

# SPECIES DIVERSITY ASSESSMENT OF MAMMAL IN DOIMUKH REGION OF ARUNACHAL PRADESH

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## ABSTRACT

The present work is to investigate and record the mammal diversity in Doimukh area of Arunachal Pradesh. A total of 30 species of mammals belonging to 18 families under 9 orders were recorded during the study period between 2013 and 2014. The survey has been carried out following the line transect and other secondary methods. Of the total recorded, Carnivora and Rodentia were the most dominant order with 9 species each, followed by Artiodactyla with 5 species, Primates with 2 species, Proboscidea, Eulipotyphla, Lagomorpha, Pholidota and Chiroptera with 1 species each. Three species of squirrel namely Hoary-bellied Himalayan squirrel, Himalayan striped squirrel and Pallas's squirrel were the frequently observed mammals during the survey. From the recorded list, 8 species were found to be threatened species under categories per IUCN Redlist, 2014. These include 5 vulnerable species (*Bos frontalis*, *Ursus thibetanus*, *Rusa unicolor*, *Pardofelis marmorata* and *Nycticebus bengalensis*) and 3 endangered species (*Elephas maximus*, *Cuon alpinus* and *Manis pentadactyla*). 2 large-sized, 1 medium-sized and 6 small-sized carnivores were recorded during the survey. The finding will provide baseline information for further systematic studies on mammals in the area.

## INTRODUCTION

Mammals are homeothermic, hair possessing vertebrates that are found in almost every ecosystem (viz., terrestrial, aquatic and arboreal) and are distributed all over the world. The mammals have ecological as well as economical importance, which makes the study on mammals diversity a crucial one. Mammal diversity study can provide information on the health of the ecosystem, vegetation structure and trophic structure. Arunachal Pradesh has rich faunal diversity (Sen and Mukhopadhyay, 1999; Datta *et al.*, 2003; Mishra *et al.*, 2005; Mishra *et al.*, 2006; Mishra and Datta, 2007; Mize and Tsomu, 2012; Mize *et al.*, 2014) with 46 amphibians (Sen, 2004), 897 birds (Lepage, 2017) and 206 mammals (Choudhury, 2003). Recent discovery of Arunachal macaque *Macaca munzala* (Sinha *et al.*, 2005) and Black pika *Ochotona nigritya* by the WWF-India team working in West Kameng district add more to the mammal diversity, making it to total of 208. The mammals, in particular include the herbivore, primate, and carnivore species (Mishra *et al.*, 2004; Choudhury, 2003). The Arunachal macaque *Macaca munzala* (Sinha *et al.*, 2005) and Namdapha flying squirrel *Biswamoyopterus biswasi* (Saha, 1981) are two endemic mammal species reported from the state. Availability of scanty literatures on mammals from the state indicates that very less work has been done and less region has been explored. With a proper and elaborative study on diversity from the state, one can easily assess the present diversity, population status etc., of the mammals along with any new discovery. Further, Ceballos *et al.*, 2005 and Schipper *et al.*, 2008 reported that 25% of total terrestrial mammals diversity comes under threatened taxa, for which conservative measures are required.

The present study was undertaken to find out the mammal diversity and to establish a baseline data on mammal diversity in Doimukh region of Arunachal Pradesh since no earlier record on mammal diversity from the said region is available. The study was also to determine those mammals that are commonly observed during the survey.

## MATERIALS AND METHODS

### Study area

The survey for present study has been carried out in Doimukh, located at 27° 09' 0" North, 93° 45' 0" East with surface elevation ranging from 200-300 m asl. Doimukh is one of the administrative circles of Papumpare district (Fig. 1) of Arunachal Pradesh with 26 villages. The landscape of Doimukh is intersected by few rivers (with one main stream, River Dikrong), surrounded by small hills, highlands and paddy fields, and the vegetation cover with semi-evergreen forests and mixed bamboo forests. The study area receives heavy rainfall during the month of July-August and the annual average rainfall lies in between 4000-5000mm. Throughout the year, the temperature varies with about 8°C in winter to about 35°C in summer.

