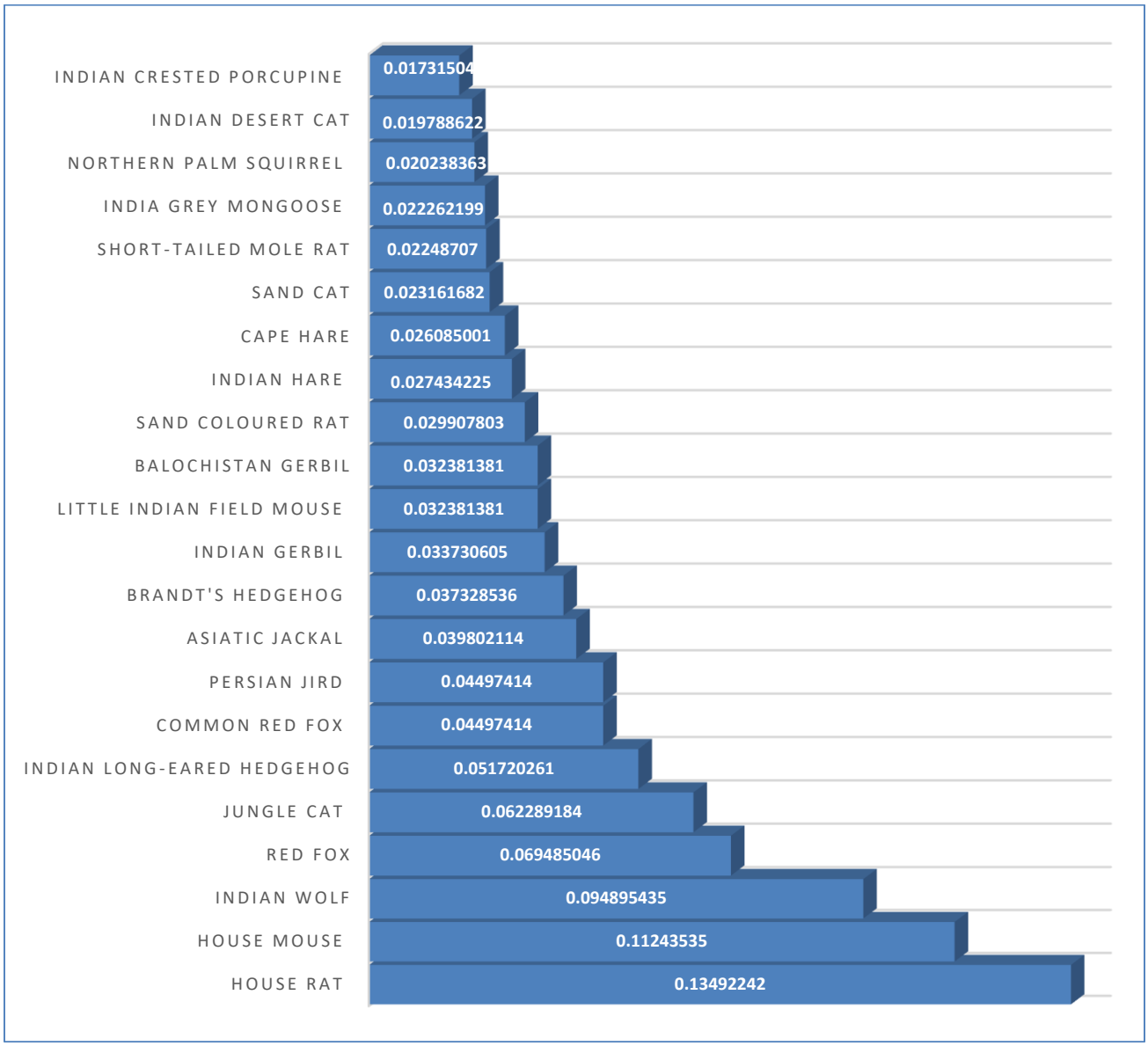

Figure 5: Mammalian species of Barkhan, Balochistan Pakistan.

Garbage in human-settled landscape serves as a food source for both carnivorous and omnivorous animal species. Data indicate that the availability of food in open environments is a crucial factor in the dispersal of mammals. Both metropolitan and countryside settings offer food and shelter, such as roofs and residential buildings. Some species are naturally shy and avoid human interactions, which may significantly influence their dispersal in urban areas. However, large omnivore mammals tend to invade residential neighborhoods when humans are absent or at night. Although medium and small mammals often inhabit homes, many people are unaware of their presence (Altaf et al., 2012; Altaf, 2016; Altaf et al., 2023; Agravat et al., 2025; Ahmad et al., 2025; Khushbakhat et al., 2025).

Table 2: Statistical analysis and diversity indices of species in Barkhan.

Diversity Indices	Values
Species	22
Individuals	4447
Simpson index (S)	0.9338
Shannon index (H')	2.902
Margalef/Richness index (R)	2.5
Evenness index (E)	0.8282
Dominance index (D)	0.06625

REFERENCES

Agravat, A., S. Pandey, A. Padhan, and A. Samal. 2025. Ecological Observations and Updated Locality Record of Ratel (*Mellivora capensis*) in Khirsara Reserve Forest, Gujarat, India. Journal of WIldlife and Ecology. 9: 208-215.

Ahmad, J., M. Altaf, M. S. H. Khan, M. Tanveer, M. Junaid, H. Ayoub, N. Rasheed, and U. Shahzad. 2025. Desert Life Unveiled: Diversity of Mammals at Cholistan, Punjab, Pakistan. Journal of Wildlife and Ecology. 9: 10-21.

Altaf, M. 2016. Assessment of avian and mammalian diversity at selected sites along river Chenab. PhD thesis submiited to University of Veterinary and Animal Sciences, Lahore, Pakistan.

