

Bats of Nepal

A field guide

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PREFACE

Inconsistent database advocates around 60 species of bat hosted to Nepalese landscape. Our knowledge on bat fauna is merely based on opportunistic and rare effort carried out by foreign scholars bounded with countries biological policy. Almost 40 years of biodiversity effort of Nepal, Small mammals has got no research and conservation priority either. Nepal is too far behind to its peripheral countries with no dedicated biologists for several years of countries conservation journey. Later this sector had been explored by university student to carry out their partial fulfillment of academic degree after early 2000. The current authors are still struggling to knock the biodiversity stakeholders of the country to pull their attention to this untouched sector. Despite of less opportunity and insecure future of current Nepalese scenario, we are dedicating to this sector with the hope to make history of success to fulfill the countries gap in research and conservation of bats. We all authors are really thankful to our parents and families who keep their deep passion to let us walk on this sector with no direct merit in return.

Bat research and conservation activities only came in surface, when Nepalese youngsters were supported and inspired by regional (CCINSA) as well global chiroptera network primarily. Co-chair of IUCN Bat specialist group, Prof. Dr. Paul A. Racey, Regius professor (Emeritus), Aberdeen University, Scotland, provided the worthiest training on bats to Nepalese students. Sincere credit goes to keen naturalist, Sally Walker and her colleagues, Zoo Outreach Organization, for arranging this important program to Nepalese students in Kathmandu. Mrs Geeta Shrestha, NATURE, Baneshwor, Kathmandu is always appreciated for her very first effort to bat conservation, through the concept of bat club in Nepal. Dr. Paul Bates and Malcolm Pearch of Harrison Institute, UK, Dr. Gabor Csorba, Hungarian Natural History Museum, Hungary (HNHM). Dr. Sara Bumrungsri, Asst. professor, Prince of Songkhla University and Pipat Soisatak, Princess of Mahachakri Srinthorn natural History Museum, Prince of Songkla University, Thailand (PMSNHM), are unforgettable and supporting institutes and personalities to us. We are grateful to our university advisors of Tribhuvan University, Nepal specially Central Department of Zoology, Kritipur and Institute of Forestry, Pokhara who sympathetically guide us to our beginning academic project. We were really confused in those days how to begin, where to communicate since we had no international approach. We would like to remember Dr. Hem Sagar Baral who always fueled us frequently with inspiring guidelines and promoting will.

Bat research has succeeded to pull the governmental attention after getting priority in Critical Ecosystem Partnership Fund, WWF; Nepal to carryout the bat research in the protected areas of eastern Nepal. This project was the foremost opportunity obtained for bat research at national level. Dr. Sarala Khaling (CEPF-Regional co-ordinator) and Angphuri Sherpa (CEPF- Country co-ordinator) are worthily remembered forever to their inducing conservation scheme and sympathy to our ef-

forts which strategically put their attention to bat research though we were less experienced and trained. Meanwhile, Bat researches were simultaneously supported by international agencies: Bat Conservation International, Lube Bat Conservancy, Rufford small grants and Chester Zoo.

A picture can speak thousand words, we have tried to include maximum photographs of the species (about 40 photographs); Most of the bat pictures used in this book were clicked during different field studies in Nepal. Some pictures are borrowed from Pipat Soisatak, PMSNHM, Dr. Gabor Csorba, HNHM.

We hope the book provide the chance to appreciate this unique component of Nepal's biodiversity heritage to governmental conservation agencies, wildlife policy makers, National and International conservation stakeholders, students, naturalist, National Parks and Wildlife divisions, Community forest users etc. People need to know, bat are important to be saved in order to secure life and nature and they are in real danger because they give births generally to a single young which is proportionately large (about 40% of mother's size) which is peculiar among mammals of nature. Many bats refuge proximity to human habitat, probably looking our sympathy for their life. This book provides the species profile of 53 bat species while 6 other are mentioned to probably occurring.

We are grateful to the Critical Ecosystem Partnership Fund, World Wild Life Fund for supporting this publication as their second phase program. We have lots to walk ahead to meet the global achievement. We hope Nepal government, ministry of forest will ease the research policy wisely to change the previous situation and prioritize small mammals in research priority for holistic conservation effort. De facto recommendation is conservation without research is futile. We hope our current energy, and enthusiasm will get countries fulcrum to contribute for next advancement. This is our first effort and there might be several errors or incompleteness. Therefore we will highly appreciate reader's suggestive comments.

Photo Courtesy:

Sanjan Thapa- *Pteropus giganteus*, *Cynopterus sphinx*, *Megaderma lyra*, *Rhinolophus ferrumequinum*, *R. affinis*, *R. sinicus*, *R. pusillus*, *R. macrotis*, *R. luctus*, *Hipposideros cineraceus*, *H. armiger*, *Myotis sicarius*, *M. nipalensis*, *M. muricola*, *M. csorbai*, *Scotophilus heathii*, *Pipistrellus javanicus*, *P. coromandra*, *Miniopterus schreibersii*. **Dr. Gabor Csorba**- *Myotis blythii*, *Eptesicus serotinus*, *Murina cyclotis* **Pipat Soisatak**- *Rhinolophus lepidus*, *R. pearsonii*, *Hipposideros Pomona*, *Scotomanes ornatus*, *Pipistrellus tenuis* and *Miniopterus pusillus* **Pushpa Raj Acharya**- *Rousettus leschenaulti*, *Eonycteris spelaea*, *Murina huttoni*, *Kerivoula hardwickii* **Sagar Dahal**- *Nyctalus noctula* **Rameshwor Ghimire**- *Hipposideros fulvus*

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INTRODUCTION

BACKGROUND

Bats are the unique mammalian group having sustained flight like birds, belonging to order 'chiroptera' (Gk. Chiron- skin and Pteron-wing). Chiroptera is the second largest among 26 mammalian orders with latest record of 1117 species throughout the world (Srinivasulu *et al.* 2010). Traditionally, the order is divided in two distinct suborders- Megachiroptera (consisting 186 species of Old world fruit bats within one family) and the Microchiroptera (consisting 931 species in 17 families) (Mickleburgh *et al.* 1992; Koopman 1993; Hutson *et al.* 2001; Mickleburgh *et al.* 2002; Simmons 2005; Srinivasulu *et al.* 2010). In general, the two orders characterized with complex laryngeal echolocation system in microbats and enhanced visual acuity in megabats despite of exception. Recent molecular phylogenetic studies challenged this traditional subdivision and proposed that the bats be subdivided into two new suborders; Yinpterochiroptera (includes the families Pteropodidae, Rhinolophidae, Megadermatidae and Rhinopomatidae) while Yangochiroptera includes all the remaining families (Teeling *et al.* 2005). To avoid the confusion some author often used the 'fruit bat' for pteropodids instead megachiroptera since some neotropical microchiroptera has found feeding ecology- frugivory.

Bats are widely distributed and have been recorded throughout the world excepting the Antarctic and a few oceanic Islands (Mickleburgh *et al.* 2002). Some of the bat families are widespread and are recorded from both the Old World and the New World regions. Some others are restricted in their range or either only to one part of the region. Among 18 families of bats, eight families (Pteropodidae, Rhinopomatidae, Hipposideridae, Myzopodidae and Mystacinidae) restricted to Old world, other six families (Noctilionidae, Phyllostomidae, Desmodontidae, Natalidae, Furipteridae and Thyropteridae) are restricted to New world

region). Families (Emballonuridae, Molossidae and Vespertilionidae) are found both in the Old and New worlds (Mickleburgh *et al.* 2002; Simmons 2005; Srinivasulu *et al.* 2010). As in other faunal distribution, bats species are also abundant in tropical ecosystem.

Bats of Nepal: A review

Relatively very little information has been published on Nepalese bats as compared to the adjoining regions. The study of bats in the Himalayas has a long but sparse history, with a handful of relevant publication. Primary focus in wildlife conservation in Nepal has been on large mammals (Heinen and Yonzon 1994) hence small mammal species like bats and rodents are least prioritized in research and hence least known to biodiversity.

Some 128 species are known from south Asia (Srinivasulu *et al.* 2010) occupying diverse niches in both natural and human modified ecosystem has been reported in the most impressive compilation on Bats of Indian subcontinent (Bates and Harrison 1997). Bat knowledge from Nepal is scanty and sparse and seems incomplete. The taxonomic numeric of Nepalese bat species reports seems inconsistent (Hutson *et al.* 2001; Bates and Harrison 1997; Acharya and Ruedas 2007; Baral and Shah 2008) with very less taxonomic input during last 10 years. However all reports confirmed the existence of fifty above bat species to the country with possibly occurring additional about 17 species (Acharya and Ruedas 2007). The recent global effort of molecular approach has boosted up the species identification in bat diversity (Mayer *et al.* 2007) but Nepal lacks even a systematic museum arrangement for general taxonomical approach to Nepalese bat researcher. Bat ecology is another nearly unexplored to part in research. Hence, it is assumed that there might be high chance of new record in Nepal's diversified zoogeography. A checklist of 53 valid bat species in Nepal has been updated (Thapa 2010). The reported number of bat species represents about 5 % of the world bat diversity and over 40% of South Asia's bat diversity. All report strongly point out the necessity of immediate review and updating of current status throughout the nation. In concluding remarks of bat review, the available information regarding Nepalese bats is now being more anecdotal through citation of sporadic pieces of works of the 30-40 years old despite of numerous potentialities on bat taxonomy and ecology that stands the global importance. Whatever the cause for current situation, countries negligence, lack of

This handbook itself is a generous start by currently appearing young researcher who had struggled since five-six years to bring this showed issue of conservation biology in the discussion forum of national to international scenario. It will be helpful to those who are developing their career to be a bat researcher, the students who is finding the career in small mammals, enthusiasts, foresters, naturalist and wildlife research and conservation institutes to deliver the basic information on species profiles on bat fauna known to date and to the Nepalese government to place these creature in national conservation priorities to succeed their biodiversity goal.

Bat studies in Nepal

The Chiropterology of Nepal evolves since the collection of mammalian fauna by Hodgson 1832. In between, Scully 1887; Hinton and Fry 1923; Fry 1925; Sauborn 1920; Worth and Shah 1969; Frick 1969; Chresmore 1970; Agrawal and Chakraborty 1971; Sinha 1973; Lekgali and McNeely 1977; Johnson et al. 1980; Mitchell 1980; Mareda 1980; Abe 1971, 1976 and 1982; Mareda 1982; Koopman 1983 and 1993; Martens 1987; Corbet and Hill 1992; Kock 1996; continued bat specimen collections (Bates and Harrison 1997; Corba et al. 1999). Biodiversity Profile Project compiled 38 bat species living and breeding with their distribution throughout protected and non-protected areas of Nepal (Sawal et al. 1992). Bates and Harrison 1997 presented remarkable information on 49 bat species of Nepal. Details from Museum visits and literature data collection and short field were the source for the information. Topal 1997 explained the *Myotis* lowpiper collected from Nepal different from other locations. Corba et al. 1999 published recent records of Chiroptera from Nepal, with remarks on their natural history. They gave an annotated list and tables with selected external and craniodental measurements of 23 bat species collected by Russian and

Hungarian expeditions. They also added first record of three species namely *Myotis myotis* and *Myotis blythii* and a checklist of 21 species known to that date from Nepal in appendix. They focused on *Myotis myotis* proved to be a new species to the globe. Myers et al. 2000 lately produced their field work in and near Chitwan National Park during March 1990 exposing the collection of 143 specimens of 14 bat species and predicting estimation of 87 probable species. They reported first record of *Eptesicus serotinus* and *Eptesicus dimisus* with notes on its morphology and systematic status as well as verified presence of *Myotis myotis* and *Myotis blythii* and also provided their locality records. Up to 2000, the chiropterology of Nepal was limited to foreign expeditions and collections. They explored different parts of Eastern, Central and Western Nepal with a rare visit to Mid-western regions.

Shrestha 1997 produced compilation of bats with taxonomic inconsistencies. Molur et al. 2002 presented 21 species of bats from Nepal with their threat categories: 2 Critically Endangered; 1 Endangered; 2 Vulnerable; 17 Least Concerned; 20 Near Threatened and 2 Data Deficient. From 2000 Nepalese started the bat studies. Malla 2000 in his thesis for M.Sc Zoology carried the diet analysis of bats (*Hipposideros armiger* and *Rhinolophus pusillus*) at Nagarjun, Kathmandu. Acharya 2006 in his thesis for M.Sc Zoology studied distribution of roosting and survival threats of bat in Pokhara Valley with reference to species and population survey at Chameri Gupha.

Phyal and Dhoubhadel 2006 and Acharya and Ruedas 2007 continued the secondary data collection and analysis. Rachal 2006; Acharya 2008 and Koiri 2008 surveyed flying fox colonies at Kathmandu. A Masters Degree thesis for Zoology on behavior study on bats (flying fox at Sallaghari, Bhaktapur) was attempted for the first time (Koiri 2008) including their population status and threats. Baral and Shah 2008 presented a good compilation of 23 bat species with illustrations. However, *Hipposideros armiger* included in this book is not confirmed. Thapa 2008 and Thapa 2009 reported flying fox colonies from Eastern Tarai of Nepal. Thapa et al. 2009; Thapa and Thapa 2009; Giri 2009, Thapa et al. 2010; Ghimire et al. 2010 documented the monitoring data. A Bachelor Degree thesis for forestry "Habitat Suitability Mapping at Kaski district" has been approached (Giri 2009). A Master Degree

thesis for Zoology entitled "Skull-Baculum Morphology and PCR Approach in Identification of Pipistrelles (Chiroptera: Vespertilionidae) from Koshi Tappu Wildlife Reserve, Sunsari, Nepal" is the first genetic practice on bats in Nepal, although it was unsuccessful (Thapa 2010). Thapa 2009; Thapa *et al.* 2010 and Adhikari 2010 made additional surveys to non-conquered area of Nepal (Morang, Sunsari and Saptari; Nawalparasi and Palpa districts respectively). Dahal and Thapa 2010 has been approaching in next new work that is bat ectoparasites study in Kathmandu Valley. Lamichhane 2010 has been carrying out bat survey inventory in Salyan district. Acharya 2010 and Thapa *et al.* 2010 recently carried on detailed monitoring at Kangchenjunga-Singhalila complex of Eastern Himalayas and Kathmandu Valley respectively. Dahal 2010 and Ghimire 2010 are exploring Biratnagar-Itahari Industrial corridor and Lalitpur district respectively. The critical review on bat studies in Nepal reflects that the country is in the move to go ahead with self motive of young generation .

□

Economic Importance of bats in Nepal

Pollinator and seed disperser

Fruit eating bats such as *Pteropus giganteus*, *Cynopterus sphinx* and *Rousettus leschanaultii* are important pollinator and seed disperser of many fruits and nuts like: Papaya, Banana, Mango, Litchi, Amla (*Phyllanthus emblica*), Kathar, Palm etc. They also pollinate and disperse seeds of other plants like Figs (*Ficus spp.*), Peepal (*Ficus religiosa*), Kadam (*Anthocephalus chinensis*), Eucalyptus, Neem (*Azadirachta indica*) etc. *Eonycteris spelaea* are remarkably important for pollinating and dispersing seed of Chiuri (*Bassia butyracea*), *Cynopterus* and *Rousettus* bats are remarkably important for dispersing seeds of Rudrakshya (*Eleaocarpus sphaericus*) in Eastern hills of Nepal. Additionally the products from these trees are used to generate income.

Pest and disease controller

Insectivorous bats are important insect predators. They feed upon mosquitoes; sand flies etc. and not only control their population but also check the outspread of diseases like Malaria, Japanese Encephalitis, Kala-azar, Dengue etc. Insectivorous bats feed upon moths, grasshoppers and leafhoppers as well as cockroaches and limits the economic losses to farmers. Carnivorous bats for eg. *Megaderma lyra* feed upon rats and limits the economic loss of grains during storage.

As food

Some community like Chepang, Satar, Yakkha Rai, Kichchak, Chidimar (Nomads) etc. kill bats for bush meat. Flesh of *Eonycteris spelaea* is delicacy to Chepang. Satar (a case from Jhapa) and Chidimar (a case from Morang) feeds upon flesh of *Pteropus giganteus*. While Yakkha Rai (A case from Sankhuwasabha) kill insectivorous bats for flesh and Kichchak kill all bats (A case from Sunsari).

For fertilizer

Although the use of bat guano as fertilizer was common in the areas near by bat caves before, this practice has been replaced by use of chemical fertilizers. The farmers who own the land of bat cave were found collecting the bat guano to their garden. However, it is hard to find the hugely populated bat cave in temperate zone throughout the year due to extreme cold winter.

Threats Noticed to Nepalese Bats

Bat studies in Nepal are at the state of insufficient monitoring relatively to other countries. Numerous species don't have specific and sufficient data. The fertility rates of many species of bats are very low approximately one pup per birth and generally one birth in a year. Hence there exists a chance of species loss before their presence evaluation as well as information is gathered. This cause is accelerated by few major threats pertaining in the country as follows.

Lack of awareness

People of Nepal has negative attitude towards bats. Despite of its great importance in pollination, seed dispersal, pest and disease control, most of Nepalese treat bats as ghosts, witches, disease transmitters and dangerous animals.

They blame bats to be responsible of cutting soft horns and ears of herds (cow, buffalo and goat) and also believe that bats urine blinds the people which are completely irrational.

Habitat encroachment and loss

The rapid transformation of the land use pattern due to haphazard urbanization, infrastructure development, industrialization and economic increment has encroached the major roosting and foraging habitats of bats. Forest fire, mass forest destructions for fire woods and timbers, and landslides are other factors directly causing the loss of their roosting and foraging habitats. Flying fox that roost in huge colony proximity to human inhabited areas are in sever threats due to human made habitat encroachment.

Habitat disturbance

Cave dwelling Bats are sensitive to microclimatic condition of hibernacula like temperature and humidity. These causes severe survival threat to bats. Bats in hibernacula and at torpor stage are in real danger to the death. Pregnant mother bat are more vulnerable to the microclimatic change. Farmers and herders as well as hunters fire camps inside the cave, firing for killing rodent pests like porcupine (a case from Ilam, Pokhara). Lots of the caves are associated with cultural platform in Nepalese societies where they smoke to worship the god of their belief. Cave

tourism is one of the emerging threats to cave bats, Lots of the cave throughout the country are in practice as show cave for touristic purpose after the successful message from the caves of Pokhara valley (Acharya, 2006). Hence is one of the emerging challenging to Nepalese bats which the obvious cave policy and management needs proper planning.