### Survey methods

Modified line transects method used by Burnham *et al.* (1980) and Bibby *et al.* (1992) were followed to survey the mammals. Transects were placed along the main trails and forest trails used by the local people in various places of the study area. The occurrence of mammals were observed on both the side along the transects up to 50 m away from the standing

pointwith direct naked eye and beyond that 20 X 40 DPSI Olympus binocular was used. The survey on transects was started from early 0600 hour to 1600 hour with 1 hour break in between (*i.e.*, from 1300 hour to 1400 hour) for taking rest. The surveys were done thrice a week. Besides observing mammals within the transect range, additional data from accidental encounter, dung, foot marks and calls were also used to record the presence of mammals. Secondary information were also obtained on mammal by interviews with the local community.

**Identification and classification**

Mammals observed were identified using the field guide, “Field Guide to Indian Mammals” (Menon, 2009). The classification and the IUCN status of recorded mammals were made following Wilson and Reader, 2005 and IUCN Red List Data, 2014, respectively.

**RESULTS**

The survey was done during 2013-2014 and it resulted in record of 30 species of mammals which belong to 18 families of 9 orders as shown in Table 1.

From the recorded list, Carnivora and Rodentia, shared the position of dominant order with 9 species each (Table 2, Fig. 2). They are followed by Artiodactyla with 5 species, Primates with 2 species and the rest 5 orders (Proboscidea, Pholidota, Lagomorpha, Eulipotyphla, Chiroptera) with 1 species each. The dominant families were Sciuridae and Muridae with 4 species each. The three species of Squirrel namely, Hoary-bellied himalayan squirrel, Himalayan striped squirrel and Pallas’s squirrel (Family: Sciuridae) all belonging to order Rodentia were observed frequently during the survey and of these 3, Himalayan striped squirrel was the most prominent one. They are followed by Mithun (Family: Bovidae) and other rodents (Family: Muridae). Of the thirty species recorded, 5 species are vulnerable (VU) and 3 species are endangered (EN) species as per IUCN Redlist, 2014. Fortunately, no critically endangered (CR) species were recorded during the study. The topmost feeders on most of the food chain are the carnivores. The survey also resulted in record of 2 large-sized carnivores

(≥ 60 kg) *Ursus thibetanus* and *Helarctos malayanus*, 1 medium-sized carnivore (20≤50 kg) *Cuon alpinus* and 6 small-sized carnivores (≤ 10 kg) *Vulpes bengalensis*, *Pardofelis marmorata*, *Prionailurus bengalensis*, *Viverricula indica*, *Paradoxurus hermaphroditus* and *Herpestes edwardsii*.

**DISCUSSION**

There is no doubt that Arunachal Pradesh is one of the richest faunal diversity regions in India. Particularly in case of mammals, 208 species are reported from the state till date, which is the highest diversity of Indian state. Still, many regions are yet to be fully explored for mammal diversity. There is still chance of new discovery during regional mammal diversity study.

During the survey total 30 species of mammals belonging to 18 families and 9 orders were recorded with no record of new species. Also, presence of 2 large-sized, 1 medium-sized and 6 small-sized carnivores (topmost feeder) were confirmed in the region. Most of the medium-sized and large-sized mammals were observed occasionally in contrast to small-sized mammals. This indicates that more the visibility of any mammal is, greater the risk of being hunted or poached. Further, the mammal diversity has negative relationship with anthropogenic activities such as deforestation and hunting (Mishra *et al.*, 2004; Aiyadurai *et al.*, 2011; Selvan *et al.*, 2013 and Solanki and Chutia, 2013). With the increase in anthropogenic activities, there will be drop in mammals diversity as well as numbers. Many developmental activities has resulted into destruction of their natural home and thereby, limiting their distribution.

