Journal of Wildlife and Ecology (2021). 5(4):159-167
www.jwepak.com

Research Paper Open Access

Diversity and cultural uses of mammals by inhabitants of Dhirkot, Azad Jammu and Kashmir, Pakistan

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SUMMARY

Pakistan is distinguished by a diverse range of bloomy and faunal mammals. The primary goals of this research are to learn about the diversity and cultural uses of mammals among the people of Dhirkot, Azad Jammu and Kashmir, Pakistan. The information was gathered using the "direct count method" and the "indirect count method." Dhirkot, Azad Jammu and Kashmir, Pakistan, was home to 11 different mammal species. According to the data analysis, the Shannon-Weiner diversity index was 0.770. It has been established that the Asiatic Jackal is the most abundant species (R.A = 0.020) in Dhirkot, Azad Jammu and Kashmir, Pakistan. All known species are used to treat diseases such as backbone pain, impotency, joint pain, paralysis, skin infections, and stomach pain. In the study area, the cape hare is the most commonly used for the treatment of paralysis.

Keywords: Mammals, diversity, Ethnomedicine, culture

Citation: Riaz, T., M. Altaf. 2021. Diversity and cultural uses of mammals in Dhirkot, Azad Jammu and Kashmir, Pakistan. Journal of Wildlife and Ecology. 5: 159-167.
Received: October, 2021; **Accepted**: December, 2021

INTRODUCTION

Terrestrial animals are essential ecological indicators that aid in the identification of conservation priority areas. Metrics such as the number of species at this time inhabiting a given area, their historical distribution documentation, and the level of threat to the species aid in conservation work (Myers, 1990; Myers *et al.*, 2000). More than 4763 mammalian species are documented in whole world (IUCN, 2002). Pakistan has some parts of three bio-geographic regions, namely the Palearctic, Oriental, and Ethiopian, and thus shows a distinctive types of diversity (Altaf, 2016).

More than 195 mammalian species are documented in Pakistan (Roberts, 2005; Watson and Roberts, 2015). Human-wildlife relation has very long history, and uses of it can be observed in art, calligraphy, folklore, poetry, and religion (Şekercioğlu et al., 2012). The fauna are used because they are advantageous for human beings (Mols and Visser, 2007). The direct uses are like cloth, shelter, foodstuff, medicines etc. (Diamond and Filion, 1987; Sibley and Monroe Jr, 1993) while, the indirect uses are included a wide array of significant ecological system from provision of clean water and air etc (Assessment, 2005) as well as they play a

important role in seed dispersion, pollination and nutrients recycling (Heine and Speir, 1989).

In Pakistan, "12 mammalian species are Critically Endangered", "12 mammalian species are Endangered", "20 Vulnerable", "32 Near Threatened" , "71 Least Concern", "38 Data Deficient" and "8 are Regionally Extinct" (IUCN, 2003). Temperature increases disrupt hibernation, reduce water availability in arid environments, cause extreme weather events, and spread diseases, all of which have an impact on mammalian diversity (Garcia-Solache and Casadevall, 2010). The decline of several large mammal species in Africa has been linked to a decrease in precipitation. Precipitation decreases plant growth and increases predation risks (Ogutu and Owen-Smith, 2003; Musiega and Kazadi, 2004).

Ethnomammalogy are the knowledge and awareness of human about mammalian species; this research can enhance conservation works, because it will enhance information related to local diversity (Alves and Souto, 2015). This research is therefore designed to know diversity and cultural uses of mammals by inhabitants of Dhirkot, Azad Jammu and Kashmir, Pakistan.

MATERIALS AND METHODS

STUDY AREA

Dhirkot is located in lesser Himalayan region (DRU, 2007). The study area is located in a moist area with monsoon access. The variations in altitude cause a slew of differences in rainfall and humidity in various parts of the region. The summer is mild (average temperature "37^{o}C"), whereas the winter is bitterly cold (average temperature "4^{o}C"), with snowfall at higher elevations. Although snowfall was occasionally documented in lower areas The rainfall (average) was noted to be 150mm. (Figure 1) (Bibi *et al.*, 2013).

