

Studies on the Mammalian Diversity of Lahaul valley, District Lahaul and Spiti, Himachal Pradesh, India with their Conservation status

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ABSTRACT: The studies on the Mammalian diversity in and around Lahaul Valley, District Lahaul and Spiti, Himachal Pradesh has been conducted during 2010-19. About 23 species belongs to 13 families under 06 orders of class Mammalia has been recorded from the different localities of study area and information on their conservation status is also provided. The order Carnivora is the most dominant order having 10 species, followed by Artiodactyla 05 species, Rodentia 03 species, Chiroptera and Primates each having 02 species and least by Lagomorpha having 01 species. In terms of mammals species recorded in different localities of Lahaul valley, the maximum number of 15 species were recorded from Tindi, followed by 14 species from Udaipur, 07 species from Pattan, 06 species from Miyar Valley, 04 species each from Keylong and Kardang, 03 species from Suraj Tal and 02 species each from Sarchu and Jispa. In these 23 recorded species as per conservation status, 02 species are listed as Endangered, 02 species Vulnerable, 03 species Near Threatened, 15 species Least Concern and 01 species Not Evaluated categories in IUCN Red List of Threatened Species; in Indian Wildlife (Protection) Act, 1972, 09 species are listed in Schedule I, 08 species in Schedule II, 01 species in Schedule III, 01 species in Schedule IV, 02 species in Schedule V and 02 species not listed; and in CITES 08 species are listed in Appendix I, 02 species in Appendix II, 06 species in Appendix III and 07 species not listed. The sustainable use of natural resources, continuous long term monitoring research projects and planned strategies are necessary for conservation of species of fauna in and around Lahaul Valley, District Lahaul and Spiti, Himachal Pradesh with the help of mammal group experts, local inhabitants, different Governments organizations, NGO's and enforcement agencies.

Keywords: Mammal, diversity, Lahaul Valley, Himachal Pradesh, India.

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INTRODUCTION

The Lahaul valley is part of cold desert area in the Trans-Himalaya Biogeographic zone in District Lahaul and Spiti of Himachal Pradesh, India. The river Chandarbhaga or Chenab is flowing in the Lahaul valley and it is covered all around with barren hills, grasslands, dry temperate forest, sub-alpine forest and snow-covered mountains (Mehta & Julka, 2001; Raman, 2016). The review of literature had revealed that no consolidated studies conducted on Mammals of Lahaul valley except meagre information provided by some workers (Prater, 1971; Mehta & Julka, 2001; Alfred *et al.*, 2006a & b; Sharma *et al.*, 2014, 2015a & b). Therefore, the present studies has made a modest attempt to explore the mammalian diversity of Lahaul Valley and also provided information on their conservation status.

MATERIAL AND METHODS

The Lahaul valley is having four entry routes *i.e.* from Kullu-Manali side Rohtang pass, Spiti side Kunzum pass, Chamba side Kugti pass, and from Ladakh side Baralacha pass and extends in North 32°-8' and 32°-59' latitude and east 76°-30' and 77°-50' longitude (Raman, 2016). The study area Lahaul valley is very vast and to record the Mammalian diversity, the nine different localities were selected in four Forest Ranges of Lahaul Forest Division *i.e.* Sarchu, Suraj Tal, Jispa, Keylong, Kardang, Pattan, Udaipur, Tindi and Miyar Valley. The extensive studies were conducted in the different period of each year in the nine different selected localities of Lahaul Valley to explore the diversity of mammalian species during July, 2010- May, 2019.

The mammalian species were recorded in and around the study area on foot and vehicles were used to reach different selected localities of the Lahaul Valley and most of the Mammals were observed by direct sighting and taking photographs in the field. The Nikon Binocular (10mm×25mm) and Nikon D7000 DSLR Camera with Telelens attachment 80-400mm was used to record the mammalian species in the field. The Camera Traps Model Spypoint, Browning and Stealthcam14.0 Megapixel trail Cameras were also used in selected localities of Udaipur, Tindi and Miyar valley to record the movement of mammals species from 2016-19. The presence of some mammals species is also ascertained on the basis of interview with forest staff, guides and villagers residing around reported locality, from earlier literature and record of forest department. The identification of mammalian species were also done by studying pugmark, faecal matter *etc.* on the forest track and near water body.