Tree dwelling bats are also equally suffering from human disturbance. Pelting stone to roosting bats, shaking the bat roosting trees and deforesting the old grown trees (Natural death also not replenished with new tree plantation) are some threats to them. Flying fox that roost in huge colony mostly outside the protected areas of country around human settlement zone are in verge of mass collapse due to either habitat clearance or due to human induced activities either intentionally or unintentional.

Similar purposeful or unpurposeful disturbance has been found at or inside the bat roosting cave like depositing some caves along the farm land with cattle fodder and dry straw of rice, millet, wheat for their cattle in extreme winter, block the cave entrance and hurdles the foraging of bats. All of these human induced disturbances alter the microclimatic condition (Carbondioxide level, temperature and humidity) of cave system which is not acceptable to roosting bat due to their physiological constraints.

Hunting and Trapping

People influenced by the traditional medicinal practice of Nepal believe that bat flesh can cure their disease like asthma, arthritis, tuberculosis, alimentary and renal diseases etc. Dhama Jhakri and Amchi's were also found using dry flesh of bat for their healing technique. Bat as a medicinal use one of the rarely studied aspect of ethnozoology in Nepal. Newars of Kathmandu Valley used to kill bats to make bat oil that was used as medicine or as eardrops to expel an ear bug, as a topical baldness cure, and as an anti paralytic (Tuladhar-Douglas, 2008). Bat flesh to feed cattle is also found as a common practice in many parts of Nepalese village (case from Kathmandu, Eastern Nepal, Chitwan etc.) to cure the red water still problem. Feeding raw bat flesh to domestic cattle is one of the serious problems which can easily vector to transmit zoonotic disease.

Medicinal use of bat can be less important issue when people feed it as meat. Chepang community is one of the well known bat hunting community of Nepal. Chepang community (with 5000 household) spread around Dhading, Makawanpur and Chitawan district of Nepal. Anecdotal report mentioned approximately 15 bat/day hunted during flowering season (July-August and November- February) of Chiuri (*Bassia butyracea*). Chepang, Chiuri and Chiroptera is one interesting information for ethnobiologist but is big challenge to bat conservation. It is serious issue since Chiuri is one of the important crops for their livelihood. Production decrease of Chiuri is often assumed due to lack of bat pollinator (further study is necessary to prove this account).

Bat flesh feeding cases are also reported from Newar community, Satar, Yakkha Rai, Kicchak (Nomads) were also reported for bat eating. However, the case might be altered in modern societies. Bat killing for fun by children and herders by throwing stone by hand and catapult, catching by hands, striking by a Long Branch and stick are unpleased act which needs to be controlled.

In conclusion, most of the bat roost are highly intermingled to human habitat, outside the protected areas are highly disturbed with human activity. Mountain bat prefer to shift their roost in human build buildings form tree or cavern cervices for warm temperature in extreme cold.

Organizations working and supporting bat conservation and research in Nepal

Small Mammals Conservation and Research Foundation (SMCRF)

114-Kantimarga, New Baneshwor, Kathmandu-10, Nepal

P.O.Box 13153, Sundhara, Kathmandu, Nepal

Tel: 977-01-4780984

Email: info@smcrf.org, URL: <http://www.smcrf.org>

The Critical Ecosystem Partnership Fund (CEPF) / WWF Nepal Programme

Baluwatar, Kathmandu

Post Box 7660 Kathmandu Nepal

Tel: +977 1 4434820 +977 1 4438458

URL: <http://nepal.panda.org/>

Himalayan Nature

P.O. Box 10918, Lazimpat, Kathmandu, Nepal

Tel: 977-01-4439042, 4444527

Email: info@himalayanature.org, URL: <http://www.himalayannature.org>

National Trust for Nature Conservation and Research Foundation (NTNC)

P.O. Box: 3712, Khumaltar, Lalitpur, Nepal

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info@ntnc.org.np, <http://www.ntnc.org.np>

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Department of National Parks and Wildlife Conservation (DNPWC)

P.O.Box 860, Babrmahal, Kathmandu, Nepal

Tel: 00977-1-4227926 / 4220912 / 4220850

Fax: 00977-1-4227675

Email: info@dnppwc.gov.np, URL: www.dnpwc.gov.np

Nepal Action Trust for Utility Resource and Education (NATURE)

Bijulibazar, Kathmandu, Nepal

Phone: 977-01-4781136, Fax : 4780235

Natural Resources Research and Conservation Center (NaReCon)

Lakeside - 6, Pokhara,

narecon@yahoo.com

Batfriends

Institute of forestry, Pokhara campus, Pokhara

Post Box no 43, Email: batfriends@mail.com, URL: <http://batfriends.tripod.com>**Nepal Bat Conservancy**

Pokhara, Nepal

URL: www.nepalbats.org**Conservation Approach to Bat Fauna in Nepal**

Public perception is one of the grass root level factor for successful conservation. During the working experience of bat researcher, public response was also tried to understand. Mixed attitude has been found among various ethnic responses. The interesting information has been found that bat gets a various ethnic recognition in various ethnic language (See at the side Box). Majority of general public has somehow negative perception to bats like bat stick on black hair because it has no eye to see, house visiting bat can drop urine on the human eye which damage the eye sight. Some bats can bite and transmit the rabies like disease. Bat flesh can cure the human and animal disease etc.

Ethnic Nomenclature for bats in Nepal	
Nepali	Chamera
Maithali	Chamgudri
Newari	Chika-lap-lap
Tharu	Badur (fruit bats), kanputri (insectivorous bats)
Tamang	Fawang
Jhangad	Badri
Yakkha Rai	Labuh-ama
Kulung Rai	Papeeu
Thulung Rai	
Khumbu Rai	
Bantawa Rai	Chhepale
Khaling Rai	Pakti
Rajbanshi	Cham-chil
Sherpa	Fama-taktak
Limbu	Nekwa
Chepang	Win
Magar	Ghi-chin
Thakali	Fapang
Dolpo	Falangtako
Gurung	Phab-Phab

Negative attitude to bats and lack of awareness and misconception has led nullified local level conservation except in areas near Koshi Tappu Wildlife Reserve where people take bats as goddess Laxmi (Goddess of wealth). Government role is quiet. Conservation is limited to university researcher and non-government organization's effort. Following bat specific conservation approaches has been done by Nepalese bat researchers and organizations.

Awareness Creation**Publication and dissemination**

Few brochures (Phuyal 2007; SMCRF 2009; Adhikari and Karki 2010; Aryal and Dhungel 2009). Educational kit "Bat Conservation in Nepal: An Educational Kit (Adhikari *et. al.* 2008) and poster and card (Acharya 2010; Thapa 2010) and greeting card with poster of bats (SMCRF 2010) relevant to bat conservation was published and disseminated to

different parts of Nepal.

School Awareness programme

Lectures to school children in different parts of Nepal have been carried on (Adhikari and Karki 2010). Nepal Action Trust for Utility Resources and Education, NATURE started the conservation of bat fauna of Nepal through bat club formation programs in schools of Kathmandu (Shrestha 2005 and 2006). The bat club formation was continued in Pokhara (Phuyal 2007) Bat clubs have been formed in the school at different parts of Nepal. SMCRF in joint venture with NATURE established Arniko School Bat Club at Satdobato, Lalitpur. Lectures to schoolchildren were carried out at 20 schools in Kathmandu valley (Thapa *et. al.* 2010).

Radio-awareness program

National radio awareness program was conducted from Radio Kantipur, a leading FM of Nepal (Thapa *et. al.* 2010). Radio awareness program to western areas of Nepal had been conducted from Radio Annapurna (Adhikari 2008). District level radio awareness programs in Tanahun district were also continued (Adhikari and Karki 2010).

Boards display

A flex board had been displayed at the entrance of Nagarjuna Cave, Shivapuri-Nagarjuna National Park, and Kathmandu (Thapa 2009). A board had been placed at Chamere Gupha, Pokhara (Phuyal 2007)

Honoring the conservation

A local of Bahundangi V.D.C. ward No. 2 was honored with small cash prize for abandoning his old house for the conservation of a colony of Greater false vampire bat *Megaderma lyra*.

Trainings

Trainings have been carried out to university students from time to time (Adhikari and KC 2008; Shrestha 2009; Thapa 2010; Adhikari and Karki 2010; Bist 2010). The most important are: Training in Field Techniques for Research and Conservation of Volant and Non-Volant Small Mammals organized by ZOO & WILD, India in collaboration with CBSG South Asia, RSG South Asia, CCINSA and RILSCINSA, Sponsored by BCI USA, Chester Zoo UK, Knowsley Safari Park UK (Daniel 2007) and Bat Conservation Educator Skills Training, Organized by ZOO/

CCINSA, Sponsored by BCI, USA, in 2008.

Bat house installation

Bat house had been installed at the Central Zoo for the awareness to the visitor as well as to develop habitat for the bats. Similarly, fourteen bat houses are installed in Kathmandu valley and a single at Sauraha, CNP (SMCRF 2010) .

Formation of cave conservation and development committee and working with local women's group in Pokhara although initiated (Phuyal 2007) remained inconsistent. Beside these national red list of bat species were assessed (National Red list of Nepal Mammals 2010) and also ten bat species were recommended for legal protection on the government of Nepal's Department of National Parks and Wildlife protected species list: *Ia io*, *Myotis csorbai*, *M. sicarius*, *Scotomanes ornatus*, *Hipposideros Pomona*, *Sphaerias blanfordi*, *Miniopterus pusillus*, *Murina aurata*, *Philetor brachypterus* (Himalayan Nature 2010).

TAXONOMY

Terminology of Measurements

External measurements:

HB-Head body length-from the tip of the snout to the base of the tail on dorsal side.

T-Tail length-from the base of the tail immediately below the anal opening to tip of the tail.

HF-Hind foot-from the heel immediately behind the os calcis to the extremity of the longest digit excluding claw and hairs.

TIB-Length of tibia-from the knee joint to the ankle.

FA-Forearm length- from the extremity of the elbow to the extremity of the carpus with the wings folded excluding the claw.

WSP-Wing span-from tip to tip of wings when fully extended.

Thumb-Length of first digit-from extremity of the carpus with the wings folded to the tip of the claw.

5mt-Fifth metacarpal- from the extremity of the carpus to the distal extremity of the innermost metacarpal.

4mt-Fourth metacarpal- from the extremity of the carpus to the distal extremity of the second innermost metacarpal.

3mt-Third metacarpal-from the extremity of the carpus to the distal extremity of the third innermost metacarpal.

1ph5mt-First phalanx of the fifth metacarpal-from the distal to proximal extremities of the upper phalanx of the fifth digit.

2ph5mt-Second phalanx of the fifth metacarpal- from the distal to proximal extremities of the lower phalanx of the fifth digit.

1ph4mt-First phalanx of the fourth metacarpal-from the distal to proximal extremities of the upper phalanx of the fourth digit.

2ph4mt-Second phalanx of the fourth metacarpal- from the distal to proximal extremities of the lower phalanx of the fourth digit.

1ph3mt-First phalanx of the third metacarpal-from the distal to proximal extremities of the upper phalanx of the third digit.

2ph3mt-Second phalanx of the third metacarpal- from the distal to proximal extremities of the lower phalanx of the third digit.

E-Ear length-from the lower border of the external auditory meatus to the tip of pinna, excluding any tuft of hair.

Cranio-dental characters:

GTL-Greatest skull length-the greatest length from the lambda to the front of canine or outermost extremity of premaxilla.

CBL-Condylo-basal length-from exoccipital condyle to the swelling of the anterior incisor.

CCL-Condylo-canine length-from exoccipital condyle to the anterior swelling of the canine

BB-Braincase breadth-in-between posterior roots of zygomatic arches.

ZB-Zygomatic breadth-the greatest distance across the zygoma.

PC-Post-orbital constriction-the least distance across the constriction posterior to the orbits.

RW-Rostral width-across the front of the orbits at their most anterior point.

M-Mandible length-from the most posterior extremities of the condyle to the anteriormost edge of the

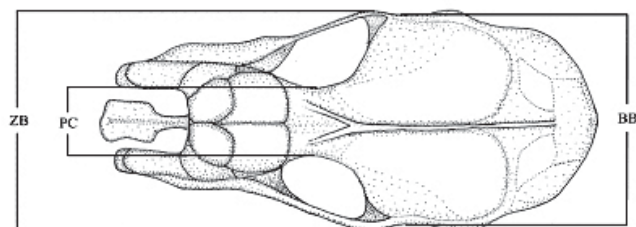
alveolus of the first lower incisor.

C-Mⁿ-Maxillary toothrow length-from the anterior of the upper canine to the posterior of the last upper molar.

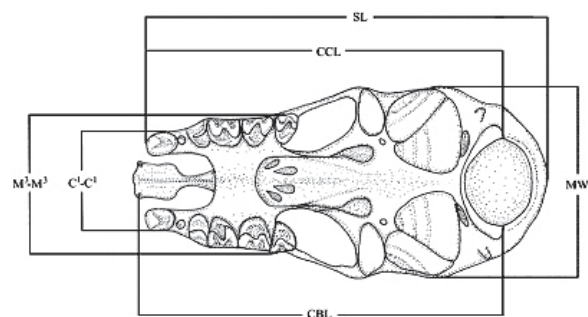
C-M_n-Mandibular toothrow length-from the anterior of the lower canine to the posterior of the last lower molar.

Mⁿ-Mⁿ-Posterior palatal breadth-across the outer borders of the last upper molars.

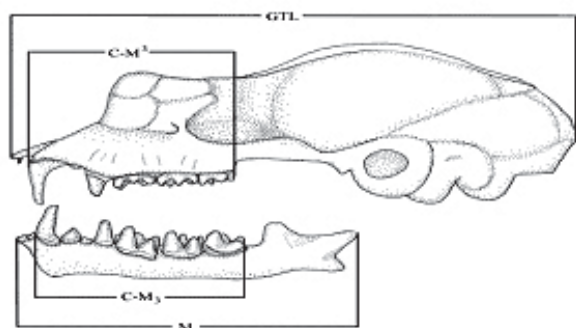
C¹-C¹-Anterior palatal breadth-across the outer borders of the upper canines.



A



B



C

Fig. 1. Skull structure of *Rhinolophus pusillus* (A. Dorsal view, B. ventral view, C. Lateral view)

List of valid bat species of Nepal with their status

Suborder Yinpterochiroptera

Superfamily Pteropodoidea

Family Pteropodidae

1. <i>Rousettus leschenaulti</i> (Desmarest, 1820)	Leschenault's Rousette	NT	LC
2. <i>Pteropus giganteus</i> (Brünnich, 1782)	Indian Flying Fox	NT	LC
3. <i>Cynopterus sphinx</i> (Vahl, 1797)	Greater Short-nosed Fruit Bat	LC	LC
4. <i>Sphaerias blanfordi</i> (Thomas, 1891)	Blanford's Fruit Bat	DD	LC
5. <i>Eonycteris spelaea</i> (Dobson, 1871)	Dawn Bat	DD	LC

Superfamily Rhinolophoidea

Family Rhinolophidae

6. <i>Rhinolophus ferrumequinum</i> (Schreber, 1774)	Greater Horseshoe Bat	LC	LC
7. <i>Rhinolophus affinis</i> Horsfield, 1823	Intermediate Horseshoe Bat	LC	LC
8. <i>Rhinolophus sinicus</i> K. Andersen, 1905	Chinese Horseshoe Bat	LC	LC
9. <i>Rhinolophus pusillus</i> Temminck, 1834	Least Horseshoe Bat	LC	LC
10. <i>Rhinolophus subbadius</i> Blyth, 1844	Little Nepalese Horseshoe Bat	DD	LC
11. <i>Rhinolophus lepidus</i> Blyth, 1844	Blyth's Horseshoe Bat	NT	LC
12. <i>Rhinolophus macrotis</i> Blyth, 1844	Big-eared Horseshoe Bat	LC	LC
13. <i>Rhinolophus luctus</i> Temminck, 1834	Great Woolly Horseshoe Bat	LC	LC
14. <i>Rhinolophus pearsoni</i> Horsfield, 1851	Pearson's Horseshoe Bat	LC	LC

Family Hipposideridae

15. <i>Hipposideros cineraceus</i> Blyth, 1853	Least Leaf-nosed Bat	DD	LC
16. <i>Hipposideros fulvus</i> Gray, 1838	Fulvus Leaf-nosed Bat	DD	LC
17. <i>Hipposideros pomona</i> K. Andersen, 1918	Andersen's Leaf-nosed Bat	NT	LC
18. <i>Hipposideros armiger</i> (Hodgson, 1835)	Great Himalayan Leaf-nosed Bat	LC	LC

Family Megadermatidae

19. <i>Megaderma lyra</i> É. Geoffroy, 1810	Greater False Vampire	LC	LC
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Suborder Yangochiroptera
Superfamily Emballonuroidea
Family Emballonuridae

20. *Taphozous longimanus* Hardwicke, 1825 Longed-winged Tomb Bat LC LC

Super family Vespertilionoidea
Family Vespertilionidae

21. *Myotis blythi* (Tomes, 1857) LESSER MOUSE-EARED MYOTIS DD LC
 22. *Myotis sicarius* Thomas, 1915 Mandelli's Mouse-eared Myotis VU VU
 23. *Myotis formosus* (Hodgson, 1835) Hodgson's Bat LC LC
 24. *Myotis nipalensis* (Dobson, 1871) Nepal Myotis LC LC
 25. *Myotis muricola* (Gray, 1864) Nepalese Whiskered Myotis LC LC
 26. *Myotis siligorensis* (Horsfield, 1855) Himalayan Whiskered Myotis LC LC
 27. *Myotis csorbai* Topál, 1997 Csorba's Mouse-eared Myotis CR DD
 28. *Plecotus homochrous* Hodgson, 1847 Brown Big-eared Bat DD
 29. *Plecotus wardi* Thomas, 1911 Gray Big-eared Bat DD
 30. *Barbastella leucomelas* (Cretzschmar, 1826) Eastern Barbastelle LC LC
 31. *Scotomanes ornatus* (Blyth, 1851) Harlequin Bat EN LC
 32. *Scotophilus heathii* (Horsfield, 1831) Greater Asiatic Yellow House Bat LC LC
 33. *Scotophilus kuhli* Leach, 1821 Lesser Asiatic Yellow House Bat DD LC
 34. *Eptesicus serotinus* Schreber, 1774 Serotine DD LC
 35. *Eptesicus dimissus* Thomas, 1916 Surat Serotine DD DD
 36. *la io* Thomas, 1902 Great Evening Bat CR LC
 37. *Pipistrellus javanicus* (Gray, 1838) Javan Pipistrelle LC LC
 38. *Pipistrellus coromandra* (Gray, 1838) Coromandel Pipistrelle LC LC
 39. *Pipistrellus tenuis* (Temminck, 1840) Least Pipistrelle LC LC
 40. *Falsistrellus affinis* (Dobson, 1871) Chocolate Pipistrelle DD LC
 41. *Arielulus circumdatus* (Temminck, 1840) Bronze Sprite DD LC