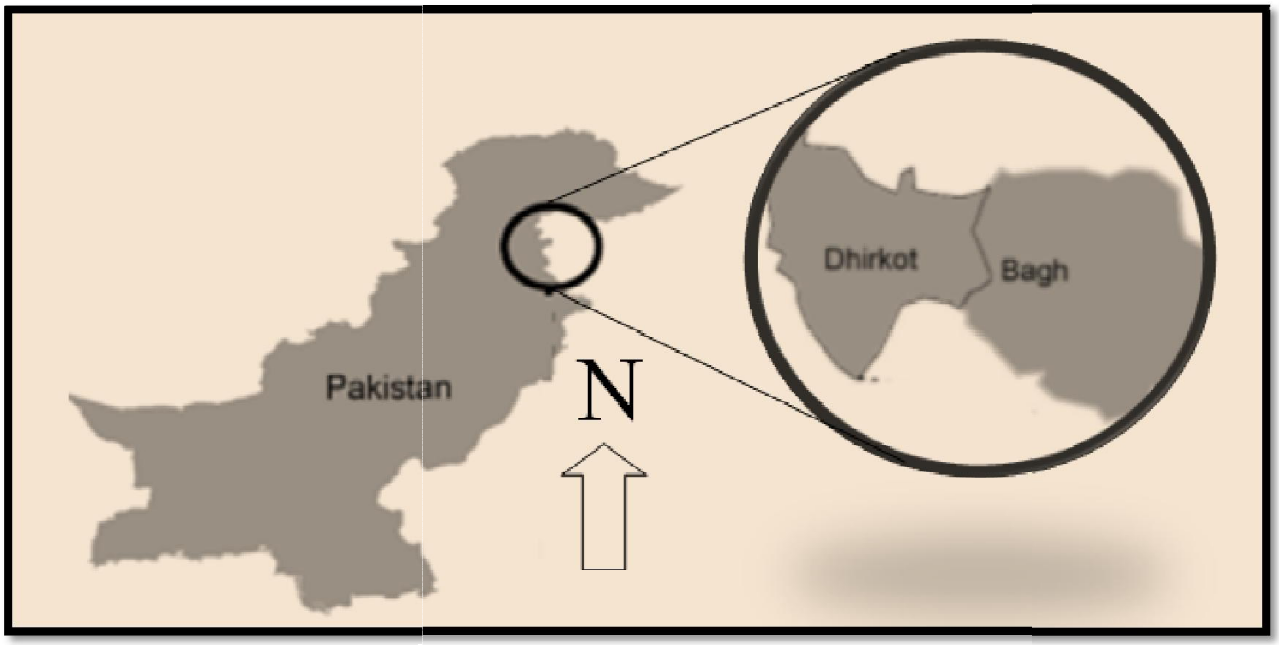

Figure 1: Map of study area.

ASSESSMENT OF MAMMALIAN DIVERSITY

The "linear count method" was utilized, and diversity of mammals was reviewed utilizing directly and indirectly counts. The direct count includes physical presence and voices, whereas the indirect count includes the presence of nests, fecal pellets, foot-prints, tree marks, and meeting with native people. Binoculars were used to observe the mammals, and field guides "mammals of Pakistan" (Roberts, 2005a, b) were used to accurately species identification.

STATISTICAL ANALYSIS

The mammalian diversity of the study area was calculated through Shannon-wiener index (Shannon and Weaver, 1949) using following formula;

$$H' = - [\Sigma PI \text{ In } PI]$$

Where, H' = Diversity Index

Ethnomammalogy: The data was collected through questionnaire; following points are documented i.e. medicinal use, Food, poaching, entertainment, product use, export, harmful, magic, superstitious and narratives.

RESULTS AND DISCUSSION

In study area, total 11 mammalian species are documented. Shannon-wiener Diversity Index for mammalian species in study area is as 0.770 (Table 1). Altaf *et al.* (2014) documented 15 mammalian species along the river Chenab, Punjab, Pakistan. Shannon-Wiener diversity index for mammalian species of head Marala (0.860), Khanki (0.972) and head Qadirabad (0.975) is also documented.

During present study, Asiatic Jackal is found as the most abundant species (R.A = 0.020) from Dhirkot, Azad Jammu and Kashmir, Pakistan (Table 1). This species is documented in all Pakistan (Roberts, 1997; Ghalib *et al.,* 2007; Rais *et al.,* 2011; Altaf *et al.,* 2014; Khan *et al.,* 2015; Iqbal *et al.,* 2018; Younus *et al.,* 2018; Rasheed *et al.,* 2020).

Specimens of small Indian mongoose are seen in Dhirkot, Azad Jammu and Kashmir, Pakistan with relative abundance of 0.041respectively (Table 1). Small Indian mongoose is in the past noted from Pakistan (Roberts, 1997; Ghalib *et al.*, 2007; Altaf *et al.*, 2012; Altaf *et al.*, 2014; Khan *et al.*, 2015; Altaf *et al.*, 2018a).