Altaf, M., M. Altaf, M. S. Amjad, S. Zahoor, N. Sultan, and M. Umair. 2021a. Diversity and Uses of Wild Animals in Bagh, AJ&K, Pakistan. Ethnobiology of Mountain Communities in Asia. 269.

Altaf, M., A. Javid, A. M. Khan, S. Nazer, K. J. Iqbal, M. S. Haider, and S. Ashraf. 2023. Habitat Preferences of Wild Mammalian Species around River Chenab in Sialkot, Gujrat and Gujranwala Districts, Punjab, Pakistan. Pakistan Journal of Zoology. 55: 2887-2893. .

Altaf, M., A. Javid, M. Munir, S. Ashraf, M. Umair, K. Iqbal, A. Khan, and Z. Ali. 2014. Diversity of wild mammalian fauna of Chenab riverine forest, Punjab, Pakistan. JAPS: Journal of Animal and Plant Sciences. 24.

Altaf, M., A. Javid, M. Umair, K. J. Iqbal, Z. Rasheed, and A. M. Abbasi. 2017. Ethnomedicinal and cultural practices of mammals and birds in the vicinity of river Chenab, Punjab-Pakistan. Journal of Ethnobiology and Ethnomedicine. 13: 41.

Altaf, M., A. M. Khan, M. Umair, Irfan, and M. A. Munir. 2012. Status of wild birds and mammals in urban habitats of Gujranwala, Punjab, Pakistan. Punjab University Journal of Zoology. 27: 9-12.

Altaf, M., A. M. Khan, S. Zahoor, M. Umair, and M. S. Amjad. 2021b. Ethno-Medicinal Uses of Wildlife in Azad Jammu and Kashmir, Pakistan. Ethnobiology of Mountain Communities in Asia. 175.

Altaf, M., M. Umair, A. R. Abbasi, N. Muhammad, and A. M. Abbasi. 2018. Ethnomedicinal applications of animal species by the local communities of Punjab, Pakistan. Journal of Ethnobiology and Ethnomedicine. 14: 1-25.

Bashir, S., M. Altaf, T. Hussain, M. Umair, M. Majeed, W. Mangrio, A. Khan, A. Gulshan, M. Hamed, and S. Ashraf. 2023. Vernacular Taxonomy, Cultural and Ethnopharmacological Applications of Avian and Mammalian Species in the Vicinity of Ayubia National Park, Himalayan Region. Biology 2023, 12, 609.

Bashir, S. M., M. Altaf, M. Umair, S. Zahoor, M. S. Amjad, and A. M. Abbasi. 2021. Ethnomedicinal Uses of Animals in Vicinity of Ayubia National Park, Khyber Pakhtunkhwa-Pakistan. Ethnobiology of Mountain Communities in Asia. 221.

Bolaane, M. 2004. The impact of game reserve policy on the River BaSarwa/Bushmen of Botswana. Social Policy and Administration. 38: 399-417.

Butti, M., L. Pacca, P. Santos, A. C. Alonso, G. Buss, G. Ludwig, L. Jerusalinsky, and A. B. Martins. 2022. Habitat loss estimation for assessing terrestrial mammalian species extinction risk: an open data framework. PeerJ. 10: e14289.

Faiz, M., M. Altaf, M. Umair, K. S. Almarry, Y. B. Elbadawi, and A. M. Abbasi. 2022. Traditional uses of animals in the Himalayan region of Azad Jammu and Kashmir. Frontiers in Pharmacology. 13: 807831.

Green, N. S., M. L. Wildhaber, J. L. Albers, T. W. Pettit, and M. J. Hooper. 2024. Efficient mammal biodiversity surveys for ecological restoration monitoring. Integrated Environmental Assessment and Management. 20: 1969-1981.

Hamm, J., G. Holmes, and J. Martin-Ortega. 2024. The importance of equity in payments to encourage coexistence with large mammals. Conservation Biology. 38: e14207.

Jacob, D. E., I. U. Nelson, S. I. Okweche, P. A. Oko, and S. C. Izah. 2024. Suitability of mammals indigenous to the global south as bioindicator species for assessing environmental health Biomonitoring of Pollutants in the Global South. p 451-484. Springer.

Khushbakhat, H., M. Altaf, M. Imran, M. U. Majeed, M. Ameen, J. Ahmad, M. Waris, M. Zohaib, and Z. S. Ansari. 2025. Spatial Distribution and Habitat Selection of Mammals in the vicinity of Lal Suhanra National Park, Pakistan. Journal of WIldlife and Ecology. 9: 164-175.

Roberts, T. J. 1997. The Mammals of Pakistan. Oxford University Press, New Yark.

Roberts, T. J. 2005a. Field guide to the large and medium-sized mammals of Pakistan.

Roberts, T. J. 2005b. Field guide to the small mammals of Pakistan.

Schell, C. J., L. A. Stanton, J. K. Young, L. M. Angeloni, J. E. Lambert, S. W. Breck, and M. H. Murray. 2021. The evolutionary consequences of human–wildlife conflict in cities. Evolutionary Applications. 14: 178-197.

Sial, M. A. 2024. Diversity, evenness, & richness of wild mammals along the Sutlej River, Punjab, Pakistan. Frontiers in Ecology and Evolution. 12: 1447694.

Zhang, C., Y. Li, X. Hu, X. Ma, W. Jia, K. Liu, and Y. Nie. 2023. Human-induced behavioural changes of global threatened terrestrial mammals. Global Ecology and Biogeography. 32: 1645-1659.

Competing interests: Authors have declared that no competing interests exist.
Funding: Authors have no source of funding for this work.
Authors' contributions: Din has designed this project, collected data and written this article; while Riaz, Zohaib and Zia have critically analyzed this article and approved as final.