From the recorded list, 8 species were found to be threatened species. These are *Bos frontalis*, *Ursus thibetanus*, *Rusa unicorn*, *Pardofelis marmorata* and *Nycticebus bengalensis* (Vulnerable species), *Elephas maximus*, *Cuon alpinus* and *Manis pentadactyla* (Endangered species). This shows there is a need for conservative initiative and management for such threatened species to this region. An elaborative study on the distribution pattern of the species will pinpoint the threats and requirements of such or any threatened species. And such

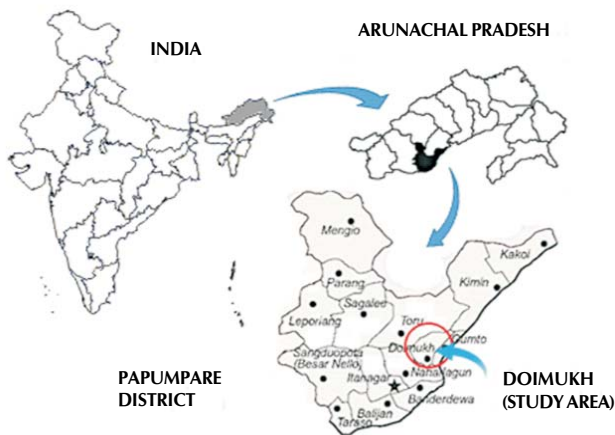


Figure 1: Map showing the survey area

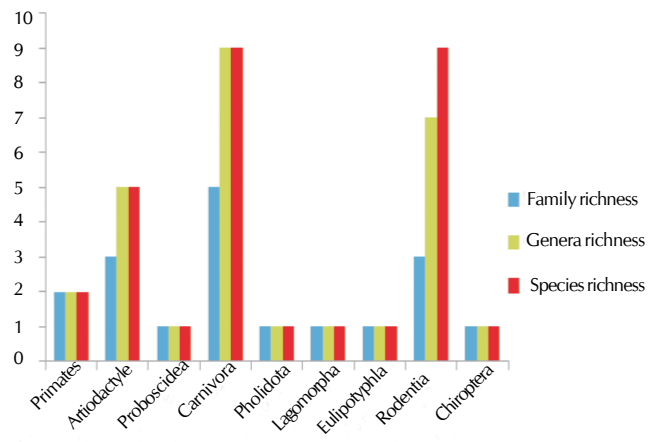


Figure 2 : Species, genera and family richness per order

**Table 1 : List of mammals recorded from Doimukh, Arunachal Pradesh**

Sl. no.	Species (Common name)	Scientific name	IUCN status	Author
		Order 1: Primates		
1	Family 1: Lorissidae Slow loris	<i>Nycticebus bengalensis</i>	Vulnerable	Lacepede, 1800
2	Family 2: Cercopithecidae Rhesus macaque	<i>Macaca mullata</i> Order 2: Artiodactyla	Least Concern	Zimmermann, 1780
3*	Family 3: Cervidae Sambar	<i>Rusa unicolor</i>	Vulnerable	Kerr, 1792
4	Indian muntjac	<i>Muntiacus muntjac</i> ,	Least Concern	Zimmermann, 1780
5*	Family 4: Bovidae Goral	<i>Naemorhedus goral</i>	Near Threatened	Hardwicke, 1825
6	Mithun	<i>Bos frontalis</i>	Vulnerable	Lambert, 1804
7	Family 5: Suidae Wild pig	<i>Sus scrofa</i> Order 3: Proboscidea	Least Concern	Linnaeus, 1758
8*	Family 6: Elephantidae Asian elephant	<i>Elephas maximus</i> Order 4: Carnivora	Endangered	C. Linnaeus, 1756
9*	Family 7: Ursidae Asiatic black bear	<i>Ursus thibetanus</i>	Vulnerable	G. Cuvier, 1823
10*	Sun bear	<i>Helarctos malayanus</i>	Data Deficient	Raffle, 1822
11*	Family 8: Canidae Wild dog	<i>Cuon alpinus</i>	Endangered	Pallas, 1811
12*	Indian fox	<i>Vulpes bengalensis</i>	Least Concern	Shaw, 1800
13*	Family 9: Felidae Marbled cat	<i>Pardofelis marmorata</i>	Vulnerable	Martin, 1836
14	Leopard cat	<i>Prionailurus bengalensis</i>	Least Concern	Kerr, 1792
15	Family 10: Viverridae Small indian civet	<i>Viverricula indica</i>	Least Concern	E. Geoffroy Saint-Hilaire, 1803
16	Common palm civet	<i>Paradoxurus hermaphroditus</i>	Least Concern	Pallas, 1777
17	Family 11: Herpestidae Grey mongoose	<i>Herpestes edwardsii</i> Order 5: Pholidota	Least Concern	E. Geoffroy Saint-Hilaire, 1818
18*	Family 12: Manidae Chinese pangolin	<i>Manis pentadactyla</i> Order 6: lagomorpha	Endangered	Linnaeus, 1758
19	Family 13: Leporidae Indian hare	<i>Lepus nigricollis</i> Order 7: Eulipotyphla	Least Concern	F. Cuvier, 1823