Indian wild boar is noted in the study area with relative abundance of 0.410 as shown in Table 1. This species is in the past documented from all Pakistan except Balochistan and Gilgit Baltistan (Roberts, 1997; Rais *et al.,* 2011; Altaf *et al.,* 2014; Chughtai *et al.,* 2018; Rasheed *et al.,* 2020).

Table 1: the diversity of Mammals in the study area.

Names	**Pi/RA**	**LogPi**	**PilogPi**
Cape hare, *Lepus Capensis* Linnaeus, 1758	0.020	-1.688	-0.035
Small Kashmir Flying Squirrel *Holopetes fimbriatus* Fischer, 1853	0.082	-1.086	-0.089
Indian Crested Porcupine *Hystrix indica* Kerr, 1792	0.061	-1.211	-0.074
Small Indian mongoose *Herpestes javanicus* É.	0.041	-1.387	-0.057

Geoffroy Saint-Hilaire, 1818			
Rhesus Macaque *Macaca mulatta* Zimmermann, 1780	0.082	-1.086	-0.089
Asiatic Jackal *Canis aureus* Linnaeus, 1758	0.205	-0.688	-0.141
Common Leopard *Panthera pardus* Linnaeus, 1758	0.004	-2.387	-0.010
Indian Wild Boar *Sus scrofa* Linnaeus, 1758	0.410	-0.387	-0.159
Small Indian Civet *Viverricula indica* Geoffroy Saint-Hilaire, 1803	0.004	-2.387	-0.010
Himalayan Palm Civet *Paguma larvata* Smith, 1827	0.008	-2.086	-0.017
Red Fox *Vulpes vulpes* Linnaeus, 1758	0.082	-1.086	-0.089
Total			-0.770
Shannon-wiener diversity index			0.770

CULTURAL USES OF MAMMALIAN SPECIES

Medicinal uses

All documented species are used to cure diseases like backbone pain, impotency, joint pain, paralysis, skin infection and stomach pain (Table 2 and 3).

Hunting

Out of total, 8 species (i.e. cape hare, Small Kashmir flying squirrel, small Indian mongoose, Common leopard, Indian wild boar, small Indian civet, Himalayan palm civet and red fox) hunted for different purposes e.g. food, parts use, entertainment, magic and harmful (Table 2).

Poaching

Out of total, 3 mammalian species (cape hare, Rhesus macaque and common leopard) are poached for export and entertainment (Table 2).

Food

Out of total, 1 mammalian species (i.e. cape hare) is used as food (Table 2).

Entertainment

Out of total, 3 mammalian species (i.e. cape hare, small Indian mongoose and Rhesus macaque) are used as entertainment in different ways like monkey entertains people with funny activities, cape hare entertains peoples with beautiful activities and small Indian mongoose and snake fight is famous as entertainment in study area (Table 2).

Parts use

Out of total, parts of 9 mammalian species (i.e. cape hare, small Indian mongoose, rhesus macaque, Asiatic jackal, common leopard, Indian wild boar, small Indian civet, Himalayan palm civet and red fox) are used in different purposes like hairs are used in brushes, skin s is used to make jackets, shoes and etc (Table 2).

Export

Out of total, 5 species (i.e. small Indian mongoose, rhesus macaque, Asiatic jackal, common leopard, Indian wild boar, small Indian civet, Himalayan palm civet and red fox) are exported to earn money (Table 2).

Harmful

Out of total, 5 species (i.e. Indian crested porcupine, Asiatic jackal, common leopard, Indian wild boar and red fox) are harmful for human and poultry and domestic animals and/or agriculture (Table 2).

Magic

Out of total, 1 species (i.e. Indian crested porcupine) is used as magic, according to local people; the presence of spines of this specious may cause a bad impact on people behavior (Table 2).

Superstitious

Out of total, 3 species (i.e. Asiatic jackal, Indian wild boar and red fox) have superstitious according to native people. Informants told that Asiatic jackal has a specific tumor-like part in head known as "Giddar singhi" if any person has every wish will be fulfill; Indian wild boar is bad omen animal; and red fox voices are fetal (bad omen) for local people (Table 2).

Table 2: Cultural study of mammals among the people of study area.