42. *Nyctalus noctula* (Schreber, 1774) Noctule DD LC
 43. *Nyctalus montanus* (Barrett-Hamilton, 1906) Mountain Noctule DD LC
 44. *Philetor brachypterus* (Temminck, 1840) Short-winged Pipistrelle VU LC
 45. *Hesperoptenus tickelli* (Blyth, 1851) Tickell's Bat DD LC
 46. *Murina leucogaster* Milne-Edwards, 1872 Rufous Tube-nosed Bat DD LC
 47. *Murina aurata* Milne-Edwards, 1872 Tibetan Tube-nosed Bat NT LC
 48. *Murina cyclotis* Dobson, 1872 Round-eared Tube-nosed Bat LC LC
 49. *Murina huttoni* (Peters, 1872) White-bellied Tube-nosed Bat DD LC
 50. *Kerivoula picta* (Pallas, 1767) Painted Woolly Bat LC LC
 51. *Kerivoula hardwickii* (Horsfield, 1824) Hardwicke's Woolly Bat LC LC

Family Miniopteridae

52. *Miniopterus schreibersii* (Kuhl, 1817) Schreiber's Long-fingered Bat LC NT
 53. *Miniopterus pusillus* Dobson, 1876 Small Long-fingered Bat DD LC

Species of bats possibly occurring in Nepal

Cynopterus brachyotis (Muller, 1838) Lesser Dog-faced Fruit Bat
Hipposideros ater Templeton, 1848 Dusky Leaf-nosed Bat
Tadarida teniotis (Rafinesque, 1814) European Free-tailed Bat
Eptesicus pachyotis (Dobson, 1871) Thick-eared Bat
Eptesicus gobiensis Bobrinskii, 1926 The Gobi Big Brown bat
Eptesicus tatei Ellerman & Morrison-Scott, 1951 Sombre Bat
Pipistrellus pipistrellus (Schreber, 1774) Common Pipistrelle

Note: The status is National first and then Global
 CR=Critically Endangered, EN=Endangered, VU=Vulnerable, NT=Near Threatened, LC=Least Concern, DD=Data Deficient

Distinguishing external character/s (dental and bacular characters in some) for identification of families and genera

Family-Pteropodidae

Head dog-like in appearance with larger eyes; first and second digits clawed (except *Eonycteris spelaea*), claw of second digit comparatively smaller than first; tail may be absent and if present is smaller; interfemoral membrane reduced or virtually absent.

Genus-*Rousettus* Gray, 1821

Medium sized pteropodid bat with elongated muzzle than *Cynopterus*, also the nostrils are not much divergent as in *Cynopterus*; tail short; white margins on anterior border of the pinna is not distinct; echolocation calls produced by clicking tongue.

Genus-*Pteropus* Brisson, 1762

Large-sized pteropodid bat with large head and large eyes on it; tail absent; interfemoral membrane least developed.

Genus-*Cynopterus* Cuvier, F., 1824

Medium-sized pteropodid bat; muzzle shorter and broader than *Rousettus*, nostrils distinctly divergent; distinct white or pale margins along the anterior and posterior borders of pinnae; Short tail slightly projecting out of the interfemoral membrane.

Genus- *Sphaerias* Miller, 1906

Small-sized pteropodid bat; muzzle moderate; thin white margin along anterior border of pinna; tail absent; interfemoral membrane reduced and concealed along the femurs and upper part of tibiae and without calcar.

Genus-*Eonycteris* Dobson, 1873

Medium-sized pteropodid bat; muzzle well elongated; only first digit clawed; tongue protrusible; tail well developed; a pair of large anal glands; fifth metacarpal comparatively shorter than third.

Family-Emballonuridae

A part of the tail projecting out from the mid-point of the interfemoral membrane.

Genus-*Taphozous* E. Geoffroy, 1818

Gular-sac present; radio-metacarpal pouch more or less developed; muzzle tapering; tragus is expanded distally forming a club shaped extremity.

Family-Megadermatidae Genus-*Megaderma* E. Geoffroy, 1810

Oval-shaped noseleaf traversed by distinct longitudinal ridge, is erected on muzzle; Pinna tall and oval; tragus distinctly bifid.

Family-Rhinolophidae Genus-*Rhinolophus* Lacépède, 1799

Roughly triangular noseleaf erected on muzzle, consisting of posterior lancet, a lower and anterior horizontal horseshoe surrounding nostrils and a perpendicular median sella; tragus absent; antitragal lobe well developed; tail concealed along interfemoral membrane; wing membrane joined to upper part of tibia.

Taxonomical character among the species has found complicated due to their relative uniformity even in skeletal morphology. It is one of the inconclusive groups of recent origin. After a long history taxonomic effort, scientists developed a comprehensive molecular phylogeny and classified them into sub group arranging the closest species. Following the book on Horse shoe bats of the World (Csorba *et al.* 2003), nine species of Nepalese Horseshoe bat grouped into six group.

1. *ferremequinum* group - *R. ferremequinum*
2. *megaphyllus* group - *R. affinis*
3. *pearsoni* group - *R. pearsoni*
4. *philippinensis* group - *R. macrotis*
5. *pusillus* group - *R. lepidus*, *R. pusillus*, *R. subbadius*
6. *rouxi* group - *R. sinicus*

Family-Hipposideridae Genus-*Hipposideros* Gray, 1831

Roughly square noseleaf erected on muzzle, consisting of a horizontal horseshoe often with accessory folioles, an intermediate leaf and a posterior leaf; Supplementary leaf or leaves may be present or absent.

Family-Vespertilionidae

Well developed tail, generally longer than half of the body length and enclosed along the interfemoral membrane, in few cases tail tip projecting few millimeter out of the membrane; tragus and anti-tragus well-developed.

Sub-family-Murininae **Genus-Murina** Gray, 1842

Protuberant tubular nostrils present.

Sub-family-Kerivoulinae **Genus-Kerivoula** Gray, 1842

Pinnae moderately long, funnel shaped; tragus long and slender about $\frac{3}{4}$ the height of pinna.

Sub-family-Myotinae **Genus-Myotis** Kaup, 1829

Pinna tall and slender generally like that of mouse; tragus straight and slender, less than to greater than $\frac{1}{2}$ of the height of the pinna.

Myotis species are divided into various sub genera that differs in a number of characters like size and shape of the feet. Although Tate 1941 subdivided eight subgroup of *Myotis*, Findley, 1972 further reclassified subgroup in genus *Myotis*.

S.N.	Subgroup	Characters	Record from Nepal
1	Leuconoe	Relatively large feet, Hairy leg, Plagiopatagium	
	Selysius	Usually smaller footed, Uropatagium (aerial feeders) <i>M. muricola</i> ,	<i>M. muricola</i> , <i>M. mystacinus</i> ,
	Myotis	Relatively large size, Long ears, broad wings, Derived dentition, Gleaner	<i>M. blythi</i> ,
Source : Stadelmann <i>et al.</i> 2004			

Sub-family-Vespertilioninae

Tip of broadly rounded or roughly pointed; tragus and anti-tragus well developed; tragus is blunt and club-shaped or crescent in appearance, it is about one-third to half the height of pinna.

Tribe-Plecotini

Pinnae tall and broad, joined across the fore-head; tragus broad at the base and tapered with blunt tip.

Genus-Plecotus Geoffroy, E., 1818

Pinnae taller and larger.

Genus-Barbastella Gray, 1821

Pinnae relatively broader.

Tribe-Nycticeinii

Muzzle relatively broader; pelage with distinct color pattern; Pinna short but broad; crescentic tragus. Tail longer.

Genus-Scotomanes Dobson, 1875

Pelage with distinct white fur on a background of brown/orange; wing membrane uniformly dark brown and essentially naked.

Genus-Scotophilus Leach, 1821

Robust bat; tragus is characteristically crescentic, with tip projecting forward; pinnae are small, roughly triangular and with number of transverse ridges; fur extends towards wing membranes adjacent to body at ventral side.

Tribe-Eptesicini

Tragus short and blunt; flat head; wings broad (narrow in *Arielulus*); only one upper premolar (pm^4) present (except in *Arielulus* with pm^2); Baculum roughly triangular (in *Eptesicus*); very small Y-shaped with paired basal lobes and a short shaft (in *Arielulus*); simple shaft with blunt tip deflected downward anteriorly, with paired basal lobes (in *Hesperoptenus*).

Genus-Eptesicus Rafinesque, 1820

Small to medium sized Vespertilionid bat; upper premolar essentially absent; tail tip projecting 1-5 mm out of the interfemoral membrane; baculum roughly triangular.

Genus-Arielulus Hill, Harrison 1987

Distinctive coloration of the dorsal pelage; second phalanx of third digit is long; wing relatively narrower and pointed; baculum very small Y-shaped with paired basal lobes and a short shaft.

Genus-Hesperoptenus Peters, 1869

Muzzle broad and blunt, swollen on sides as well as essentially naked; forehead is broad and thickly haired; pinnae yellowish brown and moderately large, thick, fleshy with anterior border convex and its tip blunt. Antitragus well developed and concealed under soft fur; Forearms and metacarpals are naked and flesh colored, while the wing membrane in between is almost black; interfemoral membrane is light reddish brown, almost black towards outer margin.

Tribe-Pipistrellini

Small vespertilionid bat; nostrils antero-laterally directed and a distinct internarial groove inbetween; conspicuous parahrinal glandular swelling on the naked muzzle; transverse ridges at the posterior border of pinna;

antitragus limited to a minute lobular projection at the base of external border of the pinna; tragus half the height of pinna.

Genus-*Pipistrellus* Kaup, 1829

Additionally, baculum with more or less bifid tip, thin and long shaft and basal lobes deflected more or less ventrally.

Genus-*Nyctalus* Bowdich, 1825

Robust vespertilionid bat; white appearing well developed buccal pads in mouth; tragus club shaped; fifth metacarpal is greatly shortened; fur extending far in wing membranes adjacent to body.

Tribe-Vespertilionini

Medium to large sized vespertilionid bat; nostrils situated apart and open obliquely outward facing. Ears short but broad; tragus less than one-third to one-third the height of pinna.

Genus-*Philetor* Thomas, 1902

Smaller vespertilionini bat; wings relatively smaller; pinna tip broadly rounded off and base of posterior border run forward, ends below and behind the angle of mouth; tragus is fleshy and thickened, its inner margin is straight, outer margin is slightly convex with an inconspicuous basal lobule, its less than one third the height of the pinna. Legs short.

Genus-*Falsistrellus* Troughton, 1943

Medium sized vespertilionini bat; paracymbial gland present; antero-laterally deflected nostrils; baculum distinctly broad, proximally widened and ventrally deeply fluted and a simple distal ending.

Genus-*Ia* Thomas, 1902

Large-sized vespertilionini bat; pinna broad, tips rounded off and breadth sub equal to height of the pinna; tragus one-third the height of the pinna; tail long and its tip extrudes 6mm from interfemoral membrane.

Family-Miniopteridae

Genus-*Miniopterus* Bonaparte, 1837

Small Vespertilionid bat; Pinna smaller; tragus taller, slender and its tip slightly curved forward; tail, interfemoral membrane and wings very long.

SPECIES PROFILE

Information for species account available to this book is referenced from various published and valid sources. Morphometric measurements are newly included prioritized to Nepalese research while Taxonomic characteristics were combined between - Bats of Indian subcontinent (Bates & Harrison, 1997); A key to the bats (Mammalia: Chiroptera) of South Asia (Srinivasulu *et al.* 2010) and Mammals of Thailand and Southeast Asia (Francis *et al.* 2008). Some information were also shared from Bats of Krau wildlife reserve (Kingston *et al.* 2006) Since the measurements from Nepalese specimens are occupied during the range, is not listed separately. Ecological feature and other information were mostly covered from Nepalese information as far as possible. The multicolored photograph of the bat species were prioritized for Nepalese specimens until the quality does not matter. Other pictures were borrowed from foreign bat researchers. Some of them keep experience to work in Nepalese bats in the past.

Nepali name of the species are continued to the published book - Nepal ka Standhari Banyajantuharu (Wild mammals of Nepal) (Baral & Shah, 2008). Those without name and additional names are created for the first time by collaborative decision of authors. The National Status is cited from National Red List for Nepal Mammals 2010.

Family Pteropodidae

1. *Rousettus leschenaulti* (Desmarest, 1820)

Common name: Leschenault's Rousette

Nepali Name: Saano Badura (Baral and Shah 2008); Jibro Padkaune Falahari chamero

IUCN Status (World-wide): LC

National Status: NT

Identifying characters:

This species is smaller in size than Pteropus. Muzzle is relatively short and slender than that of Pteropus while elongated than that of *Cynopterus*. Hind

foot and thumbs are shorter. The second phalanx of the third metacarpal is also comparatively shorter. Pelage is soft, fine and silky with darker tone. It is fulvous brown on the head, back, flanks and throat; the belly is more grayish in the median area. The nostrils are less divergent and margins of pinnae are less marked than that in *Cynopterus*. Tail is short.

Ecology:

This species can be found in variety of habitats ranging from tropical moist forest to urban environments. It roosts generally in caves, old and ruined buildings, forts and disused tunnels, in colonies ranging from a few to several thousand. It feeds on fruits and flowers.

It has two breeding cycles in a year and gives birth to a single pup (Bates and Harrison 1997). A specimen was mistnetted in a montane primary mixed forest on eastern slope of Kaligandaki valley (Jomsom) (Csorba *et al.* 1999). The roost of this species is usually quite noisy. They are phytophagous in diet, mainly feed on flower, nectar, pollen and fruit. They found sharing the roost with Dawn bat (*Eonycteris spelaea*) at the region of their common distribution. A colony (approx. 100 individuals) was explored in the cave roost of Phurumbhu VDC, Taplejung (Acharya 2010).

Conservation threats: Cave disturbance.

2. *Pteropus giganteus* (Brünnich, 1782)

Common name: Indian Flying Fox

IUCN Status (World-wide): LC

Nepali Name: Badura

National Status: LC

Identifying characters:

The snout is long and hairy throughout appearing as the fox. There are two well developed nostrils. Pinnae are black, virtually hairless, tall and pointed; they reach behind the eyes when folded forwards. Wings

HB	111.0-147.0
T	8.0-21.0
HF	15.0-22.0
FA	71.4-86.0
Thumb	24.4-31.1
2ph3mt	39.6-46.2
E	17.5-24
GTL	34.9-39.4
CBL	33.5-37.7
ZB	20.2-24
BB	14.4-16
IC	6.9-8.8
C-M ²	13.5-15.2
C-M ³	14.8-16.7
M	27.6-31.1
C-M ₃	13.5-15.2

are massive arising from the sides of the dorsum. The first digit has a large claw and second digit with comparatively smaller claw. Feet are large with robust claw. Pelage is moderate in size and coarse over the head, on shoulders and ventral aspect. Its rich chestnut brown colored on crown of the head. Its orange brown to deep chest brown colored on the nape of the neck and mantle. Belly is scarcely paler. It's relatively darker around eyes and mouth. On the posterior shoulders and mid-dorsal region, pelage is short, sparse and black with some paler hair tips. The hairs on the belly are characteristically most variable in color ranging from pale orange to red or chestnut brown which is apparently independent of sex, age or season. The interfemoral membrane is less developed concealing the tail in total.

HB	198.0-300.0
HF	38.0-58.0
FA	145-183
E	33.0-45.0
GTL	68.3-77.3
CBL	65.9-74.9
ZB	32.2-44.0
BB	23.4-25.8
IC	8.9-11.6
C-M ²	24.5-29.0
C-M ₃	24.0-33.0
M	47.8-60.0

Ecology:

These are found generally in large colonies of hundred/s to thousand/s individuals and sometimes solitary to few individuals nearby the main roost. They roost on large trees of *Bombax ceiba* (Simal), *Dalbergia Sisso* (Sisso), Teak, Eucalyptus, others in rural to urban areas, close to agricultural fields, orchards, ponds and road sides. It feeds on wide variety of fruits and flowers both wild and cultivated. Their flight is high but slow. They give birth to a single pup generally from April to early June (Bates and Harrison 1997). It travels long distances up to 150 km to and from its roost. Colonies usually have a permanent roost with one to two temporary roosts where individual shifts depending upon season and/ or other unknown factor (Sanjay Molur pers. comm. Project Pterocount). They are supposed to migrate long distance. Diet mainly includes varieties of fruit, opportunistically feeds on flowers and soft tree foliage.

It was found roosting on the tree species; Silk cotton tree (*Bombax ceiba*) Simal, Indian Rosewood (*Dalbergia sisso*) Sisso, Kadam (*Anthocephalus chinensis*), Teak (*Tectona sp.*), *Eucalyptus sp.*, Siris (*Albizia sp.*), Banpeepal (*Sapium insigne*), Peepal (*Ficus religiosa*), Mango (*Mangifera indica*) Aamp, Jack fruit (*Artocarpus heterophyllus*) Rukh Kathar. Generally it's found in large colony/ies but sometimes seen

solitary or in small population (two to four individuals in Coconut trees at Biratnagar) (Thapa 2008; 2009).

Conservation Threats: Roost collapse due to deforestation and lack of effort roost regeneration especially outside the protected areas. Hunting for medicinal purpose.