20*	Family 14: Talpidae White-tailed mole	<i>Parascaptor leucura</i> Order 8: Rodentia	Least Concern	Blyth, 1850
21*	Family 15: Hystricidae Himalayan crestless porcupine	<i>Hystrix brachyuran</i>	Least Concern	Linnaeus, 1758
22	Family 16: Sciuridae Hoary-bellied himalayan squirrel	<i>Callosciurus pygerythrus</i>	Least Concern	Geoffroy Saint-Hilaire, 1831
23	Himalayan striped squirrel	<i>Tamiops macclellandi</i>	Least Concern	Horsfield, 1840
24	Pallas's squirrel	<i>Callosciurus erythraeus</i>	Least Concern	Pallas, 1779
25*	Red Giant flying squirrel	<i>Petaurista petaurista</i>	Least Concern	Pallas, 1766
26	Family 17: Muridae House rats	<i>Rattus rattus</i>	Least Concern	Linnaeus, 1758
27*	Soft-furred field rats	<i>Millardia meltada</i>	Least Concern	Gray, 1837
28	House mouse	<i>Mus musculus</i>	Least Concern	Linnaeus, 1758
29	Little indian field mouse	<i>Mus booduga</i> Order 9: Chiroptera	Least Concern	Gray, 1837
30*	Family 18: Pteropodidae Indian flying fox	<i>Pteropus giganteus</i>	Least Concern	Brunnich, 1782

\* Data obtained from interviews with locals

information would help in planning and making any future *in-situ* or *ex-situ* conservation programmes.

Three species of squirrel *Callosciurus erythraeus*, *Tamiops*

*maclellandi* and *Callosciurus pygerythrus* are frequently observed during the survey. The reasons behind their abundance cannot be drawn properly at this point but can be

**Table 2: Species, genera and family richness per order**

Sl. no.	Order	Family	Genera	Species
1	Primates	2	2	2
2	Artiodactyla	3	5	5
3	Proboscidea	1	1	1
4	Carnivora	5	9	9
5	Pholidota	1	1	1
6	Lagomorpha	1	1	1
7	Eulipotyphla	1	1	1
8	Rodentia	3	7	9
9	Chiroptera	1	1	1
	Total	18	28	30

hypothesized that it is due to their herbivory food habit, small-sized body and less hunting pressure for food by the locals. Since, most of the large or medium sized mammals are conspicuous, they can be easily hunted by the tribal people for meat or other purposes.

The present study though doesn't indicate the population status that whether the recorded species are in safe or threatened status but it tells us the community composition, species diversity and distribution for the present moment in the region. Further, repeated survey at some intervals will allow us to know the population trend and threats of mammal of this region. The finding of this study is first of its kind from this region. Further, thorough and systematic investigation is required for complete documentation of mammal in all aspects like diversity, distribution, population status, role in ecosystem, etc., or for a new discovery from the region.

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