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Diversity and status of mammalian fauna of Abbaspur, Azad Jammu and Kashmir, Pakistan

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ABSTRACT

Total 4763 mammalian species are reported in the whole world; and 195 species of mammals are documented in Pakistan; while only 71 species of mammals are present Azad Jammu and Kashmir. Present study was conducted at Abbaspur. Linear count survey model was utilized to know the populations of mammals. Data were collected through direct as well as indirect methods. Diversity was calculated through Shannon-Wiener, Evenness and Richness indices. A total of 15 species belonging to 15 genera, 13 families and 6 orders were documented from the study area. Shannon-Wiener diversity Index was calculated as 1.07, richness index was 0.91 and Evenness index was 5.31 in the study area. During present study noted that Indian crested porcupine (*Hystrix indica*) was reported as the topmost abundant mammalian species of the Abbaspur.

Keywords: Porcupine, Fox, Mammals, Diversity, Richness

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INTRODUCTION

Total 4763 mammalian species are reported in the whole world by (IUCN, 2002); in Pakistan, 195 species of mammals are reported (Roberts, 1997b; Roberts, 2005a, b); while only 71 species of mammals are present Azad Jammu and Kashmir (Roberts, 1997b; Roberts, 2005a, b; Altaf, 2017). Out of total in Pakistan, twelve species are Critically Endangered, twelve species are Endangered, twenty species are Vulnerable, thirty two species are Near Threatened, seventy one species are Least Concern, and eight species are Regionally Extinct (IUCN, 2003).

Total 6 biogeographic regions are present in the world; out of total, some parts of 3 (i.e. Ethiopian, Palearctic and Oriental) regions are present in Pakistan. This is the reason country having the wide variety of mammalian fauna in this country (Roberts, 1997b; Roberts, 2005a, b; Altaf, 2017). Pakistan having round about 225 wetlands and gradual changes in elevation provoke changes in mammalian fauna within short distances (Altaf *et al.*, 2014b).

The mammals has direct and indirect benefits for human being (Mols and Visser, 2007). The direct benefits as; food, clothing material, medicines, product, shelter, etc. (Diamond and Filion, 1987; Sibley and Monroe Jr, 1993; Altaf *et al.*, 2017) while, the indirect benefits as; important for ecosystem services as food chain (Assessment, 2005; Altaf, 2016). Many mammalian species are important for seed dispersers, pollinators, recycling of nutrients and maintenance of ecosystems (Heine and Speir, 1989). The mammals are the important environment as other wildlife; good indicators and help to sustain, conserve and maintain the landscape (Myers, 1990; Myers *et al.*, 2000). This study was specifically designed to know the diversity of mammals in Abbaspur.

MATERIALS AND METHODS

The data were collected from May 2009 through April 2010 in selected sites of Abbaspur.

STUDY AREA

Tehsil Abbaspur, district Poonch is located near line of control (Figure 1). Abbaspur is located at 33°49′N 73°59′E, 33°49′N 73°59′E and an elevation of 1,161 m (3,809 ft). Poonch valley is consist of 8500 hectares and elevation is from 1750 meters to 2500 meters. Rainfall recorded 1600mm per year, in monsoon season and in winter. The area is included in the cold temperate forest (Khan *et al.*, 2010).

METHODOLOGY

The linear count survey model was applied, while mammalian diversity was assessed through direct and indirect count methods. The direct count (viz. physical presence and voices) while indirect count (viz. presence of nests, hair mounting, fecal pellets, foot-prints, and meeting with local people). Binoculars was used to see the animals (Roberts, 2005a, b; Mirza and Wasiq, 2007) was utilized to precise classification of the mammalian species.

STATISTICAL ANALYSIS

Shannon-weiner diversity index was utilized to know the diversity of mammalian species of the Abbaspur through the formula (Shannon and Weaver, 1949).