3. *Cynopterus sphinx* (Vahl, 1797)

Common name: Greater Short-nosed Fruit Bat

Nepali Name: Nepte chamero

IUCN Status (World-wide): LC

National status: LC

Identifying characters:

It is medium sized fruit bat with an average FA of 70.2mm (64-79mm) while *C. brachyotis* have smaller FA of 60.3 (57.3-63.3mm). The wings arise from the flanks. Membranes are dark brown and distinctly paler stripe at digits (digits are darker in *C. brachyotis*). Pinnae well marked with pale borders at anterior and posterior margins (Pinnae smaller in length and borders less distinct or absent in *C. brachyotis*). Muzzle is short (relatively shorter in *C. brachyotis*), broad and nostrils divergently projected. In male, the forehead and nape of the neck are darker russet brown, chin, anterior parts of the shoulders, sides of the chest, belly and thighs are characteristically orange tinted and posterior to back is grey brown. In females the collar is usually more tawny brown: the rump is grey brown and the belly pale grey, with slightly lighter hair-tips (In *C. brachyotis* body color generally brown to yellowish brown. Adult male possesses dark brown fur color while female yellowish while immature possesses grey color).

HB	76.0-113.0
T	4.5-19.0
HF	12.6-18.0
FA	64.0-79.0
WSP	3 0 9 . 0 -
436.0	
5mt	41.1-52.1
4mt	40.7-51.1
3mt	43.2-53.4
E	17.5-24.0
GTL	30.2-34.9
CCL	28.3-33.3
ZB	18.8-23.1
BB	11.1-14.8
C-M ³	5.4-12.2
C-M ₃	10.2-13.5
M	10.3-27.5
M ³ -M ³	22.7-27.5

Ecology:

These are found generally in small colonies of 3-16 individuals and

sometimes solitary. They roosts underside the leaves of banana leaves, *Schima walichii* (Chilaune), palm etc. It has been seen resting among crown of beetle nut (Supari) trees etc. It feeds on variety of fruits both wild and cultivated. Their flight is low but fast and breed twice a year. It was found Roosting on the underside mid rib of banana leaf at banana plantation (Satrasaya) nearby Marsyangdi River. When captured it produces sounds like baby toys. These bats often called tent making bat since they modify the tree foliage for day roost. Mostly they roost in group often called harem social group (one male multi female). Diet solely frugivorous feed on ripe fruits only due to weak teeth. Though there is no information in roost preferences, dense canopied tree branches and broad leaf of trees are mainly used for tent roost. They forage at the vicinity of their roosting site (around 5 km). It is one of the most common species in Nepal found from lowland terrain to upper hill especially in Banana, Palm and coconut orchards.

Conservation threats: Since it has high disturbance tolerance capacity, it has no threat to Nepal, though public perception it as crop pest needs to be corrected.

4. *Sphaerius blanfordi* (Thomas, 1891)

Common name: Blanford's Fruit Bat

Nepali Name: Blanford ko falahari chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

Small sized fruit bat. Pinnae are similar to that of *Cynopterus* but differs relatively narrowly rounded tips. Anterior margin of each pinna has a thin white border. Anti-tragii is in the form of small triangular lobe. Tail is entirely absent. Interfemoral membrane is reduced to a narrow rim along the femur and upper half of the tibiae. Pelage is long and dense. It's dull greyish brown dorsally and ventrally. Tibiae are furred and pelage extends on to the forearm, between the ankle and the elbow ventrally. Wing membranes are uniform brown and inserted on the distal half of the first

L	84.0-89.5
HF	12.0-12.0
FA	51.7-60.5
WSP	371.0-414.0
E	16.1-19.5
CBL	26.2-26.2
ZB	18.0-18.0
IC	5.4-5.4
C-M ¹	8.0-8.1
C-M ²	9.6-9.6
M	19.4-19.4

phalanx of the outer toe. Wing bone conspicuously pale, contrasting with darker membranes.

Ecology:

This species inhabits in bamboo forests (Molur *et al.* 2002). It is restricted to the anterior valleys between the Himalayan high ranges and the foothills where it is sympatric with *C. sphinx*, *E. spelaea* and *R. leschehnaulti*. It was also collected from pine and Oak forest in Thailand (Lekagul and Mc Neely 1977). Nepal has no further record to this species.

5. *Eonycteris spelaea* (Dobson, 1871)

Common name: Dawn Bat

IUCN Status (World-wide): LC

Nepali Name: Mirmire chamero

National status: DD

Identifying characters:

Medium sized fruit bat resembling to *Rousettus* but differs characteristically in absence of claw on second digit. Muzzle also comparatively elongated. Tail is short and its tip protrudes from the interfemoral membrane. Large kidney shaped glands are present on either side of the anal opening. Pelage short, velvety, closely flat to the skin. Dorsal pelage is dark brown, relatively paler on the back of the head and shoulders while ventral pelage is mottled grey- brown. In males, a well marked ruff of slightly darker hairs covers the chin and ventral aspect of the neck whereas in females the chin and ventral aspect of the neck is covered sparsely by hairs. The pelage extends slightly over the wing membranes or interfemoral membranes but the forearm is moderately hairy at ventral aspect. The tibiae are essentially naked.

HB	92.0-130.0
T	10.5-23.0
E	16.9-21.0
FA	66.0-78.0
HF	17.0-21.0
CL	31.7-36.3
C-M ³	11.9-13.4
C-M ₃	13.0-13.7
ZB	19.0-22.1
M	25.1-28.8
WSP	370.0-400.0
GTL	33.3-37.5
BB	14.0-15.1
IC	6.4-7.5

Ecology:

Captured at stream and among banana trees near houses (Myers *et al.* 2000). Feeds upon nectar of chiuri and disperse their seeds. It is also believed as the long distance forager that enhances to expand the

genetic dispersion of bat pollinating plants. It may feed on flower of *Oroxylum indicum* and Cactus flower in western lowland of Nepal.

Conservation threat: This species is killed for delicacy of meat by Chepang community.

Family Emballonuridae

6. *Taphozous longimanus* Hardwicke, 1825

Common name: Longed-winged Tomb Bat

Nepali Name: Laampakhete chamero (Baral and Shah 2008), Laampakhete puchhar niskeko chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters

This is small species of *Taphozous*. They smell unpleasant. The tail emerges out from the middle of the interfemoral membrane and it is haired. The third metacarpal is relatively long, usually equal to or exceeding the length of the forearm. The muzzle is simple. The nostrils open forwards and have a narrow groove between them. The sides of the face are almost naked and are dark brown in color. Pinnae are relatively short and narrow. Their bases are covered with hairs posterior, their tips are bluntly rounded off and the anterior and posterior margins are straight. The antiragal lobe of each pinna is elevated above the inferior margin of the pinna and tragus is well

HB	73-86
T	20-30.0
HF	8.0-14.0
FA	55.6-62
WSP	380-400
3mt	55.8-64
FA	95.8-109.4
1ph3mt	20.4-22.7
E	16-19
GTL	20.2-22
CCL	19.2-21.6
ZB	12-12.9
BB	9.5-10.2
IC	5.8-6.7
C-M ³	8.7-9.2
C-M ₃	9.4-10.2
M	15.4-16.4

developed and club shaped. The chin is essentially naked in both sexes; however, males have a large gular sac while females have a rudimentary fold of skin in throat. There is also a pectoral gland in male which oozes a yellow creamy secretion in the breeding season. Pelage is short and

soft. Its color varies from cinnamon brown, reddish brown to black. Females are darker in coloration. Both sexes may be spotted with paler patches dorsally; the belly tends to be lighter brown than the back. The hair bases are usually paler than the tips. The fur of the body extends onto the wing membranes for about half the length (one third in *T. melanopogon*) of each humerus and femur dorsally. The fur also extends onto interfemoral membrane dorsally. Membranes are dark brown throughout. The wings are attached to the ankles (to the tibiae in *T. melanopogon* and *T. perforatus*). The radio-metacarpal pouch of each wing is moderately developed (well developed in *T. melanopogon*).

Ecology:

This species is found in varied habitats ranging from arid areas to humid zones. It roosts in caves, old temples, mud excavation (C. Srinivasulu pers. comm.), large wells, hollows and crowns of trees and eaves of houses. They live solitarily or hundreds of bats. It is an early and fast flyer. It feeds on cockroaches and beetles. They have two breeding seasons; one in mid January and other in mid May (Bates and Harrison 1997).

Family Megadermatidae

7. *Megaderma lyra* É. Geoffroy, 1810

Common name: Greater False Vampire

Nepali Name: Nakkali boksi chamero

IUCN Status (World-wide): LC

Nepal: LC

Identifying characters:

Pinnae are characteristic and oval shaped, large with fringe of white hairs on inner margins, which are joined at half to one-third of their length. Tragus is bifid; its posterior process is taller relatively. Forehead and upper cheeks of the face is hairy. Snout is naked and flesh colored. Noseleaf is erect, straight and about 10 mm in height; which has a longitudinal ridge and a simple rounded horizontal base. Pelage is fine, soft and moderately long. Dorsal pelage is mouse grey with slightly brown shades. Ventral pelage paler with hair tips of throat and belly white while hair bases grey to

HB	70-95
HF	14.0-17.2
FA	56-71.5
WSP	396-454
E	31.5-45
GTL	27.1-30.2
CCL	24.5-27.8
ZB	15.4-17.1
BB	11.8-12.9
PC	4.3-5.2
C-M ³	10.6-12.1
C-M ₃	11.6-12.79
M	18.8-21.2

dark grey. However, juveniles are comparatively darker. Membranes and pinnae are greyish to dark grayish and semi-translucent. Wings are attached to the base of the outer toe.

Ecology:

It inhabits the dry as well as humid areas with agriculture fields and wetlands. It roosts solitarily and in small to large colonies ranging up to several hundred individuals. It has been found roosting in caves, old buildings, thatched huts etc. It flies silently and maneuvers close to the ground. They feed upon varieties of insects; however, vary seasonally; also small vertebrates (generally frogs, reptiles and rodents). It was observed hanging from the ceiling and feeding on another bat. Food remaining included fragmented carcasses of two mice (possibly *Mus platythrix*) and one shrew (*Crocidura* or small *Suncus*) indicated that the perch have been used by *Megaderma* (Csorba *et al.* 1999). It breeds once in a year and give birth to a single pup after the gestation period of 150 days (Bates and Harrison 1997). They groom own self and to each other, shakes its mouth and face while resting (Thapa 2009).

Family Rhinolophidae

8. *Rhinolophus ferrumequinum* (Schreber, 1774)

Common name: Gretarer Horseshoe Bat

Nepali Name: Thulo ghodnale chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

This species has noseleaf similar with that in *R. affinis* with horseshoe relatively narrower. The sella is narrower than that of *R. affinis*; in frontal view, its anterior border is narrow above while widespread below. The superior connecting process is bluntly rounded off in side view, which differs to that of *R. affinis* by higher connecting process. The horseshoe is relatively narrow; not covering whole muzzle. The lancet is narrowly pointed with concave sides. In the wing, the third metacarpal is characteristically shorter than that of *R. affinis*; which averages 10.4% (8.1%-14%) shorter than the fourth and 13.1% (9.0%-16.0%) shorter than the fifth. The first phalanx of the third metacarpal is contrastingly greater than that in *R. affinis*; which exceeds half the length of respective metacarpal. Dorsal pelage is long, soft and dense varying from uniform

light grayish to drab brown with paler hair bases. Ventral pelage is pale grayish brown. Immature specimens are greyer than adults.

Ecology:

In south Asia this species is found in montane forests among the mountains and valleys of the Himalaya. It is gregarious and roosts in caves, old and ruined houses and buildings. After the darkness in evening these species emerge out singly. It roosts solitary, in small to large colonies and co-occur with other species such as *Rhinolophus sp.* (*R. macrotis*, *R. pusillus*, *R. affinis*, *R. sinicus*) and other species (*Myotis nipalensis* and *Hipposideros armiger*). It has slow and fluttering flight. It feeds upon small insects; lacewings, small moths, spiders and grasshoppers. A single pup is born after a gestation period of 72 days (Bates and Harrison 1997). It was netted among dense *Berberis* bushes at about 1 m above ground, suggesting foliage glean-ing feeding behavior of this species. A specimen caught during April was pregnant with one embryo (Csorba *et al.* 1999). A single specimen was captured at about 1 m above water over a small canopied stream at the edge of Bajrabarahi religious forest, Chapagaun (Thapa *et al.* 2010).

Cave roosting. The flight emergence was noted 18:18-19:58 PM (mistnetted). They are inundated with numerous ecto-parasites (Thapa *et al.* 2010). During parturition, female can form separate colonies. They can change their shelter before the onset of winter.

9. *Rhinolophus affinis* Horsfield, 1823

Common name: Intermediate Horseshoe Bat

IUCN Status (World-wide): LC

Nepali Name: Majhau-la
ghodnale chamero

National: LC

HB	56-79
T	30-42
HF	9.9-14
FA	54.8-62.1
WSP	356-356
5mt	43-49.4
4mt	40.8-47.3
3mt	36.1-42
1ph3mt	17.9-23.1
2ph3mt	28.2-35.6
1ph4mt	10.8-14.6
2ph4mt	15.2-22.2
E	20-28.5
GTL	21.2-25.5
CCL	19.7-22.3
ZB	11-13.1
BB	8.5-10.1
PC	2.2-3.1
C-M ³	8.5-9.6
C-M ₃	9.1-10.1
M	15.2-17.9

Identifying characters:

This species has significantly short pinnae which arise to the highest level of head. Noseleaf is similar with that in *R. ferrumequinum* with horseshoe relatively broader. In the wing, the third metacarpal averages 3.5% (0.4%-6.6%) shorter than the fourth and 6.2% (3.6%-7.7%) shorter than the fifth. The first phalanx of the third metacarpal is shorter in comparison to that of *R. ferrumequinum*; which is considerably less than half the length of respective metacarpal. However, the second phalanx is long about three quarters the length of the respective metacarpal that is 73.1% (66.3%-80.4%). Pelage is variable in color ranging from buffy brown to distinctive orange (in some individuals). Pelage in females appears average darker. Connecting process is rounded and originates from below the tip of sella. The sella is slightly concave. The anterior noseleaf is broad, but does not cover the muzzle.

HB	46-68
T	20-30
HF	9.8-12.5
FA	50.0-55
WSP	290.0364-
5mt	39.1-43.7
4mt	38.2-43.2
3mt	36.7-41.9
1ph3mt	14.0-17
2ph3mt	25.2-31.5
1ph4mt	9.6-11.5
2ph4mt	14.8-18.4
E	14.0-23
GTL	22.2-24.2
CCL	18.7-20.5
ZB	10.4-11.8
BB	8.9-9.5
PC	1.7-2.5
C-M ³	8.5-9.8
C-M ₃	9.0-10.0
M	14.9-16.1

Ecology:

It is one of the common species roosting in caves and old houses and buildings within the montane forest. After the darkness in evening these species emerge out in flocks. It roosts in small to large colonies and co-occur with other species such as *Rhinolophus sp.* (*R. macrotis*, *R. pusillus*, *R. ferrumequinum*) and other species (*Myotis nipalensis* and *Hipposideros armiger*).

Cave roosting, also found roosting (hibernating) in pair inside the tunnel, 200m from the entrance, at Pharping Power house. The flight emergence was noted 18:38-21:40 (mistnetted). Produces frequent chirping sound and restless during handling. All individuals were inundated by numerous ecto-parasites (Thapa *et al.* 2010).

Echolocation: The bat detector Magenta Mkllb detected the frequency 70-90 kHz (Thapa *et al.* 2010).

10. *Rhinolophus sinicus* K. Andersen, 1905

Common name: Chinese Horseshoe Bat

Nepali Name: China
Ghodnaale chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

This species is smaller than *R. affinis*, however, their pinnae are slightly larger than that of *R. affinis* but smaller than that of *R. ferrumequinum*. The noseleaf is broader but otherwise similar to that of *R. ferrumequinum*. Lancet is of variable height and shape; sometimes triangular with straight sides. Sometimes with a well developed tip and concave margins below. In the wing, the third metacarpal is not distinctly shortened as in *R. ferrumequinum*. The pelage is soft and silky, not wooly as in the *R. beddomei*. Pelage color varies from orange, russet brown, buffy brown to grey. Even seasonal variation occurs in pelage coloration; orange and rufous tints predominate during October to April and paler commonly during May to September.

HB	43.0-52.5
T	21.5-30.0
E	15.8-20.0
FA	45.7-49.6
TIB	
HF	7.1-10.0
CL	17.4-18.47
C-M ³	7.6-8.2
C-M ₃	8.1-9.00
ZB	10.1-11.0
M	13.4-14.6

Ecology:

It is found in montane forests with heavy rainfall. It roosts singly or in colonies in caves, old disused tunnels. It was mistnetted at the edge of agricultural fields surrounded by small forest fragment. One specimen was additionally captured from small cavern in a cultivated landscape. It was found perching in niches under rocks solitarily. Various insect remains (Moths and Cockroach wings) were found in their roosting sites. It was found co-occurring with *Rhinolophus affinis* (Acharya 2010).

Echolocation: 90 kHz (Csorba *et al.* 1999).

11. *Rhinolophus pusillus* Temminck, 1834

Common name: Least Horseshoe Bat

Nepali Name: Saano
Ghodnaale chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

It is small sized Rhinolophid bat. The third metacarpal is about equal or exceeding the combined lengths of its respective phalanges (105%; 99%-113%). Tibiae are relatively shorter than that of *R. lepidus*. The noseleaf is similar in structure with that of *R. lepidus*; but when seen laterally, the connecting process of the sella is triangular in shape and more acute in outline. However, in some specimens it appears horn like processes as in *R. subbadius* and *R. cognatus*. In frontal view the base of the sella is similar to that of *R. lepidus* with broadly rounded outline. Shape of lancet varies from short equilateral triangle to a more elongated structure. The pelage is very fine but short. Dorsal pelage is light buffy brown to dark teak brown in color with paler hair bases while ventral pelage is paler with whitish tinge.

