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Record of Mammalian diversity in Doimukh region of Arunachal Pradesh, India

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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 category as per IUCN, 2014. These includes 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 findings will provide baseline information for further systematic studies on mammals in the area.

Keywords: Mammal diversity, Doimukh, Arunachal Pradesh, threatened species, line transect, commonly observed mammal.

Introduction

Mammals are homoeothermic, hair possessing vertebrates that are found in almost every ecosystem (viz., terrestrial, aquatic and arboreal) and are distributed all over the world. The mammals has ecological as well as economical importance to mankind, 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[1-6] with 46 amphibians[7], 897 birds[8] and 206 mammals[9]. Recent discovery of Arunachal macaque *Macaca munzala*[10] and Black pika *Ochotona nigritia*[11] add more to the mammal diversity, making it to total of 208. The mammals, in particular includes the herbivore, primate, and carnivore species[9,12]. The Arunachal macaque *Macaca munzala*[10] and Namdapha flying squirrel *Biswamoyopterus biswasi*[13] 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 fewer regions have 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, it is reported that 25% of total terrestrial mammals diversity comes under threatened taxa, for which conservative measures are required[14,15].

The study (from March, 2013 – March, 2014) was carried out to find out the mammal diversity and to establish a baseline information on mammal diversity in Doimukh region of Arunachal Pradesh since no earlier record on mammal diversity from the said region is available. Also, the study was undertaken to determine those mammals that are commonly observed in the area.

Materials and methods

Study area: The study was carried out in Doimukh, located at 27° 09' 0" North, 93° 45' 0" East with surface elevation ranging from 200-300m asl. Doimukh is one of the administrative circles under Papumpare district of Arunachal Pradesh which comprises total of 26 villages. The landscape of Doimukh is criss-crossed 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 with annual average rainfall lying in between 4000-5000 mm. Throughout the year, the temperature varies from 8°C in winter to 35°C in summer.

Survey methods: Modified line transects method was followed to survey the mammals[16,17]. Transects were placed along the main and forest trails, in various places of the study area. The occurrence of mammals were observed on both the side along the transects upto 50m away from the standing point with direct

naked eye and beyond that 20X40 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, footmarks 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 Mammal[18]. The classification and the IUCN status of recorded mammals were made following classification system of Wilson and Reader[19] and redlist prepared by IUCN[20], respectively.

Results and discussion

The survey was done from March, 2013 – March, 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, Figure-1). 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 total species recorded, 3% were DD, 67% were LC, 10% were EN, 17% were VU and 3% were NT (Figure-2). 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)[18] *Ursus thibetanus* and *Helarctos malayanus*, 1 medium-sized carnivore (20 ≤ 50 kg)[18] *Cuon alpinus* and 6 small-sized carnivores (≤ 10 kg)[18] *Vulpes bengalensis*, *Pardofelis marmorata*, *Prionailurus bengalensis*, *Viverricula indica*, *Paradoxurus hermaphroditus* and *Herpestes edwardsii*.

Table-1: List of mammals recorded from Doimukh, Arunachal Pradesh, India.

Sl. no.	Species (Common name)	Scientific name	IUCN status	Author
		Order 1: Primates		
	Family 1: Lorisidae			
1	Slow loris	*Nycticebus bengalensis*	Vulnerable	Lacepede, 1800
	Family 2: Cercopithecidae			
2	Rhesus macaque	*Macaca mullata*	Least Concern	Zimmermann,1780
		Order 2: Artiodactyla		
	Family 3: Cervidae			
3*	Sambar	*Rusa unicolor*	Vulnerable	Kerr, 1792
4	Indian muntjac	*Muntiacus muntjac*	Least Concern	Zimmermann,1780
	Family 4: Bovidae			
5*	Goral	*Naemorhedus goral*	Near Threatened	Hardwicke, 1825
6	Mithun	*Bos frontalis*	Vulnerable	Lambert, 1804
	Family 5: Suidae			
7	Wild pig	*Sus scrofa*	Least Concern	Linnaeus, 1758
		Order 3: Proboscidea		
	Family 6: Elephantidae			
8*	Asian elephant	*Elephas maximus*	Endangered	C. Linnaus, 1756
		Order 4: Carnivora		
	Family 7: Ursidae			
9*	Asiatic black bear	*Ursus thibetanus*	Vulnerable	G. Cuvier, 1823
10*	Sun bear	*Helarctos malayanus*	Data Deficient	Raffle, 1822

