

Bat Species Richness and Their Distribution in Pokhara Valley of Nepal.

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Abstract

Compared with the numerous studies on Chiroptera in other countries only little information has been published on Nepalese bats. Status of bats in Nepal has not been identified and even not given more interest by the government body which is devoted to wildlife managements itself. In Nepal, out of 51 species recorded by CAMP in 2002, 2 are critically endangered, 1 endangered and 5 are vulnerable. Pokhara valley is the city of caves. Some by products reports appear on bats of As Pokhara valley out of which 11 species belongs to Least concerned (LC), 5 Not threatened (NT), 1 Critically endangered (CR), 1 Endangered (EN) which is 35.29 % of bats species of Nepal. Few roosting sites of bats have been identified in Pokhara valley. These sites are distributed in the Lekhnath municipality, Pokhara sub-metropolitan city, Bhalam VDC, Armala VDC and Hemja VDC. Among the 12 roosting sites, two are tree roosts and the remaining ten are cave roosts.

Key Words: Chiroptera, Roosts, Status, Species, Sites, Pokhara

Scientists often refer to bats as Chiropterans. Globally, the Order Chiroptera (from the Latin “hand wing”) is currently composed of 17 families, about 177 genera and about 1116 species (Wilson and Reeder,2005). Chiropterans are subdivided into two main groups (suborders): Megachiroptera (the Old World Fruit Bats or Flying Foxes) and Microchiroptera (any bat that isn't a Fruit bat).

Megachiroptera have some 186 species of Fruit bat, grouped into 42 genera in a single family, the Pteropodidae. The larger, or megabats, generally have big eyes and small ears, and fox-like faces. These species of bats feed on fruit, nectar, or pollen. They live in the tropics and usually do not hibernate.

The Microchiroptera is the larger of the suborders, consisting of the remaining 16 families, 135 genera and somewhere in the region of 930 species. Of the Microchiropterans, the most diverse family is probably the Phyllostomidae (the New World Leaf-nosed Bats), with 49 genera, and the largest family the Vespertilionidae (Vesper or “Evening” Bats), with an impressive 308 species divided into 34 genera. They are smaller, insect eaters and rely more on their ears than their eyes to find food. Some bats can eat as many as 600 mosquitoes per hour. Many of them must hibernate in the winter when insects are not available. (Source: - <http://www.wildlifeonline.me.uk/bats.html>)

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Bats are mammals and warm blooded, just like us. They have fur, give birth to live young who feed on their mother's milk and are generally shy and gentle. Bat consists of about 20 percent of all the mammal species in the world. Bats are the only true flying mammals in the world. They range in size of a bumblebee, Kitti's Hog Nosed Bat (*Crassonycteris thonglongyai*), which is recorded from Thailand and its adjoining areas of Southeast Asia and weighs less than a penny (about 2-3.2 gm) (Francis,2008), to flying foxes in Asia (Indonesia) with nearly six-feet of wingspan and weighs around two pounds. Bats can be found throughout the world except in certain oceanic islands, the Arctic and Antarctic. (www.batcon.org)

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Group	Eutheria
Order	Chiroptera
Sub-orders	Megachiroptera
	Microchiroptera

Bats are nocturnal, which means they are mostly active at night and sleep during the day. They sleep upside down by hanging onto the tops of caves, trees, or buildings with toe claws. During the night bats search for food, using echolocation to find it. They send out hundreds of high-pitched sounds per second. By reading the echoes that return to them from nearby objects they can "see" what is around them.

History and Status of Bats in Nepal

As compared with the numerous studies on Chiroptera in other countries relatively only little information has been published on Nepalese bats. Exploration of the mammal's fauna started in the middle of the last century which was restricted to the Katmandu Valley which at that time was the only place available to Westerners. Although British resident Brian Hodgson yielded several new species of the bats among many other vertebrates from this territory. Due to silence policy of the Government at that time, Nepalese borders still remained closed to foreigners this promising start was not continued. After the opening to the outside world from the 1950's onward, the incredible orographic, botanical and zoological diversity of Nepal attracted several scientific expedition starting with North American and German Scientists. But for a long time new data on the Chiroptera fauna came only as by- products of other Zoological investigations or of other mammal's surveys. The latter researcher mainly concentrated on the key stone species generally mega fauna. Therefore our present knowledge on bats is very incomplete. (Adhikari, 2007)

According to South Asian Chiroptera Conservation Assessment and Management Plan (C.A.M.P.) Workshop Report, 2002 Nepal consists of 51 species of bats which are as follows: 5 data deficient, 5 Vulnerable, 20 Not threatened, 17 Least concerned, 2 Critically endangered, 1 Endangered, 1 Status unknown. But few other researchers compile few more bats in Nepal.