HB	30.0-40.0
T	13.5-26.0
HF	5.8-8.0
TIB	14.2-16.3
FA	34.0-39.7
5mt	25.1-30.2
4mt	24.8-30.4
3mt	24.2-29.5
1ph3mt	9.7-12.0
2ph3mt	13.5-17.1
1ph4mt	7.3-9.1
2ph4mt	9.3-12.0
E	15-17.5
GTL	15.6-17.2
CCL	13.0-14.0
ZB	7.1-7.8
BB	6.4-7.0
PC	1.8-2.3
C-M ³	5.4-6.0
C-M ₃	5.77-6.3
M	9.3-10.6
M ³ -M ₃	5.4-5.8
C ¹ -C ₁	3.4-3.9

Ecology:

It is found in both primary and secondary tropical moist to montane forests. This species roosts in small or large caves in hilly areas (a colony up to 1500 individuals in China) and in houses (in small colonies) (Molur *et al.* 2002). The species was mistnetted over a river within primary forest. They were observed flying higher upstream, hunting over a small pool near the mist net and eventually perching on it. Male specimen collected in October was sexually active with enlarged testes. Female specimen captured in May was carrying a full term embryo in the right uterine horn (Csorba *et al.* 1999). It was found co-occurring with other *Rhinolophus sp.* (*R. affinis*, *R. luctus*, *R. ferrumequinum*, *R. macrotis*) and other species

(*Hipposideros armiger*, *H. cineraceus*, *Myotis nipalensis* etc.) (Csorba *et al.* 1999; Ghimire *et al.* 2010; Thapa *et al.* 2010; Adhikari 2010). Forages in a wide range of forest habitats including mature forest and disturbed areas. In Makalu region (1559m), Nepal it has found house visiting at every night (Acharya 2010).

They are mid evening flier mistnetted when out for foraging at 17:50- after 18:20. First single individuals comes out and then in group. They roost in colonies inside caves. They were found roosting in colonies on cone surface, and large crevices of the ceiling of the Nagarjuna Cave near its entrance.

Echolocation: Bat detector Magenta Mkllb detected the frequency of echolocation call of 40- 65 kHz (Thapa *et al.* 2010).

12. *Rhinolophus subbadius* Blyth, 1844

Common name: Little Nepalese Horseshoe Bat

Nepali Name: Nepali Ghodnaale chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

This species is one of the smallest Rhinolophid bats. It is considerably smaller than *R. pusillus* in size. The sella is similar to that of *R. pusillus*; but the superior connecting process is more horn like. The lancet may be short and broad. Pelage color is similar to that in *R. pusillus*. Dorsal pelage is cinnamon brown with paler hair bases. Ventral pelage is slightly paler. However, the contrast between the dorsal and ventral pelage is less evident than that in *R. lepidus*.

Ecology:

It can be encountered in dense forests among bamboo clumps (Molur *et al.* 2002).

13. *Rhinolophus lepidus* Blyth, 1844

Common name: Blyth's Horseshoe Bat

Nepali Name: Blyth ko ghodnale chamero

IUCN Status (World-wide): LC

National Status: NT

HB	35.0-37.0
T	16.0-19.0
HF	6.7-8.0
TIB	13.9-15.0
FA	33.4-35.9
5mt	25.3-26.8
4mt	25.2-26.7
3mt	24.3-25.7
1ph3mt	7.2-10.6
2ph3mt	12.9-13.7
1ph4mt	6.9-8.6
2ph4mt	8.0-9.5
E	14.1-18.0
GTL	14.5-14.6
CCL	6.7-12.9
BB	6.0-6.5
PC	2.2-2.2
C-M ³	5.1-12.9
C-M ₃	5.1-5.8
M	9.2-9.5
M ³ -M ³	4.4-4.9
C ¹ -C ¹	2.7-3.2

Measurements of *Rhinolophus subbadius*

HB	35-54.0
T	14-28.0
HF	5.5-10.0
TIB	14.9-18.4
FA	37-41.8
WSP	232-256.0
5mt	29.4-33.4
4mt	29.6-33.8
3mt	28.2-33.3
1ph3mt	10-13.3
2ph3mt	16-18.9
1ph4mt	7.6-10.5
2ph4mt	9.6-12.3
E	14.5-20.6
GTL	16.2-18.4
CCL	13.3-15.5
ZB	7.6-8.8
BB	6.5-7.8
PC	1.8-2.6
C-M ³	5.6-6.8
C-M ₃	6-7.4
M	10-12.1
M ³ -M ³	5.7-6.3
C ¹ -C ¹	3.7-4.2

Measurements of *Rhinolophus lepidus*

Identifying characters:

This species usually exceeds *R. pusillus* in size. It has noseleaf similar with that in *R. pusillus*; however, the tip of the triangular shaped connecting process is generally more broadly rounded off when seen laterally. The lancet is well developed which has broadly rounded off to pointed tip. Dorsal pelage is typically grey-brown. Ventral pelage is slightly paler. Longer FA and TIB measurements can distinguish *R. lepidus* from *R. pusillus*. They have three mental grooves at lower lip.

Ecology:

This species is found in dry and moist forests and fringe areas

(C. Srinivasulu pers. comm.). It roosts in caves, unused tunnels, old and ruined houses and buildings and old temples (Molur *et al.* 2002). Its flight is slow and low and feeds up on lepidopterans, coleopterans, dipterans, hymenopterans (Bates and Harrison 1997).

Echolocation: CF 100 KHz (Kingston *et al.* 2000).

14. *Rhinolophus macrotis* Blyth, 1844

Common name: Big-eared Horseshoe Bat

Nepali Name: Laamkaane
Ghodnaale chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

The pinna is characteristically large. The noseleaf is also markedly differing from other groups. When seen laterally, the superior connecting process is broadly rounded off while the anterior surface of the sella is short, slightly emarginated beneath the connecting process. The inferior surface of the sella is very broad at the base; its apex is rounded off and deflected downwards. The sella projects strongly forward. The lancet is relatively short with slightly convex sides and sub-acutely pointed tip. The pelage is soft and with wooly texture, the hairs are slightly exceeding than that in *R. lepidus*. The dorsal pelage is buffy brown while ventral pelage is slightly paler. The combined length of phalanges of the third metacarpal is about equal to the length of the respective metacarpal.

Ecology:

This species roosts in small or large caves and abandoned mines (Molur *et al.* 2002). Its flight is fast and feed up on coleopterans and dipterans (Bates and Harrison 1997). Specimens caught in July were lactating; male specimens captured in October had expanded testes indicating the sexually active period (Csorba *et al.* 1999).

HB	39.0-48.7
T	17.3-26.2
HF	7.5-9.0
TIB	17.3-19.5
FA	39.0-46.0
5mt	32.0-35.2
4mt	31.9-35.7
3mt	30.8-34.2
1ph3mt	12.7-14.3
2ph3mt	18.0-20.2
1ph4mt	8.5-10.1
2ph4mt	10.9-12.6
E	21.0-25.9
GTL	17.3-19.9
CCL	15.2-16.6
ZB	7.9-8.6
BB	8.1-8.7
PC	1.8-2.6
C-M ³	6.2-6.7
C-M ₃	6.3-6.9
M	10.9-12.7
M ³ -M ₃	4.7-6.2

It was found co-occurring with other *Rhinolophus* sp. (*R. affinis*, *R. pusillus*, *R. ferrumequinum*) and other species (*Myotis nipalensis* etc.) (Ghimire *et al.* 2010).

They roost in colonies inside caves. They are mid evening flier mistnetted during 17:58- 20:30. Feed on moth. Its fast flight was observed. It was found inundated with single-few parasites.

Echolocation: The bat detector Magenta Mkllb detected the frequency 60 kHz (Thapa *et al.* 2010).

15. *Rhinolophus luctus* Temminck, 1834

Common name: Great Woolly Horseshoe Bat

Nepali Name: Makhamalla
Ghodnaale chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

This species is a large Rhinolophid bat. The noseleaf is characteristically large; with well developed basal lappets on either side of the sella, the horseshoe is very broad which has a distinct median emargination which clearly divides it into two halves. The depth of the nostril pits is emphasized by the upturned edges of the internarial cup. When seen laterally, the anterior edge of the sella is convex with the superior connecting process broadly rounded off below. The base of the sella has a flange on each side forming the well pronounced basal lappets obscuring the upper edge of the internarial cup. The inferior surface of the sella is broad. The lancet is very high and well developed; it's sub-acutely rounded with rounded off tips. The pelage is characteristically long, dark and wooly with dark hair bases and slightly paler hair tips throughout. In the wing, third metacarpal is characteristically short, in average 86% (83.8%-87.9%) of the length of

HB	85-90.0
T	49-55.0
HF	16.5-20.0
TIB	34.2-40.9
FA	70-80.5
5mt	55.4-63.
4mt	55.1-61.5
3mt	47.2-53.7
1ph3mt	26.9-30.2
2ph3mt	35.4-41.7
1ph4mt	14.6-15.9
2ph4mt	23.1-26.3
E	40-40.0
GTL	31.5-32.5
CCL	27.5-28.7
ZB	14.8-16.2
BB	11.8-12.4
PC	2.7-3.2
C-M ³	11.8-12.6
C-M ₃	12.7-13.3
M ₃	22.6-23.2
M ³ -M ₃	10.4-11.3

the fourth metacarpal. However, combined length of phalanges of the third metacarpal is greatly longer, 134.0% (125.1%-142.5%) than the respective metacarpal.

Ecology:

This species is forest dweller. It roosts solitarily or in pairs in small or large caves, rocky outcrops, overhanging edges and large hollows in trees (Molur *et al.* 2002). Its flight is low and just above the ground and feed up on lepidopterans (Ghimire *et al.* 2010), coleopterans, termites and other insects (Bates and Harrison 1997). It rests at the highest part of the cave and was found co-occurring with other *Rhinolophus sp.* (*R. pusillus* and *R. affinis*). Roosting solitary inside caves. They are early evening flier mistnetted at 18:10. They feed up on moth. Its flight is low and rests at higher places inside the cave (Ghimire *et al.* 2010).

16. *Rhinolophus pearsoni* Horsfield, 1851

Common name: Pearson's Horseshoe Bat

IUCN Status (World-wide): LC

Identifying characters:

It is medium sized Rhinolophid bat. The noseleaf is similar in structure with that of *R. luctus*; but smaller and without circular basal lappets on either side of sella. When seen laterally, the inferior extremity of the sella is not deflected downwards and forwards. The pelage is long soft and with wooly texture and mid-chest brown in color. Pinnae are smaller than that in *R. luctus*. Interfemoral membrane is characteristically haired dorsally and at posterior border. Lower lip has a single deep groove.

Ecology:

It is found in montane forests with bamboo intermixed and even in cultivated areas. This species roosts in small or large caves in hilly areas (Molur *et al.* 2002; Bates and Harrison 1997). Two specimens

HB	51.0-64.0
T	20.0-29.0
HF	50.8-55.1
TIB	18.9-29.2
FA	50.8-54.8
5mt	39.9-44.3
4mt	37.8-42.6
3mt	34.0-38.8
1ph3mt	15.9-19.2
2ph3mt	23.3-27.2
1ph4mt	9.6-12.6
2ph4mt	14.3-17.9
E	23.5-28.0
GTL	22.9-25.1
CCL	19.7-22.3
ZB	11.4-12.1
BB	10.4-10.9
PC	2.3-2.7
C-M ³	8.5-9.9
C-M ₃	9.1-10.7
M ₃ ³	15.2-17.9
M ³ -M ³	8.5-9.4

caught in October were in deep torpor (Csorba *et al.* 1999). It was found co-occurring with other *Rhinolophus sp.* (*R. affinis*, *R. pusillus*, *R. ferrumequinum*) and other species (*Hipposideros armiger* etc.) (Csorba *et al.* 2010; Adhikari 2010).

Echolocation: 56 kHz- 65 kHz in south East Asia.

Family Hipposideridae

17. *Hipposideros cineraceus* Blyth, 1853

Common name: Least Leaf-nosed Bat

IUCN Status (World-wide): LC

Nepali Name: Fusro
Golopatre chamero

National Status: DD

Identifying characters:

It's small hipposiderid bat. Noseleaf is generally about 4mm in width. The anterior leaf of noseleaf is without lateral leaflets or a median emargination; it's slightly concealed by short, fine hairs and consists of well developed triangular shaped internarial septum. A small narial lappet surrounds each nostril on its outer margin. Intermediate leaf is slightly hairy with four long vibrissae. Posterior leaf scarcely exceeds the width of intermediate and anterior leaf and consists of less distinct septa and four cells and it has clearly defined frontal sac situated in the mid-line behind the posterior leaf. In the wing the third metacarpal is shortest and fourth is the longest. The combined lengths of phalanges of third metacarpal significantly exceed the metacarpal. Pelage is soft, dense but short. Its dull mid-brown with paler hair bases dorsally, ventral surface is paler in coloration with white patches on chest and belly. In some individuals hair tips at flanks are orange tinged. Membranes are dark brown.

HB	33.0-42.0
T	22.0-30.0
HF	6.0-7.0
TIB	13.8-16.7
FA	33.0-36.3
5mt	26.2-27.8
4mt	26.9-28.8
3mt	24.4-26.6
1ph3mt	14.3-16.2
2ph3mt	12.5-15.3
1ph4mt	8.4-11.2
2ph4mt	6.2-8.6
E	13.0-17.0
GTL	15.2-16.2
CCL	12.7-13.7
ZB	6.9-7.6
BB	7.2-8.2
PC	2.1-2.8
C-M ³	4.9-5.3
C-M ₃	5.2-5.8
M	8.8-9.4
M ³ -M ³	4.6-5.1
C ¹ -C ¹	2.7-3.1

Ecology:

These species mainly roosts inside caves and rests on house ceilings (Acharya 2010). These are gregarious. More than a hundred individuals were estimated during their flight observation at entrances of four caves; Bagh cave, Naya cave, Manjushree cave and Barahi cave at Chobhar (Thapa *et al.* 2009; 2010). These can co-occur with other Hipposiderid species (*H. armiger*) (Acharya 2010) and *Rhinolophus pusillus* (Thapa *et al.* 2010). It feeds upon moths frequently. A single pup is born after a gestation period of 180 days (Bates and Harrison 1997).

Echolocation call: CF 144 (Kingston *et al.* 2000)

18. *Hipposideros fulvus* Gray, 1838

Common name: Fulvous Leaf-nosed Bat

Nepali Name: Kailo
Golopatre chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

It's medium sized hipposiderid bat. The pinnae are characteristically larger than other species which are broadly rounded off. The noseleaf is generally about 5mm in width. In the wing the third metacarpal is significantly shorter than fourth and also shorter than fifth. The combined lengths of phalanges of third metacarpal significantly exceed the metacarpal. Pelage is varying in coloration from dull yellow, pale grey, dull brown and golden orange. An adult weigh between 8-9 grams.

Ecology:

This species is found within arid regions to thick forests. They roosts in colonies of a few to large number of individuals in caves. They are late evening flyer with slow fluttering and low flight. It feeds upon cockroaches and coleopterans.

HB	40.0-50.0
T	24.0-35.0
HF	6.0-9.8
TIB	16.5-20.7
FA	38.4-44.0
5mt	28.7-33.1
4mt	28.3-33.9
3mt	27.3-31.2
1ph3mt	16.1-18.9
2ph3mt	16.2-19.5
1ph4mt	10.0-12.0
2ph4mt	8.2-11.2
E	19.0-26
GTL	17.2-18.6
CCL	15.0-16.4
ZB	8.6-9.6
BB	7.5-9.4
PC	2.2-2.8
C-M ³	6.0-6.9
C-M ₃	6.4-7.5
M	11.1-12.0
M ³ -M ₃	5.8-6.8
C ¹ -C ¹	3.6-4.4

A single pup is born after a gestation period of 150-160 days (Bates and Harrison 1997).

19. *Hipposideros pomona* Andersen, 1918

Common name: Andersen's Leaf-nosed Bat

Nepali Name: Gudikhaane
Golopatre chamero

IUCN Status (World-wide): LC

National Status: NT

Identifying characters:

It's medium sized hipposiderid bat. The pinnae, the noseleaf are similar as in *H. fulvus*. In the wing the third metacarpal is shorter than fifth. Hair tips of dorsal pelage are various shades of mid-dark brown with significantly paler hair bases. Ventral pelage is pale throughout.

FA	38.1-43.2
5mt	30.2-30.9
4mt	30.3-31.5
3mt	28.6-29.5
E	18.5-25.0
GTL	16.5-16.7
CCL	14.2-16.0
ZB	7.9-9.0
PC	2.5-2.7
C-M ³	5.5-6.2
C-M ₃	6.0-6.8
M	9.8-11.3
M ³ -M ₃	5.3-5.5
C ¹ -C ¹	3.4-3.4

First lower premolar (pm²) is about or more than two-thirds the length (antero-posterior) and height of second premolar (pm⁴), whereas in *H. fulvus*, pm² is half the length (antero-posterior) and less than half the height of pm⁴.

Ecology:

They roost in small colonies of a few individuals in caves and crevices in subterranean habitats (Molur *et al.* 2002).

20. *Hipposideros armiger* (Hodgson, 1835)

Common name: Great Himalayan Leaf-nosed Bat

Nepali Name: Thulo
Golopatre chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

It's largest hipposiderid bat. Noseleaf has four supplementary leaflets, with the outerleaf distinctly smaller than the other three. The anterior leaf is without a median emargination, the narial lappets are scarcely

developed, internarial septum is less inflated, intermediate leaf has a well defined median process and has numerous vibrissae and the upper surface is "wave-shaped" with at least four convexities and three concavities, posterior leaf has three well defined septa and four cells and its upper surface has clearly defined median and lateral processes, behind this posterior leaf above each eye there is a fleshy elevation which is the characteristic of this species [in some specimens it is exceptionally developed (Csorba *et al.* 1999)]. Well developed frontal depression is found in males while less developed in females. However, tufts of black hairs project out from this depression in both sexes. Posterior concavity of pinna is serrated [found less distinct in an individual from Sundarijal (Thapa *et al.* 2009)]. Pelage is soft, dense and long. It's dark-grey brown to blackish brown on the head and shoulders as well as darker brown to blackish brown on back and flanks with paler hair bases dorsally, ventral surface is paler and uniform grey-brown in coloration. In the wing, fifth metacarpal is significantly shorter than the third and fourth metacarpals. The third metacarpal exceeds combined lengths of its phalanges. Membranes are dark brown/ black.