Shannon-weiner diversity index is known as H'.

$$H' = -[\Sigma PiLogPi]$$

Species richness was documented by Margalef (1958). Species richness is known as R.

$$R= S-1/Log(N)$$

Evenness Index was documented by Pielou (1966). Evenness is also known as or noted as E.

$$E = H'/\log(S)$$

Where, "Pi" is "Proportion of the species" and "i" is "relative to the total number of species"

"LogPi" is "natural logarithm of this proportion"

"S is "total no. of species"

"N" is "total no. of individual"

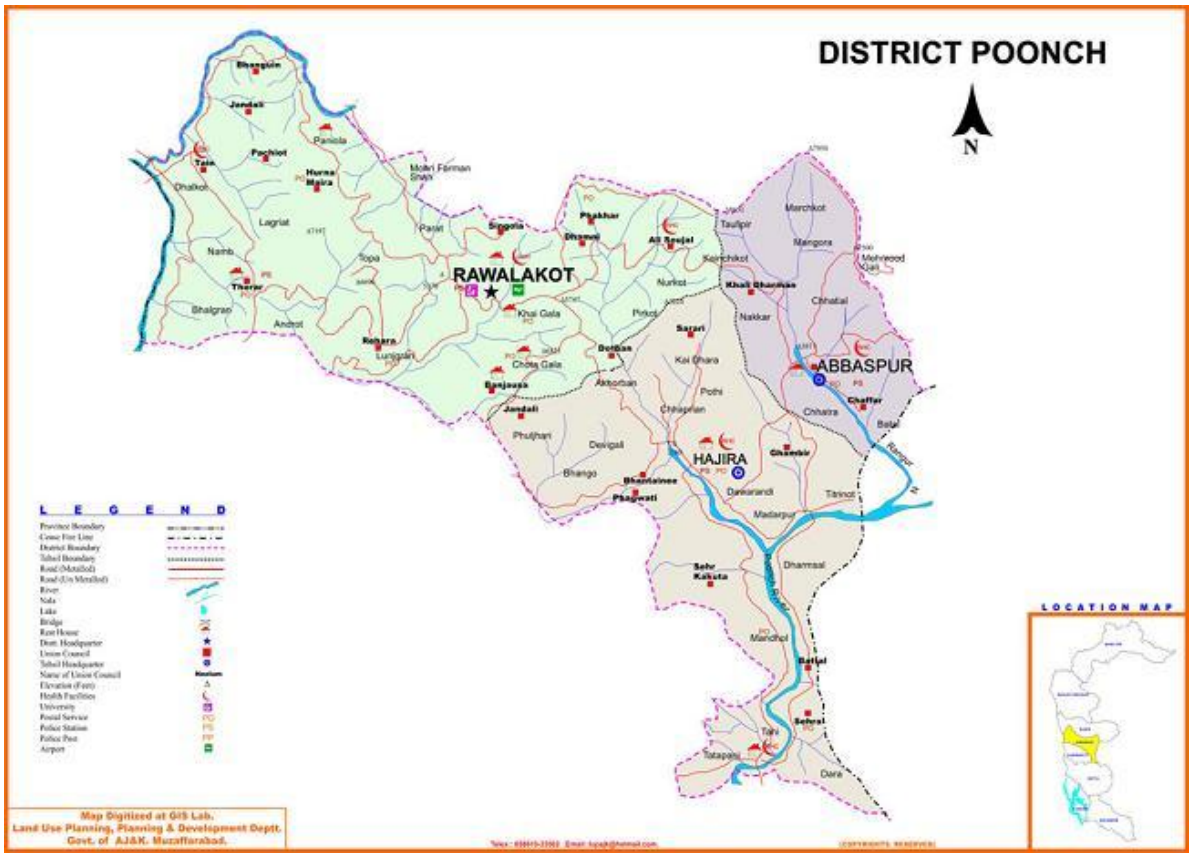

Figure 1: The map of the study area.

RESULTS AND DISCUSSION

A total of 15 species belonging to 15 genera (Table 1), 13 families (Figure 2) and 6 orders (Figure 3) were documented from the study area. "Shannon-Wiener diversity Index" was noted as 1.07, richness index was 0.91 and Evenness index was 5.31 in the study area (Table 1).

During present study noted that Indian crested porcupine (*Hystrix indica*) was found as the most abundant species of the study area with relative abundance of 0.14 (Table 1). Previously it was also reported from the Balochistan, Indus plain,

Himalayan forest, Lasbela, Kirthar, Shogran, Chitral, Murree hills, Hazara, Swat, head Khanki, head Qadirabad, Chotiari Reservoir, head Marala, Thal desert, Mahban and Malka valley, Azad Jammu and Kashmir and Punjab (Roberts, 1997a; Maan and Chaudhry, 2001; Rais *et al.*, 2011; Altaf *et al.*, 2014a; Khan *et al.*, 2015; Iqbal *et al.*, 2018).