RESULTS AND DISCUSSION

About 23 species belongs to 13 families under 06 orders of class Mammalia has been recorded from the different localities of study area and information on their conservation status is also provided (**Table 1**). The glimpse of Mammals species recorded from the different localities in the study site is provided in **Plate I and II**. The studies reveals that the order Carnivora is the most dominant order having 10 species, followed by Artiodactyla 05 species, Rodentia 03 species, Chiroptera and Primates each having 02 species and least by Lagomorpha having 01 species. In terms of mammals species recorded in different localities of Lahaul valley, the maximum number of 15 species were recorded from Tindi, followed by 14 species from Udaipur, 07 species from Pattan, 06 species from Miyar Valley, 04 species each from Keylong and Kardang, 03 species from Suraj Tal and 02 species each from Sarchu and Jispa.

Table 1: Mammals recorded from different localities of Lahaul Valley, District Lahaul and Spiti, Himachal Pradesh with their Conservation Status.

Sl. No.	Species/Sub-species (Scientific and Common Names)	Conservation Status			Mammals recorded in and around different localities of Lahaul Valley								
		IUCN (RLTS)	IW(P)Act (Sch.)	CITES (App.)	Sarchu	Suraj Tal	Jispa	Keylong	Kardang	Pattan	Udaipur	Tindi	Miyar Valley
I. Order: PRIMATES													
1. Family: Cercopithecidae													
1.	<i>Semnopithecus ajax</i> Pocock, 1928, Himalayan Gray Langur or Kashmir Gray Langur	EN	II	I	-	-	-	-	-	-	+	+	-
2.	<i>Macaca mulatta</i> (Zimmermann, 1780), Rhesus Macaque	LC	II	II	-	-	-	-	-	-	+	+	+
	II. Order: LAGOMORPHA												
	2. Family: Ochotonidae												
3.	<i>Ochotona roylei</i> (Ogilbey, 1839), Royle's Pika	LC	IV	-	-	-	-	-	-	+	+	+	+

Sl. No.	Species/Sub-species (Scientific and Common Names)	Conservation Status			Mammals recorded in and around different localities of Lahaul Valley								
		IUCN (RLTS)	IW(P)Act (Sch.)	CITES (App.)	Sarchu	Suraj Tal	Jispa	Keylong	Kardang	Pattan	Udaipur	Tindi	Miyar Valley
	III. Order: CARNIVORA												
	3. Family: Felidae												
4.	<i>Panthera uncia</i> (Schreber, 1775), Snow Leopard	VU	I	I	-	+	-	+	+	+	+	+	+
5.	<i>Prionailurus bengalensis</i> (Kerr, 1792), Leopard Cat	LC	I	I	-	-	-	-	-	-	+	+	-
	4. Family: Canidae												
6.	<i>Canis lupus chanco</i> Gray, 1863, Tibetan Wolf	LC	I	-	-	-	-	-	+	-	+	-	-
7.	<i>Vulpes vulpes montana</i> (Pearson, 1836), Himalayan Red Fox	LC	II	III	-	-	-	+	+	+	+	+	+
	5. Family: Viverridae												
8.	<i>Paguma larvata</i> (C.E.H. Smith, 1827), Himalayan Palm Civet or Masked Palm Civet	LC	II	III	-	-	-	-	-	-	-	-	+
	6. Family: Ursidae												
9.	<i>Ursus arctos abellinus</i> Horsfield, 1826, Himalayan Brown Bear	LC	I	I	-	-	-	+	-	+	+	+	-
10.	<i>Ursus thibetanus laniger</i> Pocock, 1932, Himalayan Black Bear	VU	II	I	-	-	-	-	-	-	-	+	-
	7. Family: Mustelidae												
11.	<i>Martes flavigula</i> (Boddaert, 1785), Yellow-throated Marten	LC	II	III	-	-	-	+	-	+	+	+	-
12.	<i>Mustela altaica</i> Pallas, 1811, Mountain Weasel or Altai Weasel	NT	II	III	-	-	-	-	-	+	+	-	-
13.	<i>Mustela ermine ferghanae</i> (Thomas, 1895), Stoat or Ermine	NE	I	III	-	+	+	-	-	-	-	-	-