Ecology:

Although it has been found roosting in lofts of houses, verandahs of old houses and old temples in South Asia but it's found commonly in cave in Nepal. They were found roosting on rock ceiling of the short tunnel at eastern side of Sundarijal water reservoir (Thapa *et al.* 2009). In the caves some colonies were found roosting in dry places while some were roosting in moist places. About 25 individuals were observed hanging on the moist surface and flying near the spring inside the Kailash Cave, some 300m inside (Thapa and Thapa 2009). A colony of six individuals was

HB	82.0-105.0
T	50.0-64.0
HF	13.0-17.0
TIB	33.9-44.3
FA	85.4-95.0
5mt	55.6-63.5
4mt	58.3-66.9
3mt	59.4-67.1
1ph3mt	28.5-32.7
2ph3mt	28.4-33.5
1ph4mt	20.4-24.7
2ph4mt	13.2-16.5
E	26.0-34.0
GTL	30.0-32.4
CCL	25.6-29.2
ZB	16.5-18.4
BB	11.2-12.1
PC	3.9-4.8
C-M ³	11.3-12.5
C-M ₃	12.6-14.0
M	20.7-23.4
M ³ -M ₃	11.5-12.8
C ¹ -C ₁	7.6-9.0

observed hibernating in the cave at Godawari (Thapa *et al.* 2010). They roost in colony of few individuals to hundred/s. Their flight emerges during sunset (at Mulkharka) to early evening (mistnetted at 18:56 at Siddha Cave, Bimalnagar). They were seen circling round the trees and hunted flying insects. These were found roosting inside the last spacious area of the Kailash cave. When disturbed flies with flapping, and after a very short flight again goes to rest (Thapa and Thapa, 2009). Its colony can co-occur with colonies of other species such as *Rhinolophus sp.* (*R. affinis*, *R. macrotis*, *R. pusillus*, *R. ferrumequinum*) and other species (*Myotis nipalensis*, *M. csorbai* and *Miniopterus schreibersii* etc.). These species is the first to fly out of the cave and may have poor echolocation (Sanjan Thapa pers. obs. comm.). These are low flying species. Breeds once a year and give birth to two pups (Bates and Harrison 1997). The female specimens caught in March and July were lactating while another two females were found to be still pregnant (each with one embryo) in the middle of April; indicating a long-lasting birthing period (Csorba *et al.* 1999). A single ecto-parasite was present in an individual from Siddha Cave (Ghimire *et al.* 2010).

Family Vespertilionidae

21. *Myotis blythi* (Tomes, 1857)

Common name: LESSER MOUSE-EARED MYOTIS

Nepali Name: Sano
Musakaane chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

This species has large pinnae among the genus, with bluntly rounded tip. Anterior border of each pinna is evenly convex, with a sharply projecting lobe at the base. There is a scarce median notch at the posterior border. Antitragus is small and low. Tragus is tall but narrow, about half the height of the pinna. It's widest just above the base and has the straight anterior margin which narrows to the tip. The posterior margin is slightly convex in its midway while sharply emarginated just above the projecting basal lobule. The Muzzle is simple with crescentic nostrils that open laterally. There is a wide shallow internarial groove in between nostrils. The upper and lower lips, glandular swellings of muzzle and periorbital regions are faintly haired while, the forehead, upper parts of muzzle including almost rhinarium are thickly haired. Pelage is wooly. Dorsal pelage is buffy brown in color with dark grey hair roots. The

hairs on the back are 7-8 mm long. Ventral pelage is paler in appearance and also with dark hair roots. The interfemoral membrane is almost naked, enclosing the tail entirely except its extreme tip. Wing is broader in relation to the length, which joins the base of phalanx of the outer metatarsal. Feet are moderate, slightly exceeding half the length of tibia.

Ecology:

This species are found in arid regions. It is gregarious, congregates in nursery and/ or hibernating colonies up to 500 individuals, forages in shrub and grassland habitats, including farmland and gardens. Maternity colonies are usually found in underground habitats such as caves and mines and sometimes in attics of buildings and in large colonies (Particularly in Central Europe). This species can co-occur with *Miniopterus schreibersii*. They are late evening flier with slow flight and flying one-ten meters from the ground. It feed upon dipterans probably.

HB	65.0-80
T	53.0-68.0
HF	11.0-17.0
TIB	23.7-27.2
FA	55.5-58.3
5mt	51.5-54.5
4mt	53.1-56.2
3mt	54.3-57.7
E	19.0-26.0
GTL	20.8-21.5
CCL	18.1-18.9
BB	9.4-9.4
PC	4.8-5.2
C-M ³	8.2-8.5
C-M ₃	9.2-9.2
M	15.7-16
M ³ -M ³	8.7-9
RW	5.2-7.7

22. *Myotis sicarius* Thomas, 1915

Common name: Mandelli's Mouse-eared Myotis

Nepali Name: Mandelli ko musakaane chamero

IUCN Status (World-wide): VU

National Status: VU

Identifying characters:

The forehead and muzzle are covered in hairs, however, the ears, areas around eyes and nostrils are essentially naked and dark in color. Pinna is dark; the anterior margin is evenly rounded and convex while posterior margin has a well marked shallow concavity beneath the bluntly rounded tip. Tragus is tall but narrow, about half the height of the pinna. Feet are small but about equal to half the length of tibiae. Pelage is dense, short but very soft. Dorsal pelage is uniform deep chocolate brown to dark ferruginous brown. Ventral pelage is paler with the hair tip ginger colored and darker hair root, yellow shade at the belly. In the

wing, the third metacarpal scarcely exceed the fourth and fifth. Wing membranes and interfemoral membranes are black in color, naked, semi translucent and uniformly dark brown/black. Each wing is attached to the base of first phalanx of outer metatarsal of the foot.

Habitat and ecology:

It was collected in a mistnet set by a river at Godavari in the Kathmandu Valley at an approximate altitude of 1350m a.s.l. (Bates and Harrison 1997). It is found in montane forests on hill sides and in valleys (Molur *et al.* 2002). Three specimens were captured at 3m above the water over a river, in a partly deforested area.

Among the three, two were heavily pregnant, each with a full term embryo in the right uterine horn. It was found producing high intensity echolocation in comparison to other *Myotis* (Csorba *et al.* 1999). Two specimens were also captured over a stream at a foot to three feet above the water over a small stream in between the agricultural fields and dense canopied religious forest at Bajrabarahi. Their flight is distinct, fast with turns and flies 10-12 feet above the ground (Thapa *et al.* 2010).

HB	50.0-56.0
T	44.0-54.0
HF	10.0-11.0
TIB	19.7-22.0
FA	48.1-54.6
5mt	40.7-44.8
4mt	42.0-45.3
3mt	42-45.3
E	17.2-19.0
GTL	18.8-18.9
CCL	16.19-17.7
ZB	11.8-11.8
BB	8.0-8.4
PC	4.1-4.4
C-M ³	7.1-7.52
C-M ₃	4.9-8.25
M	13.92-14.9
M ³ -M ³	7.7-8.0
C ¹ -C ¹	4.9-5.3

23. *Myotis formosus* (Hodgson, 1835)

Common name: Hodgson's Bat

Nepali Name: Hodgson ko chamero

IUCN Status (World-wide): LC

Nepal: LC

Identifying characters:

The pelage has characteristic coloration. Its mid-brown mid dorsally while orange brown on flanks. Pale Cinnamon brown on throat while deep orange posterior. Head is hairy excluding around the eyes, nostrils and lips. Pinnae are short, ovate shaped naked and are orange colored with darker margins. The anterior margin is evenly rounded where as

shallow concavity on the posterior border. Tragus is long, narrow and obtusely pointed; anterior border is concave in its upper part. Wings are broad and characteristic in color pattern of orange and black. The orange color extends in narrow line along side of each metacarpal. Black triangular areas present between third, fourth and fifth metacarpals and inside the fifth metacarpal. Additionally, these black areas are dotted and marked with orange. The interfemoral membrane is orange. The feet are averagely less than half the length of tibiae.

T	36.0-53.6
HF	10.2-11.6
TIB	21.0-24.9
FA	44.5-49.6
5mt	42.3-47.2
4mt	42.3-44.0
3mt	43.2-45.7
E	12.8-15.6
GTL	18.1-18.9
CCL	16.3-16.6
ZB	11.7-11.9
BB	8.1-8.7
PC	4.4-4.5
C-M ³	6.8-7.25
C-M ₃	7.4-7.8
M	13.7-14.1
M ³ -M ³	7.4-7.8
C ¹ -C ¹	4.9-5.3

Ecology:

It inhabits lowland and primary montane forests as well as secondary forests and other habitats from sea level to foothills of Himalayas. It roosts in caves, tree foliage, amongst bushes and in houses. During winter they hibernate in caves (Bates and Harrison 1997; Smith and Xie 2008). Specimen was mistnetted in a mature Rhododendron forest half an hour after sunset, and its mouth was found full of insect remains (Csorba *et al.* 1999).

24. *Myotis nipalensis* (Dobson, 1871)

Common name: Nepali Myotis

Nepali Name: Nepali musakaane chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

The naked part of the face and muzzle is reddish but not nearly black (as in *M. mystacinus*). The eyes are concealed under numerous fine hairs. The upper lip is fringed with hairs, that means snout is whiskered. Pinna is dark brown/ black and relatively short; the anterior margin is evenly convex while posterior margin has a shallow concavity beneath the rounded tip. Tragus is tall but narrow, about half the height of the pinna. Feet are small, less than half the length of tibiae. Dorsal pelage is

russet brown, with dark hair roots. However, the hair root at ventral pelage is also darker but the hair tip is characteristically grey or creamy white. In the wing, the third metacarpal scarcely exceed the fourth and fifth. Wing membranes are naked and uniformly dark brown, and each wing is attached to the distal end of outer metatarsal of the foot. Interfemoral membrane is also dark, which is slightly haired adjacent to the body and tibiae dorsally.

HB	38.0-47.0
T	32.0-40.0
E	12.0-14.0
FA	34.5-36.8
TIB	
HF	7.0-8.0
CL ₃	11.6-12.4
C-M ³	4.7-5.7
C-M ₃	5.3-5.7
M	9.7-10.3

Ecology:

It inhabits in wide variety of habitat; often found in arid or mountainous habitats, including forest, shrubland, grassland areas, desert, rural gardens and urban areas. It roosts in cracks, rocks, buildings, caves and old mines (Smith and Xie 2008; Srinivasulu pers. comm. and Katerina Tsytulina pers. comm.). Usually feed after dusk, fly low above the ground while hunting insects. However, their flight is fast and maneuvering. Most probably non-migratory, however, their populations are relocated to other places and shelters when disturbed. They hibernate in underground shelters. This species reproduce once a year and give birth to a single pup.

Cave roosting in colonies inside caves holes and crevices. Supposed flying over water pool and open fields at the edge of foot-hill primary forest during the early evening. They are late evening flier mistnetted earliest at 19:56. Its flight is fast. Ecto-parasite (lice) observed in their body and wings (Thapa *et al.* 2010; Ghimire *et al.* 2010).

Echolocation: Magenta Mkllb bat detector detected 65 KHz at Godawari (Thapa *et al.* 2010)

25. *Myotis muricola* (Gray, 1846)

Common name: Nepalese Whiskered Myotis

Nepali Name: Parkhale chamero (Baral and Shah 2008); Nepali Junge Musakaane chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

It can be distinguished by darker ventral pelage color with essentially black hair bases and ochraceous brown tips. The tail may be shorter in *M. muricola* (32.9: 25.0-39.0) than that in *M. nipalensis* (37.1: 32.0-42.0). Dorsal pelage with dark brown/ black bases and tips flecked with russet brown. In general, the hairs are darker appearing on the back than those of *M. mystacinus* (Bates and Harrison 1997). Pinnae and feet are relatively small. Wings are attached to the distal end of the outer metatarsal of each foot. The upper lip has well developed fringe of hairs.

Ecology:

It inhabits in primary and secondary montane and lowland forests, scrub, secondary growth and gardens. It roosts solitary or in small colonies of few individuals among tightly rolled leaves of broad leaved trees especially banana. Its fast flyer and often encountered in the forest under storey and in gaps along streams (Rickart *et al.* 1993; Molur *et al.* 2002; Heaney *et al.* 2004; P. Bates and G. Csorba pers. comm. 2006; Sedlock pers. comm. 2006; Smith and Xie 2008). Fly just after sunset. The two males were captured, one in montane primary broadleaved forest and another in a partly deforested area, both over a river. Flight was observed just 1m above water or higher commonly along the river bank (Csorba *et al.* 1999). An individual was mistnetted at one foot over a small stream at Godawari at late evening (Thapa *et al.* 2010).

Echolocation: 40-45 kHz (Csorba *et al.* 1999).

26. *Myotis siligorensis* (Horsfield, 1855)

Common name: Himalayan Whiskered Myotis

HB	41-47
T	25-39
HF	4.0-6.7
TIB	11.7-16.8
FA	31.2-37.0
5mt	27.8-34.5
4mt	28.9-33.5
3mt	29.8-33.2
E	6.0-13.3
GTL	12.8-13.8
CCL	11.5-12.33
ZB	7.3-8.5
BB	6.0-6.5
PC	3.1-3.4
C-M ³	4.8-5.54
C-M ₃	5.1-5.99
M	9.2-10.1
M ³ -M ³	4.8-5.6
C ¹ -C ¹	3.0-3.5

Nepali Name: Sana dante chamero (Baral and Shah 2008); Himalaya ko junge musakaane chamero
National Status: LC

IUCN Status (World-wide): LC

Identifying characters:

Muzzle is pointed with a well developed fringe of hairs on the upper lip. Pinnae and feet are small. Dorsal pelage is dark brown. Ventral pelage is pale brown with the hair tip pale brown and dark brown hair root. In the wing, the third metacarpal scarcely exceed the fourth and fifth. Wing membranes and interfemoral membranes are uniformly brown. Each wing is attached to the base of first phalanx of outer metatarsal of the foot.

FA	30.0-31.5
GTL	12.-12.8
CCL	11.2-11.2
BB	6.2-6.2
PC	2.9-3.1
C-M ³	4.5-4.8
C-M ₃	4.9-5
M	9-9.2
M ³ -M ³	4.8-5
C ¹ -C ¹	3.0-3.2

Ecology:

It roosts in small colonies of few individuals in caves and crevices in old buildings. It is found in montane forests on hill sides and in valleys in Himalayas (Molur *et al.* 2002). It is a high flying species which is also seen foraging near human settlements (Bates and Harrison 1997). The bat mentioned as one of the commonest bats in Kathmandu valley in the past (Hinton & Fry 1923). It was reported that, these bat often enter to human dwelling houses to hunt the insect around kerosene lamps (Scully 1887).

Echolocation: It produces Constant Frequency (CF) search signals at 66 kHz.

27. *Myotis csorbai* Topál, 1997

Common name: Csorba's Mouse-eared Myotis

Nepali Name: Csorba ko Musakaane chamero

IUCN Status (World-wide): DD

National Status: CR

Identifying characters:

The coloration of dorsal pelage is dark brownish while that of ventral pelage is dull gray. Cranio-dental diagnostic characteristics were found most helpful in distinguishing *M. csorbai*. The skull is small with bulbous braincase which is distinctly elevated above the flattened

T	31.9-42.0
TIB	14.4-17.4
HF	6.6-15.8
FA	33.7-37.5
E	11.9-16.4
CL	11.07-12.71
C-M ³	4.63-5.50
C-M ₃	4.9-5.5
ZB	~8.9
M	8.97-9.87

rostrum. The sagittal and lamboid crests are scarcely evident. The zygomata are wide. The short coronoid process of each half mandible has vertical anterior border and horizontal posterior border. The condyle stands to the tip of lower canine. The first upper incisor (i^2) and second upper incisor (i^3) are distinct and bicuspidate. The upper canine is weak and equal about to height as well as about half of the crown area of third upper premolar (pm^4). The first upper premolar (pm^2) and second upper premolar (pm^3) are minute. pm^3 is half to the crown area of pm^2 . pm^3 is slightly displaced internally from the tooth row. The lower canine is characteristically smaller in comparison to upper one. It's about two third of the crown area of third lower premolar (pm^4). The molars are characteristically larger.

Ecology:

It inhabits the area surrounded by subtropical secondary forests. It roosts in caves. This species was found to leave the cave early before total darkness during summer. It was captured above the river or river bank. Their flight is typical in slow circles at 10-30 cm above water surface, rarely fly above 1-3 m in the river bank. However, their flight pattern of changing height is similar to that of *M. daubentonii*. It was found hunting for about an hour after emergence just after sunset. However, some specimens captured just after 15-30 min were found full stomach after the emergence which indicates their high foraging efficiency. Neonatal weight is also higher relatively (Csorba *et al.* 1999). These were found roosting inside crevices and small holes. When they are disturbed flies for some time and again goes to rest (Thapa and Thapa 2009).

Echolocation: probably a steep FM sweep at 40 kHz (Csorba *et al.* 1999).

Note: This is the only bat endemic to Nepal.

28. *Plecotus homochrous* Hodgson, 1847

Common Name: Brown Big-eared Bat

Nepali Name: Khairo
laam kaane chamero

National Status: DD

Identifying characters:

Pinnae are characteristically large joined across by a very narrow membrane. Each pinna is elongated, oval in shape, with anterior and posterior margins evenly convex and tip bluntly rounded off. The anterior margin is haired with very short hairs. The antitragal lobe is virtually absent. A rounded lobe projects from the base of the anterior margin. The tragus is about half the height of the pinna; its anterior border is essentially broad, the tip bluntly pointed and the posterior border slightly convex. Pinnae are pale brown, semi translucent and crossed with about twenty conspicuous transverse ridges. Tail is characteristically long exceeding the HB; it's entirely enclosed within the interfemoral membrane with extreme tip protruding. Wings are short but broad; the third metacarpal is longer

HB	40-45
T	48-50
HF	7.0-8.0
TIB	15.1-17.5
FA	36.5-40.3
5mt	33-35.5
4mt	33.3-37.2
3mt	37.5-40.6
E	39-41.4
GTL	16.1-16.5
CCL	13.8-14.2
ZB	8.1-8.2
BB	7.6-7.8
PC	3.4-3.3
C-M ³	5.0-5.3
C-M3	5.4-5.7
M	9.8-10.2
M ³ -M ³	5.5-5.9

than fourth and fifth. Wing membranes are virtually naked and uniform brown in coloration. Interfemoral membrane is slightly haired adjacent to the body throughout. Nostrils open upwards and are extended backwards to form narrow fissures. Well marked internarial groove separates the nostrils. Pelage is long, soft and dense on the back while it is shorter on the belly; its buffy brown dorsally with dark hair roots while paler grey buff ventrally also with dark hair roots. The baculum has a slender shaft and two slender basal lobes.