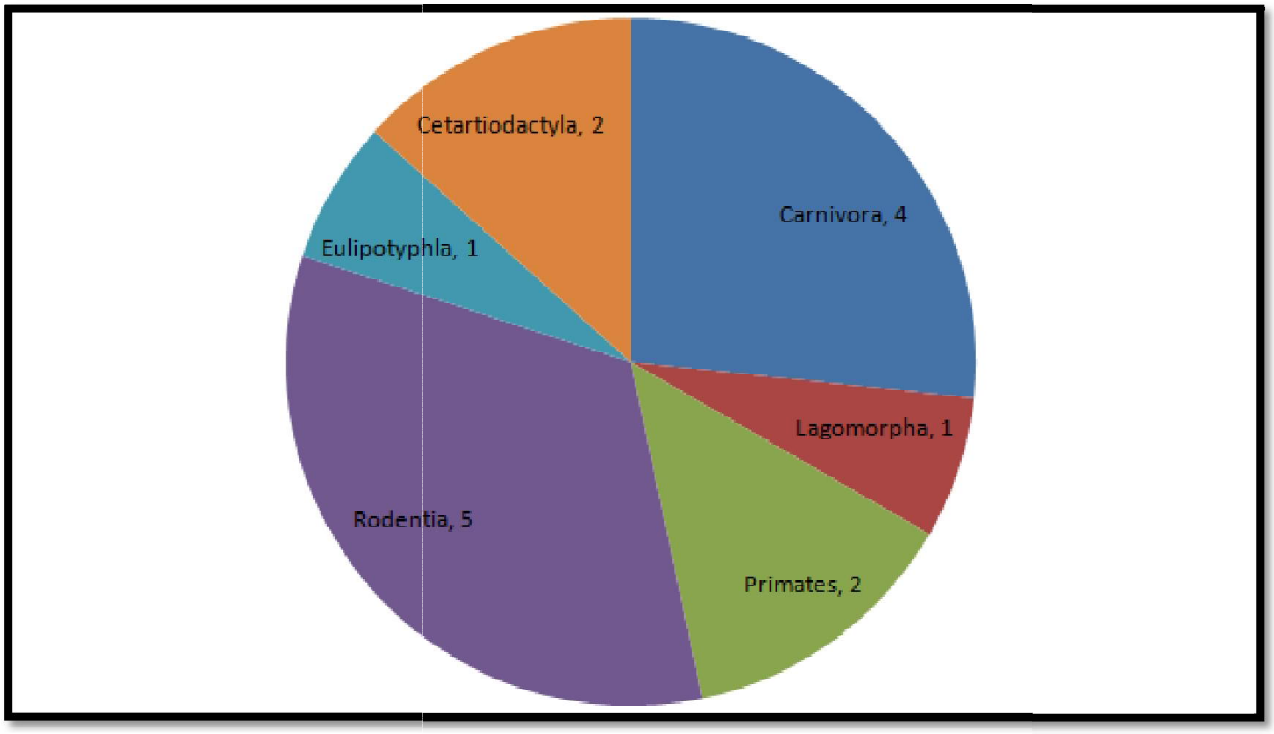

Figure 2: Orders of mammalian species recorded in study area.