Sl. No.	Species/Sub-species (Scientific and Common Names)	Conservation Status			Mammals recorded in and around different localities of Lahaul Valley								
		IUCN (RLTS)	IW(P)Act (Sch.)	CITES (App.)	Sarchu	Suraj Tal	Jispa	Keylong	Kardang	Pattan	Udaipur	Tindi	Miyar Valley
IV. Order: ARTIODACTYLA													
8. Family: Moschidae													
14.	<i>Moschus leucogaster</i> Hodgson, 1839, White-bellied Musk Deer or Himalayan Musk Deer	EN	I	I	-	-	-	-	-	-	+	+	-
9. Family: Bovidae													
15.	<i>Capra sibirica</i> Pallas, 1776, Siberian Ibex or Himalayan Ibex	LC	I	I	-	-	-	-	-	-	+	+	+
16.	<i>Hemitragus jemlahicus</i> (Smith, 1826), Himalayan Tahr	NT	I	-	-	-	-	-	-	-	-	+	-
17.	<i>Naemorhedus goral</i> (Hardwicke, 1825), Himalayan Goral	NT	III	I	-	-	-	-	-	-	-	+	-
18.	<i>Pseudois nayaur</i> Hodgson, 1833, Bharal or Blue Sheep	LC	I	-	+	-	-	-	-	-	-	-	-
V. Order: RODENTIA													
10. Family: Sciuridae													
19.	<i>Marmota himalayana</i> (Hodgson, 1841), Himalayan Marmot	LC	II	III	+	-	-	-	+	-	-	-	-
20.	<i>Eoglaucomys fimbriatus</i> (Gray, 1837), Kashmir Flying Squirrel	LC	-	-	-	-	-	-	-	+	+	+	-
11. Family: Muridae													
21.	<i>Niviventer niviventer</i> (Hodgson, 1836), Himalayan White-bellied Rat	LC	V	-	-	+	-	-	-	-	-	-	-
VI. Order: CHIROPTERA													
12. Family: Vespertilionidae													
22.	<i>Plecotus auritus</i> (Linnaeus, 1758), Brown Long-eared Bat	LC	-	-	-	-	-	-	-	-	+	+	-
13. Family: Pteropodidae													
23.	<i>Pteropus medius</i> (Temminck, 1825), Indian Flying Fox	LC	V	II	-	-	+	-	-	-	-	-	-
Total of Mammal species recorded in different localities of Lahaul Valley					02	03	02	04	04	07	14	15	06

Where + = presence of species; - = absence of Mammal species in the different localities of Lahaul Valley, District Lahaul and Spiti, H.P.

IUCN Red List of Threatened Species categories: EN- Endangered; VU- Vulnerable; NT- Near Threatened; LC- Least Concern; NE- Not Evaluated.

Indian Wildlife (Protection) Act [IW(P)Act], 1972 Schedules: I, II, III, IV, V.

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) Appendixes: I, II, III.

In these 23 recorded species as per conservation status, 02 species are listed as Endangered, 02 species Vulnerable, 03 species Near Threatened, 15 species Least Concern and 01 species Not Evaluated categories in IUCN Red List of Threatened Species; in Indian Wildlife (Protection) Act, 1972, 09 species are listed in Schedule I, 08 species in

Schedule II, 01 species in Schedule III, 01 species in Schedule IV, 02 species in Schedule V and 02 species not listed; and in CITES 08 species are listed in Appendix I, 02 species in Appendix II, 06 species in Appendix III and 07 species not listed (Anonymous, 2010; IUCN, 2019; CITES, 2019).