Ecology:

This species is found in arid regions northern to mountains (plateau). It roosts in hollow trees, old buildings and possibly caves. It emerges relatively late in the evening. Their flight is slow but with rapid twists and turns (Bates and Harrison 1997).

29. *Plecotus wardi* Thomas, 1911

Common Name: Gray Big-eared Bat

Nepali Name: Fusro laam
kaane chamero

National Status: DD

Identifying characters:

This species is larger than *P. homochrous*. The pelage is very pale dorsally with creamy buff to darker buffy brown hair tips while pale, white or white tinged buff hair tips. The hair roots are dark throughout. The baculum has shorter and broader shaft and the most robust basal lobes.

Ecology:

This species is found in mountainous areas with temperate climate to northern arid plateaus. They roost in dark places and generally in small colonies. It emerges after dusk and their flight is slow but controlled. However, it is capable of hovering in front of leaves and twigs to pick off insects. It feeds on small moths, spiders and lacewings (Bates and Harrison 1997).

HB	47.0-53.0
T	49.0-54.0
HF	7.0-9.5
TIB	18.5-22.1
FA	41.9-45.1
5mt	35.2-38.0
4mt	36.0-38.7
3mt	37.2-39.9
E	37.0-42.0
GTL	16.9-17.6
CCL	14.8-15.4
ZB	8.5-8.9
BB	7.3-8.1
PC	3.3-3.8
C-M ³	5.4-5.8
C-M ₃	5.9-6.3
M	10.6-11.2
M ³ -M ₃	5.9-6.3

30. *Barbastella leucomelas* (Cretzschmar, 1826)**Common Name:** Eastern Barbastelle**Nepali Name:** Purbiya Himali Chamero**IUCN Status (World-wide):** LC**National Status:** LC**Identifying characters:**

It is small bat with short, flat and wide muzzle. Above the level of flat median area of the muzzle there are prominent glandular swellings covered by dense hairs. Lip fringed with hairs. Nostrils are crescent shaped and open upwards and outwards on a flat hairless median space which is bordered with two elevated crescentic ridges laterally. Pinnae darker brown with faint transverse ridges and hairy posterior margin, however, not extending to tips. They are not so enlarged but broad and faced forwards, nearly square in outline and anterior margin extends to join together at the bases on the forehead. Tragus is triangular and large

(more than half of the height of the pinna). Tibia is long but foot relatively short. Wings and interfemoral membrane uniformly brown. Wing is attached to the base of outer toe. Dorsal pelage is long, fine and soft while pelage at belly is short. Head and back essentially black, however, on the posterior back and flanks hairs are blackish brown, however, with slightly paler hairs surrounding vent in some specimens. Tail is long.

Ecology:

It is found solitarily, in Himalayan moist temperate forest. It was captured from the montane primary broad-leaved forest (Csorba *et al.* 1999). It roosts in tunnels, caves, crevices, abandoned and old building, mines, tree hollows and under the bark. They are late emerging for flight and are insectivorous in food habit. According to Roberts 1977 females give birth earlier than other species and usually twins (Bates and Harrison 1997). According to Blanford (1888-91), it was common at an altitude of between 1538-2462 m a.s.l. (Bates and Harrison 1997). Roost singly or in group (non - social colony) under bark and in tree hollows. It goes for hibernation during extreme cold of winter.

HB	47.0-51.0
T	40.0-52.0
HF	6.0-8.0
TIB	17.9-20.1
FA	38.7-42.1
5mt	35.4-37.6
4mt	36.7-38.7
3mt	38.9-41.5
E	15.0-17.0
GTL	15.1-16.1
CCL	13.4-14.2
ZB	7.3-7.6
BB	7.4-7.6
PC	3.8-4.0
C-M ³	4.7-5.1
C-M ₃	5.1-5.7
M	9.36-10.1
M ³ -M ₃	5.3-5.6

31. *Scotomanes ornatus* (Blyth, 1851)**Common name:** Harlequin Bat**Nepali Name:** Gahana chamero IUCN Status**(World-wide):** LC**National Status:** EN**Identifying characters:**

The pelage is characteristic in coloration. Pelage at head, back and flanks are essentially orange to orange-brown with a mixture of greater to lesser extent of paler hairs and intermittent frosting with tufts of pure white hairs; these sometimes coalesce to form a white line down the middle of the back. The belly is a complex mixture of dark brown and creamy white hairs; in general the paler hairs predominate. The membranes are

uniformly dark brown and essentially naked. The feet are black and about half the length of the tibiae. The face is naked and muzzle is whiskered. Nostrils are round and simple and face slightly outwards. Pinnae are large, naked and brown colored throughout; each with an evenly convex anterior border and a broadly rounded tip. The tragus of each ear is broad and crescent shaped and about one-third to half the length of the pinna (Bates and Harrison 1997).

Habitat and ecology:

It can be found in deep humid valleys and hilly forests. It roosts among trees and banana leaves (Lekagul and McNeely 1977). It emerges late and is a high and fast flyer (Bates and Harrison 1997). Slow and heavy flight pattern near trees (at canopy level) and rocky walls, not lower than 10-15m above the ground was observed (Csorba *et al.* 1999).

Echolocation: ranging from 80 kHz to 25 kHz with maximum time at 30 kHz (Csorba *et al.* 1999).

32. *Scotophilus heathii* (Horsfield, 1831)

Common name: Greater Asiatic Yellow House Bat **Nepali Name:** Thulo asiali Pittachamero
IUCN Status (World-wide): LC **National Status:** LC

Identifying characters:

This species is a robust Vespertilionid bat. The tail is characteristically long with its terminal end projecting 2-3 mm beyond the interfemoral membrane. Muzzle is broad but blunt, swollen on sides, dark in color and mostly naked. Nostrils are round and simple and face slightly outwards. The pelage is characteristic in coloration. Pinnae are smaller in relation to the size of head; they are naked and have a number of transverse ridges. The tragus of each ear is characteristically crescent shaped and about half the length of the pinna. Pelage is fine and short; it's longer on the nape of the neck and throat. At head and back there is

HB	61.0-85.0
T	40.0-66.0
HF	11.3-15.0
TIB	23.7-29.7
FA	56.1-65.6
5mt	59.7-61.1
4mt	60.6-60.6
3mt	61.9-62.3
E	30-42.0
GTL	24.5-24.5
CCL	19.79-21.7
ZB	15.9-17.3
BB	10.4-10.4
PC	4.8-4.8
C-M ³	8.5-5.8
C-M ₃	9.7-9.8
M	15.9-17.4
M ³ -M ³	9.8-9.9

pale buffy brown hair roots and darker olive, grey to brown hair tip. The nape of the neck is paler in coloration. The throat, chest and belly are pale yellow-buff to whitish or white throughout. Additionally, in some individuals the back is chestnut brown and belly is reddish or golden yellow. The membranes are uniformly dark brown and mostly naked; with some hairs adjacent to the body and along forearm ventrally. The third metacarpal slightly exceeds the fourth and fifth in length. The feet are about half the length of the tibiae (Bates and Harrison 1997).

Habitat and ecology:

It can be found in variety of habitats including urban areas (Gabor Csorba and Paul Bates Pers. comm.). It roosts in attics, roofs, walls, pillar gaps, crevices and cracks in houses, old buildings, among the leaves and crown of palm tree. They live in small colonies or solitarily. It emerges from the roost late and is a low flyer with steady speed. One or two pups are born after the gestation period of 115 days (Bates and Harrison 1997). It was collected along the sal forest edge and cultivated fields in an arid flood plain at Banke district (Mitchell 1980).

These were found roosting at space between roofs covered with galvanized plate and ceiling and house made up of timber. The faeces are quite broad and cylindrical. They twitter sharply and quarrel when disturbed. They were found roosting at spaces between walls and pillar of the house too in Taaghandubba and Inaruwa. When the wings were stretched it implied great force to escape or bite (Thapa 2009).

33. *Scotophilus kuhli* Leach, 1821

Common name: Lesser Asiatic Yellow House Bat **Nepali Name:** Sano asiali Pitta chamero
IUCN Status (World-wide): LC **National Status:** DD

Identifying characters:

This species is smaller than *S. heathii*. This species differ in pelage

HB	67.0-93
T	43.0-71.0
HF	9.0-15.0
FA	55.4-65.8
5mt	50.3-59.2
4mt	54.0-63.9
3mt	53.7-64.8
E	13.0-20.0
GTL	21.7-25.2
CCL	19.0-21.3
ZB	14.5-16.9
BB	9.7-10.8
PC	5.2-5.9
C-M ³	7.1-8.4
C-M ₃	8.1-9.6
M	14.8-18.0
M ³ -M ³	9.3-11.0

coloration distinctly with the dorsal pelage chestnut brown and ventral pelage paler usually without the characteristic yellowish tinge of *S. heathii* (Bates and Harrison 1997).

Ecology:

It can be found in primary and secondary habitats and in both rural and urban areas. It roosts in temples, caves, tree hollows, and dry leaves of palm trees, cracks, crevices and holes in walls, roofs and attics of houses, old buildings. They live in large colonies up to several hundred individuals. It emerges from the roost early. One or two pups are born after the gestation period of 105-115 days. Preferably feeds up on hymenopterans and dipterans (Bates and Harrison 1997).

Echolocation: Peak frequency 40 kHz, end frequency 37 kHz.

Note: Measurement not available for Nepal.

34. *Eptesicus serotinus* Schreber, 1774

Common name: Serotine

Nepali Name: laampuchhre chamero (Baral and Shah 2008); Thulo laampuchhre chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

Large species of the genus. The muzzle is exceptionally broad with glandular swellings. Upper lip fringed with fine hairs. Pinnae are dark; moderate in length with about six transverse ridges. The tragus is less than half the height of the pinna; the tip of the tragus is bluntly pointed. Pelage is generally fine, dense and silky with hair bases or roots usually dark. Dorsal pelage is essentially dark brown with distinct gloss on the back. Pelage at throat and belly is paler, uniformly grey or buffy-grey. Wings are broader in comparison to length. Fifth metacarpal is shorter than third and/ or fourth. Wing membranes join at the base of the outer toe. Tail tip extends 5 mm from the interfemoral membrane. The dorsal surface of interfemoral membrane

HB	~80.0
T	~58.0
E	~14.0
FA	54.2-55.1
HF	~10.0
CL	18.3-19.5
C-M ³	7.1-7.8
C-M ₃	7.1-8.7
ZB	13.3-14.6
M	15.0-16.0

is lightly haired adjacent to body and femora. Ventral surface of wing membrane are also lightly haired alongside forearm.

The angular process of the mandible is smaller but slightly projecting beyond the condyle. Canines are about twice longer than the adjacent premolar (pm⁴).

Baculum is stunted with a scarce tip and bilobate base.

Ecology:

This species inhabits in semi desert, temperate and sub-tropical dry forest, farmland and sub-urban areas. They forage in pastures, open woodland edges, tall hedgerows and forested regions. It feeds on large beetles, moths and flies (Bates and Harrison 1997).

35. *Eptesicus dimissus* Thomas, 1916

Common name: Surat Serotine

Nepali Name: Surat ko laampuchhre chamero

IUCN Status (World-wide): DD

National Status: DD

Identifying characters:

The muzzle is exceptionally broad with loose skin over the forehead which mostly forms distinct folds running between ears. Pinnae are short and rounded; with naked posterior margin while some hairs at the anterior margin. The anterior margin is slightly convex while the posterior margin is nearly straight. The tragus is short and rounded with anterior border distinctly convex while posterior border fairly concave. Pelage is short and sparse. Dorsally chestnut brown with pale hair bases and brown hair tips, ventrally pale brown with uniform pale brown hairs. Wing membranes are nearly naked, joined at the middle of outer metatarsal which clearly distinguishes from *E. pachyotis* in which the wing membranes join at the base of the outer toe. Calcar has well developed keel. Tail tip extends 1-3 mm from the interfemoral membrane.

HB	56.0-63.0
T	36.0-41.0
E	14.0-15.0
FA	38.0-42.0
HF	8.0-8.9
CL	~15.4
C-M ³	~5.9

Cranium is shorter but broader than that of *E. fuscus*. The first upper incisor (i²) is bifid and exceeds very slightly the cingulum of the canine. Second upper incisor (i³) is two-third of i². Upper canines are characteristically longer (more than twice) than the adjacent premolar (pm⁴). pm⁴ is narrower while mandible is shorter but broader than that in *E. fuscus*.

Ecology:

Captured over streams (Myers *et al.* 2000).

36. *Ia io* Thomas, 1902

Common name: Great Evening Bat

Nepali Name: Aaiya

Aayo chamero

IUCN Status (World-wide): LC (IUCN 2010)

National Status: CR

Identifying characters:

This species is one of the largest vespertilionid bats. Externally it resembles to a large Serotine. However, differ in pinna with rounded off tips and the breadth around sub-equal to the height, the tragus is one third the height of pinna, nostrils outwardly facing, wing membranes are black throughout. Tail is longer and its tip extruding some 6mm from the interfemoral membrane. The wings are attached to the outer metatarsal of each foot. Pelage is uniform grey brown but when viewed in lights appears slight glossy seen dorsally while uniform matt grey brown.

T	65.0-69.6
HF	11.4-17.0
FA	70.9-78.4
5mt	62.7-68.8
4mt	69.2-74.2
3mt	71.3-75.8
E	23.0-26.4
GTL	27.0-29.4
CCL	25.04-26.41
ZB	16.7-18.0
BB	11.7-12.2
PC	5.5-6.1
C-M ³	10.5-11
C-M ₃	11.47-12.1
M	20.35-21.8
M ³ -M ₃	11.0-11.6

Ecology:

Exclusively cave roosting species. Gravid females are found roosting majorly during spring. These bats leave the cave during the evening before twilight (Csorba *et al.* 1999). This species has been reported feeding on insect diet mainly but also often reported as predator to birds in South-East Asia.

37. *Pipistrellus javanicus* (Gray, 1838)

Common Name: Javan Pipistrelle

Nepali Name: Java ko

chamero

IUCN Status (World-wide): LC

Nepal: LC

Identifying characters:

Dorsal pelage varies from a uniform chestnut brown to darker clove brown with a light frosting of paler brown hair tips. Ventral pelage has

buffy brown hair tips and black hair roots.

Pinnae and membranes are uniform dark brown and essentially naked.

HB	40.0-55.0
T	26.0-40.0
E	5.0-15.0
FA	30.0-36.0
HF	3.0-8.0
CL	11.9-13.1
C-M ³	4.6-5.2
C-M ₃	4.8-5.5
ZB	8.2-9.0
M	9.3-10.7

The first upper incisor (i^2) has anterior and secondary cusps. The secondary cusp may be indistinct, however, attains three-quarter ($\frac{3}{4}$) height of anterior cusp. The second upper incisor equals the height of secondary cusp of i^2 . It has larger central and a smaller lateral accessory cusp. The upper canine has

a distinct posterior secondary cusp which is also present in *P. tenuis*. The first lower premolar is half to three quarters the crown area of second lower premolar as in *P. coromandra* and two-thirds the height of second lower premolar as in *P. tenuis*.

The baculum has a long but narrow shaft, strongly bifid tip and ventrally deflected well developed basal lobes.

Ecology:

This species is found in varied habitat types from primary and secondary forested regions, agricultural landscapes to urban areas. It roosts in trees, crevices and cracks in walls and ceilings of houses, tiles of huts, old buildings, temples, under bark and in holes of large trees, signboards, tree hollows. They occur in small groups of few individuals. It is an early flyer with a slow fluttering flight and hunts on flies, ants and other small insects. There are three breeding seasons and two pups are born (Sanborn *et al.* 1952; Bates and Harrison 1997; Heaney *et al.* 1998; Sara Bumrungsri pers. comm.; Paul Bates Pers. comm.). A single specimen was trapped over a river in partly deforested area while other was captured over a river within primary forest. Frequently observed hunting at canopy level in primary forest and in agricultural landscapes over corn fields (Csorba *et al.* 1999).

Echolocation: The typical echolocation calls are of relatively high in intensity with a steep then shallow frequency from 60 to 40 kHz with maximum time around 45-50 kHz (Csorba *et al.* 1999).

38. *Pipistrellus coromandra* (Gray, 1838)**Common Name:** Coromandel Pipistrelle**Nepali Name:** Buchhe chamero
(Baral and Shah 2008); Coromandel ko pipistrelle chamero
National Status: LC**IUCN Status (World-wide):** LC**Identifying characters:**

Dorsal pelage is uniform brown ranging from chestnut to dark clove brown. Ventral pelage is distinctly paler with beige brown to cinnamon brown hair tips and dark hair roots. Pinnae and membranes are mid to dark brown and essentially naked, except interfemoral membrane is slightly haired throughout adjacent to the body and tail.

The first upper incisor (i^2) has anterior and secondary cusps. The secondary cusp may be occasionally small or absent, however, attains half the height of anterior cusp. The second upper incisor (i^3) is well developed with larger principal cusp and a smaller lateral accessory cusp.

i^3 usually exceeds the height of secondary cusp of i^2 . The upper canine has a secondary cusp and a distinct cingular cusp posterior. The first lower premolar is half to three quarters the crown area of the second lower premolar.

The baculum has a straight or slightly sinuous shaft with a distinctly bifid tip and basal lobes deflected ventrally.

Ecology:

This species is found in varied habitat types from forested regions, agricultural landscapes to urban areas. It roosts in trees, crevices and cracks in walls (Dahal and Thapa pers. obs. comment) and ceilings of houses, tiles of huts, old buildings, temples, under bark and in holes of large trees, signboards, tree hollows in small groups of few individuals. It has been captured from bamboo hollows of huts and sheds (Thapa 2010). It is an

HB	34.0-50.2
T	22.0-39.0
HF	3.4-8.0
FA	25.5-34.3
5mt	25.2-31.1
4mt	25.7-32.7
3mt	25.8-33.1
E	7.1-14.0
GTL	11.8-13.1
CCL	10.6-11.9
ZB	7.6-8.2
BB	5.7-6.7
PC	3.0-3.8
C-M ³	3.9-4.6
C-M ₃	4.1-5.1
M	8.2-9.5
M ³ -M ₃	5.0-6.0
RW	4.3-5.3

early flyer with a slow fluttering flight and hunts on flies, ants and other small insects. There are three breeding seasons and two pups are born (Bates and Harrison 1997). Most of them were captured over streams (Myers *et al.* 2000).