Sl. no.	Species (Common name)	Scientific name	IUCN status	Author
	Family 8: Canidae			
11*	Wild dog	*Cuon alpinus*	Endangered	Pallas, 1811
12*	Indian fox	*Vulpes bengalensis*	Least Concern	Shaw, 1800
	Family 9: Felidae			
13*	Marbled cat	*Pardofelis marmorata*	Vulnerable	Martin, 1836
14	Leopard cat	*Prionailurus bengalensis*	Least Concern	Kerr, 1792
	Family 10: Viverridae			
15	Small indian civet	*Viverricula indica*	Least Concern	E. Geoffroy Saint-Hilaire, 1803
16	Common palm civet	*Paradoxurus hermaphrodites*	Least Concern	Pallas, 1777
	Family 11: Herpestidae			
17	Grey mongoose	*Herpestes edwardsii*	Least Concern	E. Geoffroy Saint-Hilaire, 1818
		Order 5: Pholidota		
	Family 12: Manidae			
18*	Chinese pangolin	*Manis pentadactyla*	Endangered	Linnaeus, 1758
		Order 6: Lagomorpha		
	Family 13: Leporidae			
19	Indian hare	*Lepus nigricollis*	Least Concern	F. Cuvier, 1823
		Order 7: Eulipotyphla		
	Family 14: Talpidae			
20*	White-tailed mole	*Parascaptor leucura*	Least Concern	Blyth, 1850
		Order 8: Rodentia		
	Family 15: Hystricidae			
21*	Himalayan crestless porcupine	*Hystrix brachyuran*	Least Concern	Linnaeus, 1758
	Family 16: Sciuridae			
22	Hoary-bellied himalayan squirrel	*Callosciurus pygerythrus*	Least Concern	Geoffroy Saint- Hillaire, 1831
23	Himalayan striped squirrel	*Tamiops macclellandi*	Least Concern	Horsefieid, 1840
24	Pallas's squirrel	*Callosciurus erythraeus*	Least Concern	Pallas, 1779
25*	Red Giant flying squirrel	*Petaurista petuarista*	Least Concern	Pallas, 1766
	Family 17: Muridae			
26	House rats	*Rattus rattus*	Least Concern	Linnaeus, 1758
27*	Soft-furred field rats	*Millardia meltada*	Least Concern	Gray, 1837
28	House mouse	*Mus musculus*	Least Concern	Linnaeus, 1758
29	Little indian field mouse	*Mus booduga*	Least Concern	Gray, 1837
		Order 9: Chiroptera		
	Family 18: Pteropodidae			
30*	Indian flying fox	*Pteropus giganteus*	Least Concern	Brunnich, 1782

*Data obtained from interviews with locals.

Table-2: Species, genera and family richness per order.

Order	Family	Genera	Species
Primates	2	2	2
Artiodactyla	3	5	5
Proboscidea	1	1	1
Carnivora	5	9	9
Pholidota	1	1	1
Lagomorpha	1	1	1
Eulipotyphla	1	1	1
Rodentia	3	7	9
Chiroptera	1	1	1
Total	18	28	30

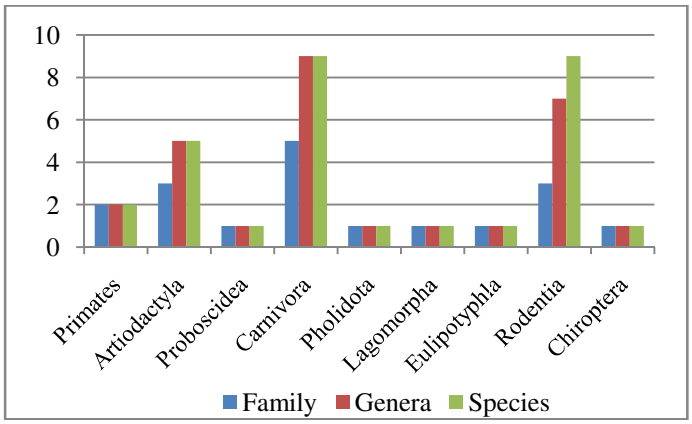

Figure-1: Species, genera and family richness per order.

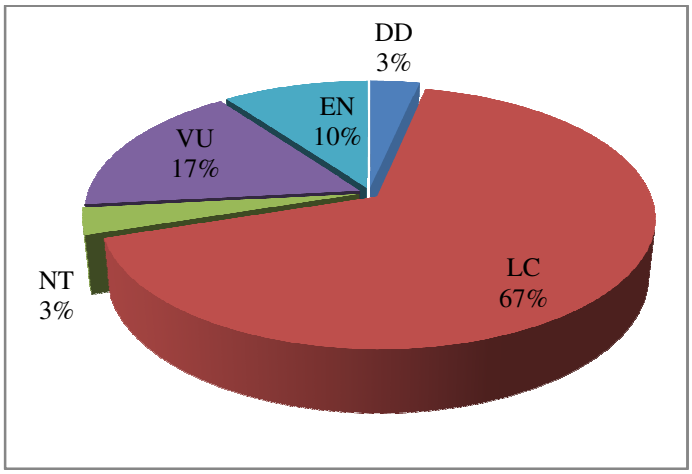

Figure-2: Percentage of species to IUCN status.

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 mammal diversity among Indian states. Still, many regions are yet to be fully explored for mammal diversity. There is still chance of new discovery along regional mammal diversity study.

Of total 30 species of mammals, 2 large-sized, 1 medium-sized and 6 small-sized carnivores (topmost feeder) were recorded. Small-sized mammals were observed frequently. The medium-sized and large-sized mammals were observed ocassionally. This indicates that more the visibility of any mammal is, greater the risk of being hunted or poached. Further, the mammal diversity showed negative relationship with anthropogenic activities such as deforestation and hunting[12,21-23]. With the increase in anthropogenic activities, there has been 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 unicolor*, *Pardofelis marmorata* and *Nycticebus bengalensis* (Vulnerable species) and *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 mammal distribution pattern will not only pinpoint the requirements of these mammals but also, let us know about their threats. And such information would help in planning and making any future *in-situ* or *ex-situ* conservation programmes.
Three species of squirrel *Callosciurus erythraeus*, *Tamiops macclellandi* and *Callosciurus pygerythrus* were frequently observed during the survey. The reasons behind their abundance cannot be drawn properly at this point but can be hypothesized that it is due to their herbivory food habit, small-sized body and less hunting pressure for food by the locals. Since, the large or medium sized mammals are conspicuous, they can be easily hunted by the tribal people for meat or other purposes.

Conclusion

At present, the survey indicates that the diversity of terrestrial mammals in Doimukh is at good condition. The present study doesn't indicate the population status that whether the recorded species are high or less in individual numbers in the area. Rather, it only tells us the community composition, species diversity and distribution of recorded terrestrial mammals. The findings can be treated as a baseline data, as no work on mammal diversity has been done previously from this region.

A 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 any new discovery from the region.

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