Plate I. 1. *Semnopithecus ajax* Pocock, 1928, Himalayan Gray Langur; 2. *Macaca mulatta* (Zimmermann, 1780), Rhesus Macaque; 3. *Ochotona roylei* (Ogilby, 1839), Royle's Pika; 4. *Panthera uncia* (Schreber, 1775), Snow Leopard; 5. *Prionailurus bengalensis* (Kerr, 1792), Leopard Cat; 6. *Canis lupus chanco* Gray, 1863, Tibetan Wolf; 7. *Vulpes vulpes montana* (Pearson, 1836), Himalayan Red Fox; 8. *Paguma larvata* (C.E.H. Smith, 1827), Himalayan Palm Civet; 9. *Ursus arctos abellinus* Horsfield, 1826, Himalayan Brown Bear; 10. *Ursus thibetanus laniger* Pocock, 1932, Himalayan Black Bear; 11. *Martes flavigula* (Boddaert, 1785), Yellow-throated Marten; 12. *Mustela altaica* Pallas, 1811, Mountain Weasel.



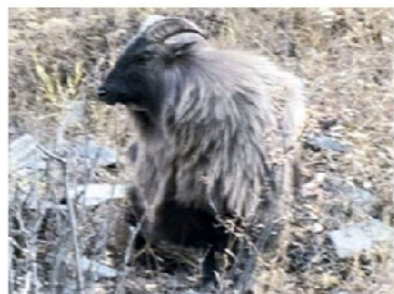
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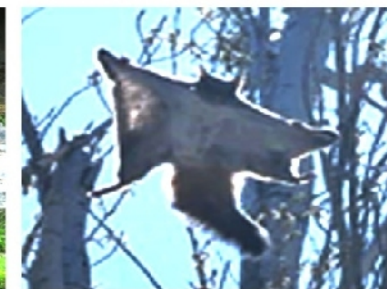
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Plate II. 13. *Mustela erminea ferghanae* (Thomas, 1895), Stoat or Ermine; 14. *Moschus leucogaster* Hodgson, 1839, Himalayan Musk Deer; 15. *Capra siberica* (Pallas, 1776), Siberian Ibex or Himalayan Ibex; 16. *Hemitragus jemlahicus* (C.H. Smith, 1826), Himalayan Tahr; 17. *Naemorhedus goral* (Hardwicke, 1825), Himalayan Goral; 18. *Pseudois nayaur* Hodgson, 1833, Bharal or Blue Sheep; 19a & 19b. *Marmota himalayana* (Hodgson, 1841) Himalayan Marmot; 20. *Eoglaucomys fimbriatus* (Gray, 1837), Kashmir Flying Squirrel; 21. *Niviventer niviventer* (Hodgson, 1836), Himalayan White-bellied Rat; 22. *Plecotus auritus* (Linnaeus, 1758), Brown Long-eared Bat; 23. *Pteropus medius* (Temminck, 1825), Indian Flying Fox.

The records of flagship, threatened and important mammals species such as Snow Leopard, Himalayan Musk Deer, Himalayan Brown Bear, Himalayan Black Bear, Himalayan Tahr, Himalayan Ibex, Himalayan Gray Langur, Tibetan Wolf *etc.* is a good sign that their habitat is least disturbed and needs systematic conservation strategies for their protection in the Lahaul valley.

Due to tough landscape terrain and harsh environmental conditions, the very low human populations residing in the different parts of Lahaul valley, they had made a balance with nature for their survival, utilizing natural resources in sustainable way and also growing vegetation by developing agricultural fields in Jispa, Keylong, Pattan and Udaipur *etc.* The sustainable use of natural resources, continuous long term monitoring research projects and planned strategies are necessary for conservation of species of fauna in Lahaul Valley, District Lahaul and Spiti, Himachal Pradesh with the help of group experts, local populations, different Government organizations, NGO's and enforcement agencies. Further the more exploration of study area Lahaul Valley during different season of the year and tough climatic conditions will results in getting more information on status of Biodiversity and planning strategies for their conservation. At present none of the area is declared Protected Area in Lahaul Valley by Government of India, therefore the efforts are required to declare the part of selected areas of Pattan, Udaipur, Tindi, Miyar under Protected Area network of India.

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