Sr.	**Common name**	**Code**	MED	HUN	POC	FOO	ENT	PU	EXP	HAR	MAG	SUP
1	Cape hare	CH	65	67	2	80	24	6	0	0	0	0
2	Small Kashmir Flying Squirrel	SKFS	3	9	0	0	0	0	0	0	0	0
3	Indian Crested Porcupine	ICP	5	0	0	0	0	0	0	24	13	0
4	Small Indian mongoose	SIM	9	8	0	0	12	9	9	0	0	0
5	Rhesus Macaque	RM	7	0	12	0	34	6	6	9	0	0
6	Asiatic Jackal	AJ	6	0	0	0	0	7	7	24	0	29
7	Common Leopard	CL	34	8	2	0	0	24	24	100	0	0
8	Indian Wild Boar	IWB	3	8	0	0	0	8	8	88	0	56
9	Small Indian civet	SIC	12	8	0	0	0	24	24	0	0	0
10	Himalayan Palm Civet	HPC	12	8	0	0	0	24	24	0	0	0
11	Red Fox	IF	24	8	0	0	0	24	24	9	0	25

Note: MED (medicinal use), FOO (Food), POC (poaching), ENT (entertainment), PU (product use), EXP (export), HAR (harmful), MAG (magic), SUP (superstitious) and NAR (narratives)

MEDICINAL USES OF MAMMALIAN SPECIES

Total 11 species are utilized to treat ailments (Table 2 and 3). Fat is the most utilized (n=10) part in the traditional recipes, while hair (n=1), meat (n=1) and bile (n=1) are also utilized in different recipes (Figure 2) as oral and topical (Figure 3). These body parts are used to treat the following diseases i.e. backbone pain, impotency, joint pain, paralysis, skin infection and stomach pain (Figure 4). Cape hare is the most frequent used in the study area for the treatment of paralysis. Altaf *et al.* (2017) and Altaf *et al.* (2018b) documented the cultural uses of mammalian species viz. superstitious, narratives, food, magic, product use, hunting, export and medicine uses of mammals along river Chenab. Flesh, blood, milk, eggs and fats were used to treat various diseases viz. paralysis, weakness, fever, fever, joint pain, allergy, impotency, epilepsy and etc.

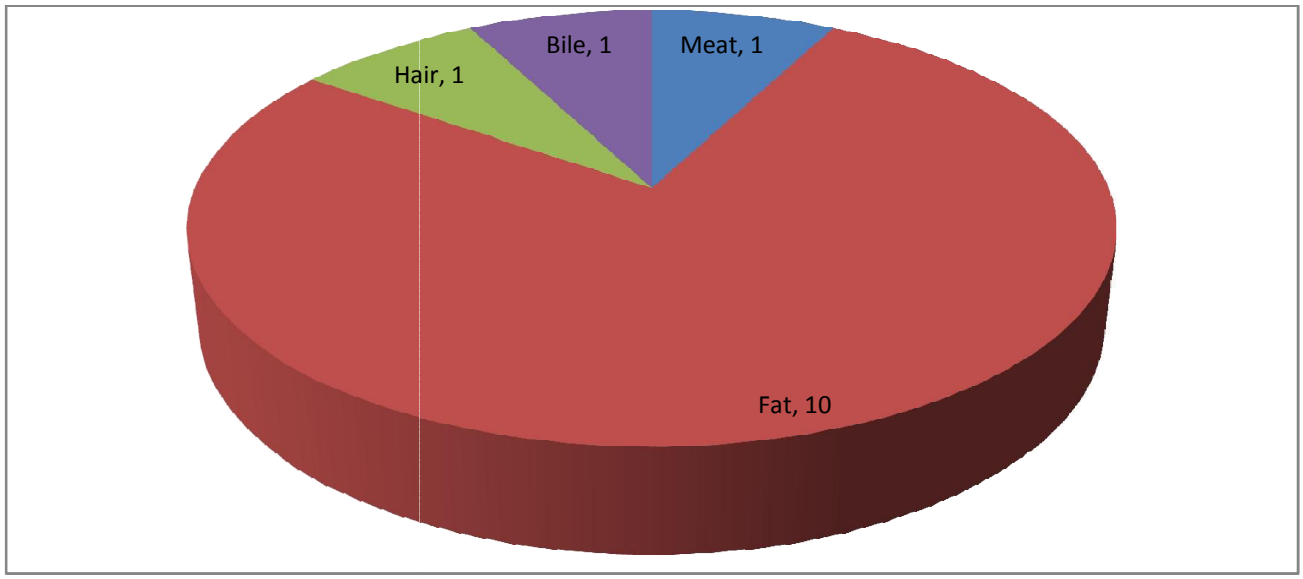

Figure 2: Uses of body parts of medicinal mammalian species among the people of study area.