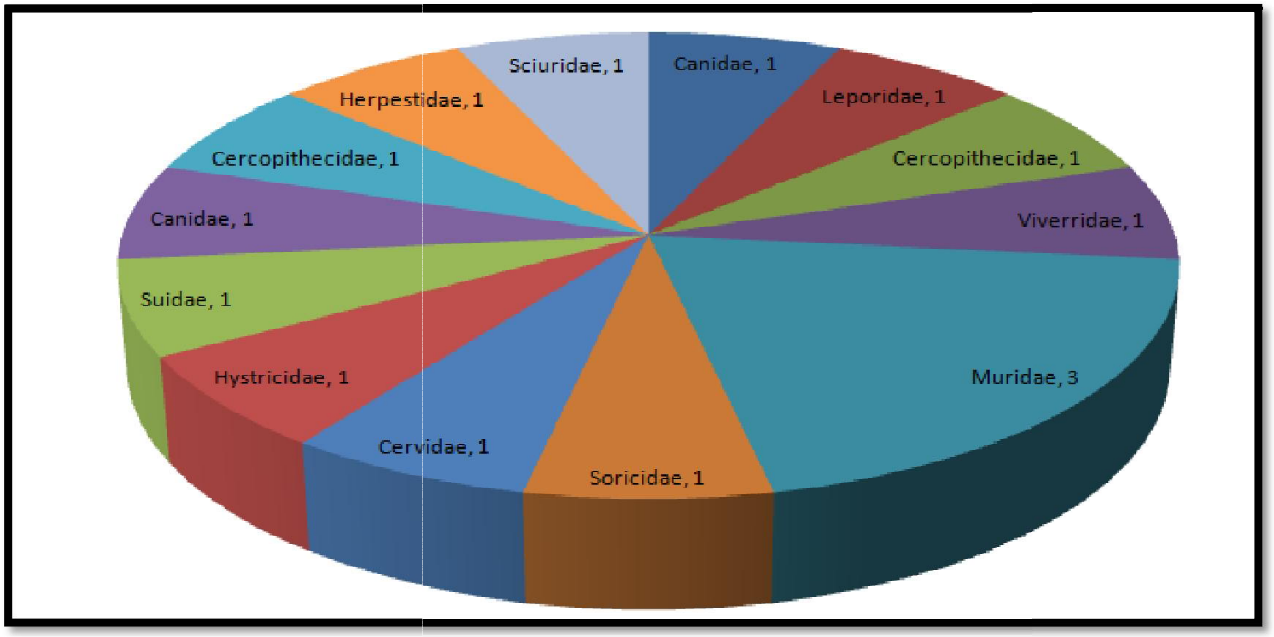

Figure 3: Families of mammalian species recorded in study area.

Asiatic Jackal (*Canis aureus*)was observed (relative abundance, 0.12) from study area during present study, it was also reported from the Hazara, Murree hills, Quetta, Islamabad, head Khanki, head Qadirabad, Balochistan, Chotiari Reservoir, Thal desert, Lasbbela and Azad Jammu and Kashmir (Roberts, 1997a; Ghalib *et al.*, 2007; Rais *et al.*, 2011; Altaf *et al.*, 2014a; Khan *et al.*, 2015; Faiz and Fakhar-i-Abass, 2016; Iqbal *et al.*, 2018; Younus *et al.*, 2018).

Present census revealed that Himalayan Palm civet (*Paguma larvata*) was reported from the study area with relative abundance was 0.01. Previously it was reported from Rawapindi, Sergoda, Multan, Dera, Ghazikhan, Hazara, Mansera and Margalla hills (Roberts, 1997a; Awan *et al.*, 2004).

Himalayan Wood Mouse (*Apodemus rusiges*) and Indian Barking Deer (*Muntiacus muntjak*) were documented as the lowest abundant species of the study area and relative abundance of both species were 0.001 in study area.

House Mouse (*Mus musculus*)was sighted in study area (relative abundance, 0.11) during present study, researchers (Roberts, 1997a; Rais *et al.*, 2011; Altaf *et al.*, 2012; Altaf *et al.*, 2014a; Faiz *et al.*, 2015; Faiz and Fakhar-i-Abass, 2016; Iqbal *et al.*, 2018; Manzoor *et al.*, 2018) also documented from the areas of Balochistan province, Hazara, Faisalabad Gujranwala, head Khanki, head Qadirabad, head Marala, Chotiari reservoir, Thal desert, Pothwar and Azad Jammu and Kashmir.

House Rat (*Rattus rattus*) was observed from study area (relative abundance, 0.13) during present study, and previously documented from Balochistan, Sindh, Bahawalpur, KPK, Murree, Dera Ghazi Khan, Gujranwala, Head Khanki, Head Qadirabad, Pothwar and Azad Jammu and Kashmir.(Roberts, 1997a; Altaf *et al.*, 2012; Altaf *et al.*, 2014a; Faiz *et al.*, 2015; Faiz and Fakhar-i-Abass, 2016; Iqbal *et al.*, 2018).

House Shrew (*Suncus murinus*) and Indian Wild Boar (*Sus scrofa*)were documented from study area with relative abundance of 0.08 in study area. Previously House Shrew was also recorded from Karachi area, Punjab, Mardan, Swat, Dir, Hazarat, Abbottabad, Balakot, Kaghan valley, Multan, Chotiari Reservoir and Thal desert (Roberts, 1997a; Awan *et al.*, 2004; Rais *et al.*, 2011; Altaf *et al.*, 2014a; Khan *et al.*, 2015). Researchers (Roberts, 1997a; Rais *et al.*, 2011; Altaf *et al.*, 2014a) reported Indian Wild Boar from the Margalla hills, Murree foothills, Peshawar, Mardan, Dera Ismail Khan, Balochistan, Chitral valley, Punjab, Mahban and Malka valley.