Pokhara valley

Pokhara valley is located in Kaski district of western region of Nepal. The precise geographical location of the valley is between 28°24' to 28°4' N and 83°99' to 84°65' E. The average height

of the Pokhara valley above the sea level ranges from 730m to 1030 m. The main precipitation here occurs in the form of rainfall. The climate is sub-tropical but due to the elevation, the temperatures are moderate: the summer temperatures average between 25 - 35°C, in winter around 5 - 15° C. Various researches have been done in Pokhara during different time events. Some information on Bats has been published as a by product of some other research.

Bat species richness in Pokhara valley based on research and secondary data collection

No specific research on Bats of Pokhara has been done except Phuyal, (2005), Acharya, (2006).

Csorba (in 1999) reported *Rhinolophus macrotis* and *Hipposideros armiger* from Batule Chour, 8 Km North of Pokhara. Tej Kumar Shrestha reported *Kerivoula picta* (in 2000) and *Rhinolophus subbadius* in his publication “Mammals of Nepal” (1997).

Sujas has identified some 12 bat roosting sites. These sites are distributed in the Lekhnath municipality, Pokhara sub-metropolitan city, Bhalam VDC, Armala VDC and Hemja VDC. Among the 12 roosting sites, two are tree roosts and the remaining ten are cave roosts. All of the roosts identified are situated in and around urban areas. Three of the caves (Gupteshwor Cave, Bat Cave and Mahendra Cave) are already known roosts. The remaining caves and tree roosts were documented for the first time. Roosting sites and their GPS coordinate in Pokhara Valley are listed below:-

S. N.	Name of the Roost	Location	GPS Location		Remarks
			Latitude	Longitude	
1	Sita Cave	Lekhnath – 14	28°14'50"	84°0'19"	Accessible cave roost
2	Pandit Chowk	Pokhara – 18	28°14'50"	84°0'14"	Accessible tree roost
3	Radhakrishna tole	Pokhara – 18	28°15'31"	83°57'6"	Accessible tree roost
4	Radhe radhe Cave	Pokhara – 15	28°8'30"	83°5'54"	Inaccessible cave roost
5	Buddha Cave	Pokhara – 9	28°10'45"	84°0'52"	Inaccessible cave roost
6	Gupteshwor Cave	Pokhara – 17	28°10'56"	84°0'40"	Accessible cave roost
7	Peace Cave	Hemja - 2	28°11'22"	83°57'32"	Accessible cave roost
8	Bat Cave	Pokhara – 16	28°15'48"	83°59'32"	Accessible cave roost
9	Mahendra Cave	Pokhara – 16	28°16'3"	83°58'36"	Accessible cave roost
10	Crazy Cave	Armala - 6	28°16'19"	83°58'51"	Accessible cave roost
11	Putali Cave	Bhalam – 2	28°12'37"	83°59'33"	Accessible cave roost
12	Birendra Cave	Bhalam – 2	28°10'44"	83°59'33"	Accessible cave roost

Source: Sujas, 2005

During his study eleven species were recorded from Pokhara Valley. These bats belong to four families, four sub-families, and nine genera. Of the bats identified, three species are fruit bats from the Family Pteropodidae. The remaining eight species are insectivorous bats, belonging to the following families: Megadermatidae (1), Rhinolophidae (2), Pteropodidae (3) and Vespertilionidae (5). Bat species recorded by Sujas are *Megaderma lyra*, *Cynopterus*

sphinx, *Pteropus giganteus*, *Rousettus leschenaulti*, *Hipposideros pomona*, *Rhinolophus pusillus*, *Myotis formosus*, *Myotis muricola*, *Myotis siligorensis*, *Pipistrellus javanicus* and *Scotophilus heathii*.

Dr. Luis Ruedas, (Fulbright Scholar to Kathmandu University from Portland State University), identified *Hipposideros (Rhinolophus) armiger* and *Rhinolophus macrotis* during “Training and interaction program on Bats” on 3-5 September, 2006. *Pteropus giganteus* were found foraging at the forest which is reported formally by the residents of Chhinedada of Pokhara Valley. Total 6 species were recorded from Banpale forest situated within the premises of IOF using an ultra sound detector (<http://batfriends.tripod.com>). Acharya during his master dissertation submission to the Central Department of Zoology, Tribhuvan University reported presence of *Rhinolophus armiger* and *Rhinolophus pusillus* in Bat Cave. (Acharya, 2006). Other records are found from Dr. Paul A. Racey (Chair, IUCN SSC Chiroptera specialist Group) and Dr. Sripathi Kandula (Scientific chair of CCINSA from Madurai Kamaraj University) during “Field Techniques for Research and Conservation of Volant and Non Volant Small Mammals” at Pokhara at Institute of Forestry. They identified *Rhinolophus affinis*, *Rousettus leschenaulti*, *Hipposideros armiger*, *Miniopterus sp. spec.* in World peace cave and *Rhinolophus affinis* and *Hipposideros armiger* in Birendra cave and *Pipistrellus coromandra/ javanicus* at Institute of Forestry, Banpale forest. Paul also recommended that there could be 90 species of bats in Nepal instead of the few from existing reports. The fauna of bats of Nepal is improperly known. (Daniel, 2007)