Table 3: Medicinal uses of mammalian species among the people of study area.

Sr.	Common name	MOU	Part Use	Treatments	FC	SU
1	Cape hare	O	Meat	Paralysis	65	24
2	Small Kashmir Flying Squirrel	T	Fat	Joint pain, backbone pain	3	0
3	Indian Crested Porcupine	T	Fat	Joint pain, backbone pain	5	0
4	Small Indian mongoose	T	Fat, hair	Joint pain, backbone pain, skin infection	9	0
5	Rhesus Macaque	T	Fat	Impotency, joint pain, backbone pain	7	1
6	Asiatic Jackal	T	Fat	Joint pain	6	0
7	Common Leopard	T	Fat	Impotency, joint pain, backbone pain	34	5
8	Indian Wild Boar	T	Fat	Joint pain	3	0

9	Small Indian civet	T	Fat	Joint pain	12	1
10	Himalayan Palm Civit	T	Fat	Joint pain, backbone pain	12	1
11	Indian Fox	T	Fat, bile	Stomach pain, joint pain, backbone pain	24	2

Note: MOU (mode of use), FC (frequency of citation), SU (self use)

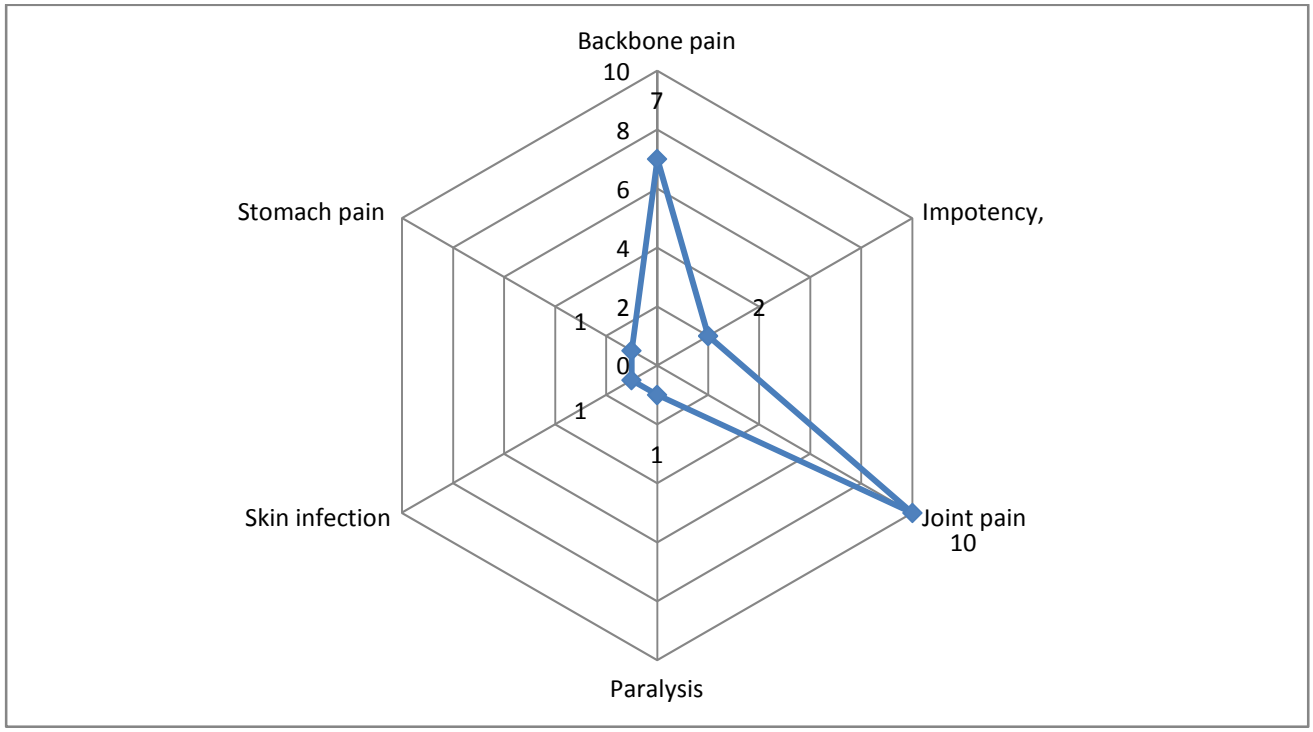

Figure 4: Diseases treated with mammalian body parts in study area.

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