Red Fox (*Vulpes vulpes*) was seen in study area (relative abundance, 0.05) during present study. Previously this was also recorded from Khunjrab, Mahaban, Malka Valley and Bagh (Qureshi *et al.*, 2011; Azad *et al.*, 2018; Iqbal *et al.*, 2018).

Rhesus Macaque (*Macaca mulatta*)was seen in study area (relative abundance, 0.06) during present study, this was also observed from the

Himalayan temperate forest, Chitral, Swat, Kohistan and Hazara district (Roberts, 1997a).

Cape hare (*Lepus capensis*) and grey langur (*Semnopithecus entellus*) were reported from the study area and relative abundance of both species were as 0.07 (Table 1).

Small Indian Mongoose (*Herpestes javanicus*) species was seen in study area (relative abundance, 0.03) during present study, and also documented from Indus River, Central and Northern Sindh, Tharparkar, Cholistan, South western part of Punjab, Murree foothills, Balochistan, Chotiari Reservoir, Thal desert, Mahban and Malka valley (Roberts, 1997a; Ghalib *et al.*, 2007; Rais *et al.*, 2011; Khan *et al.*, 2015; Iqbal *et al.*, 2018).

Small Kashmir Flying Squirrel (*Hylopetes fimbriatus*) species was seen in study area (relative abundance, 0.04) during present study. Previously it was also documented from Hazara, Swat, Nathiagali, Kaghan Valley, Murree Hills, Azad Jammu and Kashmir, Kohistan and some areas of Gilgit (Molur, 2003).

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Table 1: Diversity of mammals in study area.

Sr.	Common name, Scientific name (Species authority), Order, Family	Status (IUCN)	R.A.	LogPi	PiLogPi
1	Asiatic Jackal, *Canis aureus* (Linnaeus, 1758), Carnivora, Canidae	LC	0.12	-0.93	-0.11
2	Cape hare, *Lepus capensis* (Linnaeus, 1758), Lagomorpha, Leporidae	LC	0.07	-1.16	-0.08
3	Grey langur, *Semnopithecus entellus* (Dufresne, 1797), Primates, Cercopithecidae	LC	0.07	-1.16	-0.08
4	Himalayan Palm civet, *Paguma larvata* (Smith, 1827), Carnivora, Viverridae	LC	0.01	-2.16	-0.02
5	Himalayan Wood Mouse, *Apodemus rusiges* (Miller, 1913), Rodentia, Muridae	LC	0.001	-2.33	-0.01
6	House Mouse, *Mus musculus* (Linnaeus, 1758), Rodentia, Muridae	LC	0.11	-0.96	-0.10
7	House Rat, *Rattus rattus* (Linnaeus, 1758), Rodentia, Muridae	LC	0.13	-0.88	-0.12
8	House Shrew, *Suncus murinus* (Linnaeus, 1766), Eulipotyphla, Soricidae	LC	0.08	-1.10	-0.09
9	Indian Barking Deer, *Muntiacus muntjak* (Zimmermann, 1780), Cetartiodactyla, Cervidae	LC	0.001	-2.33	-0.01
10	Indian Crested Porcupine, *Hystrix indica* (Kerr, 1792), Rodentia, Hystricidae	LC	0.14	-0.86	-0.12

11	Indian Wild Boar, *Sus scrofa* (Linnaeus, 1758), Cetartiodactyla, Suidae	LC	0.08	-1.12	-0.09
12	Red Fox, *Vulpes vulpes* (Linnaeus, 1758), Carnivora, Canidae	LC	0.05	-1.27	-0.07
13	Rhesus Macaque, *Macaca mulatta* (Zimmermann, 1780), Primates, Cercopithecidae	LC	0.06	-1.20	-0.08
14	Small Indian Mongoose, *Herpestes javanicus* (É. Geoffroy Saint-Hilaire, 1818), Carnivora, Herpestidae	LC	0.03	-1.49	-0.05
15	Small Kashmir Flying Squirrel, *Hylopetes fimbriatus* (Gray, 1837), Rodentia, Sciuridae	LC	0.04	-1.38	-0.06
Shannon-wiener index					1.07
Evenness index					0.91
Richness index					5.31

Notes: RA (relative abundance), LC (least concerned)

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Authors' contributions: Rasheed has designed project and collected data, Bashir has written this article and Jaddon critically analysis this article and approved as final.