Bates and Harrison, 1997 and CAMP report 2002 reported *Rhinolophus macrotis*, *Rhinolophus pusillus*, *Rhinolophus subbadius*, *Hipposideros armiger*, *Hipposideros pomona*, *Miniopterus pusillus*, *Kerivoula picta* from Pokhara Valley. {Bates, (1997); Molur, (2002)}

Adhikari reported presence of *Rhinolophus armiger* and *Rhinolophus pusillus* from Bat Cave, at Batulechaur, during one day training program organized at Bat Cave. (Adhikari et al., 2008)

Conclusion

Pokhara is a potential habitat for bats of Nepal. There is need of extensive survey of bats in Pokhara Valley. This city can also be developed as potential tourist site for bat watching as large number of caves exists in this valley. A total of 18 species of bats are reported by different author through different publication. These bats belong to 5 families and 11 genera. Of the bats identified, 3 species are fruit bats from the Family Pteropodidae. The remaining 15 species are insectivorous bats, belonging to the following families: Megadermatidae (1), Rhinolophidae (5), Hipposideridae (1) and Vespertilionidae (8). They are listed below of which 11 species belongs to Least concerned (LC), 5 Not threatened (NT), 1 critically endangered (CR), 1 Endangered (EN).

S. N.	Family	Genus	Common Name	Scientific Name	Red List
1	Megadermatidae	Megaderma	Greater False-vampire bat	<i>Megaderma lyra</i>	LC
2	Pteropodidae	Cynopterus	Short-nosed Fruit Bat	<i>Cynopterus sphinx</i>	LC
3	Pteropodidae	Pteropus	Indian flying fox	<i>Pteropus giganteus</i>	LC
4	Pteropodidae	Rousettus	Fulvous Fruit Bat	<i>Rousettus leschenaulti</i>	NT
5	Rhinolophidae	Hipposideros	Andersen's Leaf-nosed Bat	<i>Hipposideros pomona</i>	NT
6	Rhinolophidae	Rhinolophus	Least Horseshoe Bat	<i>Rhinolophus pusillus</i>	LC
7	Rhinolophidae	Rhinolophus	Intermediate Horseshoe Bat	<i>Rhinolophus affinis</i>	LC
8	Rhinolophidae	Rhinolophus	Big-eared Horse-shoe Bat	<i>Rhinolophus macrotis</i>	NT
9	Rhinolophidae	Rhinolophus	Chestnut Horseshoe Bat	<i>Rhinolophus subbadius</i>	EN
10	Vespertilionidae	Myotis	Hodgson's Bat	<i>Myotis formosus</i>	NT
11	Vespertilionidae	Myotis	Nepalese Whiskered Bat	<i>Myotis muricola</i>	LC
12	Vespertilionidae	Myotis	Himalayan Whiskered Bat	<i>Myotis siligorensis</i>	NT
13	Vespertilionidae	Pipistrellus	Javan Pipistrelle	<i>Pipistrellus javanicus</i>	LC
14	Vespertilionidae	Scotophilus	Asiatic Greater Yellow House Bat	<i>Scotophilus heathii</i>	LC
15	Vespertilionidae	Miniopterus	Nicobar Long-fingered Bat	<i>Miniopterus pusillus</i>	CR
16	Vespertilionidae	Pipistrellus	Coromandel Pipistrelle	<i>Pipistrellus coromandra</i>	LC
17	Vespertilionidae	Kerivoula	Painted Bat	<i>Kerivoula picta</i>	LC
18	Hipposideridae	Hipposideros	Great Himalayan Leaf-nosed Bat	<i>Hipposideros armiger</i>	LC

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वन वीउ, डालेघांस, भूईघांस, जडीवुटी तथा कृषिका गुणस्तरीय

वीउहरु खरिद विक्रीका लागि हामीलाई सम्भनुहोस् ।

विजया दशमी तथा शुभ-दिपावली २०६५ को हार्दिक

मंगलमय शुभ-कामना व्यक्त गर्दछौं ।

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