Conservation threats:

Children play with these bats and kill for fun. According to locals at KTWR, Kusaha after the flooding of Koshi the population of the species has decreased. Their habitat is disturbed when the house is re-thatched or maintained (Thapa 2010).

Note: Often this species is hectic to distinguish from large *P. tenuis*, when there are significant overlaps in all external measurements. The case is more serious when both of them occur together in same localities.

39. *Pipistrellus tenuis* (Temminck, 1840)**Common Name:** Least Pipistrelle**Nepali Name:** Sano chamero
(Baral and Shah 2008); Sano pipistrelle chamero
National Status: LC**IUCN Status (World-wide):** LC**Identifying characters:**

Generally dorsal pelage is uniform brown but varies in tone from mid-brown to deep clove brown. Ventral pelage is same as in *P. javanicus* but with dark brown or black hair roots. Pinnae and membranes are dark throughout and essentially naked.

The first upper incisor (i^2) has anterior and secondary cusps. The secondary cusp attains half the height of principal cusp as in *P. coromandra*. The second upper incisor exceeds the height of secondary cusp of i^2 . The upper canine has a distinct posterior secondary cusp. The

first lower premolar is three quarters the crown area of second lower premolar and about two-thirds the height of second lower premolar. The baculum is shorter but similar with that of *P. javanicus* except with distinct notch on basal lobes.

HB	33.0-45.0
T	20.0-35.0
E	5.0-11.0
FA	25.0-30.0
HF	3.0-7.0
CL	9.3-10.7
C-M ³	3.5-4.1
C-M ₃	3.8-4.4
ZB	7.3-7.6
M	7.2-8.3

Ecology:

This species is found in varied habitat types from arid zones, wet and humid areas to forested areas in rural and urban landscapes (C. Srinivasulu pers. comm.). It roosts in hollows of trees, holes, crevices and cracks in walls and ceilings of old buildings, dead leaves of trees. They occur in small groups of few individuals. It has also been found roosting in bamboo hollow of huts and sheds (Thapa 2010). It is an early flyer with a varied flight pattern ranging from a jerky flight with many twists and turns, slow fluttering and floating flight to an inconsistent flight as evening progresses. It feed up on beetles, cockroaches and wingless ants in winter, more varieties of insects during summer and winter, while termites, moths, hymenopterans, dipterans and beetles during monsoon. There are two breeding seasons, one in February-March and other in July-August and give birth to one to three pups (Bates and Harrison 1997).

Conservation threats:

Children play with these bats and kill for fun. According to locals at KTWR, Kusaha after the flooding of Koshi the population of the species has decreased. Their habitat is disturbed when the house is re-thatched or maintained (Thapa 2010).

40. *Falsistrellus affinis* (Dobson, 1871)

Common name: Chocolate pipistrelle **Nepali Name:** Chaklaty chamero (Baral and Shah 2008); Choklaty pipistrelle chamero

IUCN Status (World-wide): LC **National Status:** DD

Identifying characters:

Its pelage is characteristically soft, dense and comparatively long. Dorsal pelage is essentially dark brown with extreme tips of some of the hairs are pale grey giving a slightly grizzled effect. Ventral pelage is slightly paler. The membranes, ears and naked parts of the face are uniform blackish to brown.

Braincase appears relatively smaller to the rostrum. Coronoid process of each half mandible exceeds the lower canine in height. Incisors are not separated from canines in the toothrows. Upper canine (C¹) unicuspid and broad at base.

Baculum has thick and broad shaft, proximal wide and ventrally deeply fluted end and simple distal end.

Ecology:

It roosts in small colonies of five or six individuals in roofs of buildings and cracks, hollows in trees, near human habitations (Molur *et al.* 2002). It feeds on small insects (Bates and Harrison 1997).

HB	43.0-51.0
T	30.0-41.0
E	12.0-15.0
FA	38.4-41.4
HF	7.0-8.0
CL	13.7-14.7
C-M ³	5.5-5.7
C-M ₃	5.6-5.8
ZB	~9.1
M	10.5-11.4

41. *Arielulus circumdatus* (Temminck, 1840)

Common Name: Bronze Sprite

Nepali Name: Kaale chamero (Baral and Shah 2008); Jhilke chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying Characters:

Its pelage is characteristic, long and soft. Dorsal pelage is essentially black with orange sheen at head and back. Ventral pelage is paler with slightly darker hair roots and paler roots. Ears darker brown or black in color with pale anterior and posterior margins in some specimens. Tragus is broad and with pale margins. Wing membranes are uniform dark brown and essentially naked.

HB	~95.0
T	42.9-48.0
TIB	16.2-17.4
HF	6.7-8.5
FA	40.8-43.6
E	13.5-16.3
CL	14.6-15.88
C-M ³	5.85- 6.5
C-M ₃	6.18-6.80
ZB	~11.6
M	11.52-12.7

Ecology:

This species dwells to the surface of ponds and rivers (3-4m above), hunt around canopy of the montane forests in small gaps. Flight is fast and less maneuverable than that of *Pipistrellus* (Csorba *et al.* 1999). They can also be found from primary and secondary teak forest in South Asia (Bates and Harrison 1997, Molur *et al.* 2002).

Echolocation: 45-50 kHz (Csorba *et al.* 1999).

42. *Nyctalus noctula* (Schreber, 1774)**Common name:** Noctule**Nepali Name:** Gandhe chamero
(Baral and Shah 2008);
Thulo gandhe chamero
National Status: DD**IUCN Status (World-wide):** LC**Identifying characters:**

This species is a large and robust vespertilionid bat. Tail is relatively short with the tip of the final vertebrae (third caudal vertebra) protruding 2-3 mm from the membrane. Calcar is well developed. Muzzle is broad with well marked glandular swellings. In adult there is presence of a whitish/yellowish oval buccal pad at the posterior aspect or angle of mouth. Pinna is short and tragus is club-shaped expanding distally. Antitragus is low. Feet are large, more than half the length of tibiae. Wings are long, narrow, leathery, opaque and black in color. The fifth metacarpal is greatly shortened than third or fourth. Pelage is short, dense, fine and silky. The dorsal pelage ranges from cinnamon brown to dark brown with marked gloss in reflected light.

HB	68.0-80.0
T	33.0-55.0
HF	10.2-11.4
FA	50.9-57.8
WSP	336.0-336.0
5mt	41.1-45.6
4mt	51.4-54.5
3mt	53.4-55.9
E	13.0-17.3
GTL	18.1-19.4
CCL	17.1-18.6
ZB	12.2-13.3
BB	9.4-10.3
PC	5.1-5.8
C-M ³	7.1-7.7
C-M ₃	7.5-8.2
M	13.8-14.7
M ³ -M ₃	8.5-9.5
RW	7.7-8.9

Ventral pelage is somewhat similar to the dorsal pelage, sometimes slightly paler or darker. Hairs are characteristically uni-colored. Wing membranes are densely furred ventrally, which seems as a thick line joining the elbows to the knees. Interfemoral membranes are haired throughout. Penis is distinctly enlarged.

Habitat and ecology:

It forages over wetland, woodland and pastures. They feed upon larger moths, beetles and flies. Summer colonies are found in tree holes, sometimes in buildings. Winter hibernacula are in rocks, crevices, caves and occasionally artificial structure. Maternity colonies number 20-50 females (Occasionally up to 100). In May, the captured female was lactating; probably giving birth to twins (the uterine horns were

enlarged, each with a placental scar). Noctules were observed flying usually above 10 m in open fields. The flight pattern and echolocation appears similar to those of European *Nyctalus noctula*. It can be confused with *Scotophilus* species in flight (Csorba *et al.* 1999). It was found in the tree holes of Chestnut *Castanopsis tribuloides* (Musure Katus) at Swoyambhu (Thapa *et al.* 2010). They migrate and hibernate.

43. *Nyctalus montanus* (Barrett-Hamilton, 1906)**Common name:** Mountain Noctule**Nepali Name:** Pahadi chamero
(Baral and Shah 2008); Sano
gandhe chamero**IUCN Status (World-wide):** LC**National Status:** DD**Identifying characters:**

This species is small noctula. The fur is characteristically uniform brown throughout in coloration (which is bi-colored in *N. leisleri*).

Ecology:

It inhabits in riparian habitat and arid flood plains with rich undergrowth in the Himalaya. It roosts among rocky cliffs, crevices among rocks and overhanging vegetation (Molur *et al.* 2002). It was collected from arid flood plain dominated with vegetation of *Euphorbia sp.*, agave, mango and banyan; *Acacia catechu* constitutes predominant undergrowth (Mitchell 1980).

HB	70.0-70..0
T	43.0-43.0
FA	42.9-43
5mt	36.0-37.0
4mt	42.5-43.0
3mt	41.5-43.8
E	14.0-14.0
GTL	16.2-16.9
CCL	15.4-16
BB	8.3-8.7
PC	4.8-4.9
C-M ³	6.5-6.6
C-M ₃	6.9-7.0
M	12.7-12.8
M ³ -M ₃	7.8-7.8

44. *Philetor brachypterus* (Temminck, 1840)**Common name:** Short-winged Pipistrelle**Nepali Name:** Rohu ko
chamero**IUCN Status (World-wide):** LC**National Status:** VU**Identifying characters:**

This species is a small but robust vespertilionid bat. Fifth metacarpal is shorter in comparison to fourth. Face is similar to *Nyctalus* with short,

blunt, essentially naked snout. Nostrils are situated apart and open obliquely outwards. Pinna is short and broad; anterior margin is slightly convex, the tip broadly rounded off and posterior margin with base running forwards to end behind and below the angle of the mouth. Tragus is fleshy and thickened with interior margin straight while outer margin is slightly convex with inconspicuous basal lobule; it is broad and short, less than one third the height of the pinna. Legs are short and wings are attached to the lower end of tibiae. The pelage is reddish brown dorsally and paler ventrally (Bates and Harrison 1997), while specimens in BMNH appears deeper chocolate brown. Penis is relatively very large and without a prepuce.

T	27.1-32.2
HF	6.4-8.1
FA	31.7-35.7
5mt	7.1-30.1
4mt	30.2-35.2
3mt	31.5-36.1
E	8.0-10
GTL	13.4-14.9
CCL	12.4-13.7
ZB	10.0-10.7
BB	7.4-8.1
PC	4.4-4.8
C-M ³	4.5-4.8
C-M ₃	4.7-5
M	9.9-10.7
M ³ -M ³	6.6-7.1
RW	6.3-6.7

Ecology:

It inhabits in montane forest. It is known to roosts in tree hollows (Molur *et al.* 2002).

45. *Hesperoptenus tickelli* (Blyth, 1851)

Common name: Tickell's Bat

Nepali Name: Tickell ko nakkali chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

It's large-sized vespertilionid bat. Muzzle is broad and blunt swollen on the sides and essentially naked anteriorly. The forehead is broad and thickly haired. Pinnae are yellowish brown, moderately long, thick fleshy, anterior border of which is convex and tip broadly rounded. Tragus is crescent shaped with blunt tip and about half the height of the pinna. Antitragus well developed and partly concealed under short fur. Wings are moderately broader and comparatively longer. Forearms, metacarpals and femora are flesh-colored within black colored membranes; however, interfemoral membrane is light reddish brown which darkens to almost black at the outer margins. Pelage is moderately short and

dense. Dorsal pelage varies in coloration from light grayish yellow to bright golden brown, sometimes with rufous tinge to the hair tips and dark grey hair bases. Ventral pelage is lighter grey with shorter hairs.

Ecology:

It roosts solitarily or in small colonies of few individuals among dense canopy of forests of lowlands to hills. This species forages in open land areas within paddy fields, grasslands. Its flight is slow but steady. It feeds majorly on beetles, termites and other insects. Female give birth to a single pup yearly (Bates and Harrison 1997). The species was captured in an arid flood plain with dominant vegetation of *Euphorbia sp.*, agave, mango and banyan (*Ficus sp.*); Thorn bush *Acacia catechu* constitutes predominant undergrowth (Mitchell 1980).

HB	61.0-83.6
T	44-63
HF	9.0-14.0
FA	50.0-60.4
WSP	374.0-416.0
5mt	42.3-53.6
4mt	43.3-56.4
3mt	44.3-56.5
E	14.0-18.8
GTL	18.5-20.5
CCL	17.2-19.6
ZB	13.1-15.4
BB	9.2-7.2
PC	4.5-5.5
C-M ³	7.1-8.2
C-M ₃	7.9-9.2
M	14.6-16.5
M ³ -M ³	8.6-10.4
RW	8.1-9.9

46. *Murina leucogaster* Milne-Edwards, 1872

Common name: Rufous Tube-nosed Bat

Nepali Name: Thulo Naalinaake chamero

IUCN Status (World-wide): DD

National Status: DD

Identifying characters:

This is large species of the genus. Muzzle and lower lips are naked, fleshy and dark. Nostrils are tubular and protuberant; orifices are circular and open obliquely. Upper lip fringed. Eyes are smaller and located near the anterior bases of the ear. Pinna is short but broad, anterior margin is smoothly convex with rounded tips and its interior is haired, while posterior margin is consequently nearly straight above and convex below. Tragus is long, narrow and tapering. Anterior margin is slightly convex, concave above and slightly convex below with a basal notch. Pelage is dense and velvety. The dorsal pelage is ferruginous red, intermixed with fawn with dark grey hair roots.

Ventral pelage is paler in appearance with the hair roots paler. The interfemoral membrane is moderately haired dorsally with fine reddish hairs and its naked ventrally. Wing is short but broad with larger thumb, which joins the base of outer toe of each foot. Feet have hairy toes characteristically.

Ecology:

It inhabits in forest. In China this species is found roosting in caves, trees and houses. It forages in both forested and open areas (Smith and Xie 2008). It was found dead in a room early on the morning of September. While foraging in open fields, it apparently skims closely over the surface of crops and grasses (Scully 1887).

HB	47
T	35
HF	9
FA	40.9
5mt	37.8
4mt	37.5
3mt	39.9
E	15
GTL	18.8
CCL	16.3
ZB	10
BB	8.2
PC	5.5
C-M ³	6.1
C-M ₃	6.6
M	13.1
M ³ -M ³	6.4
RW	66

47. *Murina aurata* Milne-Edwards, 1872

Common name: Tibetan Tube-nosed Bat **Nepali Name:** Sano Nalinaake chamero (Baral and Shah 2008), Tibatti Nalinaake chamero

IUCN Status (World-wide): LC **National Status:** NT

Identifying characters:

Nostrils are tubular and outwardly protuberating. Pinna is broad and rounded, without an emargination on the posterior border. Tragus is long but narrow and tapering white colored. Pelage is thick and very soft. Dorsal pelage is characteristically mixed; golden and brown in color with the bases of hairs dark brown, pale straw brown midway and hair tips golden. Ventral pelage has dark hair roots and grey hair tips.

Wings are essentially naked with uniform mid-brown coloration. Interfemoral membrane is moderately haired dorsally, with golden hairs while slightly covered by short grey hairs ventrally. Feet are also hairy.

Ecology:

It is believed to be roosting in tree or foliage in China (Smith and Xie 2008). This species hunts close to ground and it is thought to be hibernating in trees in the forest during the winter. It has been recorded from Sedonchen, Sikkim at an altitude of 2000m a.s.l. The area is a small village surrounded by steep mountain slopes covered by thick mixed forest of pine, oak, maple, walnut and bamboo. Few fields of buck wheat were also found in the locality (Bates and Harrison 1997).

HB	45.0-45.0
T	27.0-27.0
HF	4.5-4.5
FA	27.7-29.6
5mt	25.3-27.8
4mt	25.2-27.5
3mt	26.0-28.2
E	13.0-13.0
CCL	12.3-12.3
ZB	7.5-7.5
BB	6.7-6.7
PC	4.0-4.0
C-M ³	4.5-4.5
C-M ₃	4.5-4.9
M	9.2-9.4
M ³ -M ³	4.7-4.8
RW	4.3-4.7

48. *Murina cyclotis* Dobson, 1872

Common name: Round-eared Tube-nosed Bat **Nepali Name:** Golokaane Nalinaake chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

Pelage is characteristic. The dorsal pelage has more orange and less reddish hue with hair roots pale grey. Ventral pelage slightly darker in appearance because of mid-grey hair roots although the hair tips are paler. The interfemoral membrane is moderately covered with orange hairs dorsally and it's nearly naked ventrally. Feet and hind limbs are very hairy. Pinna is broadly rounded, without an emargination on the posterior border. Tragus is typical of the genus; convex on its anterior border whilst the posterior border is concave above and slightly convex below; Light brown and

HB	44-44
T	35.2-35.2
HF	8.0-8.0
FA	32.0-32.0
5mt	30.0-30.0
1ph5mt	29.6-29.6
2ph5mt	30.2-30.2
4mt	14.8-14.8
1ph4mt	16.5-16.5
2ph4mt	14.4-14.4
3mt	9.5-9.5
1ph3mt	7.5-7.5
2ph3mt	4.2-4.2
E	5.4-5.4
Tragus length	5.9-5.9
WSP	11.2-11.2
wt.	5.6-5.6

whitish at base internally, while the long pointed tragus (slightly curved, and not as narrow as *Kerivoula*) is white with brown tips and with a notch at the base of the posterior margin.

Ecology:

This species is forest dweller and roosts among leaves of Cardamom plantations in forested tracts as well as in caves. It is found roosting in colony of two to five individuals (Molur *et al.* 2002). Hunts for small insects among the cardamom plantations and is a low and swift flyer (Bates and Harrison 1997). It can also be reported from secondary forest (G. Csorba pers. comm.). Probably it roosts in the dry leaf of banana trees in Nepalese hill. It was captured by hand in a hut well after sunset at Chitwan National Park (Csorba *et al.* 1999).

Echolocation:

High frequency, very broadband FM sweeps, of low intensity and short duration, and typically emitted in groups of 1-2 calls. Mean initial frequency 165 KHz with end frequency 5 kHz, Peak frequency 77 kHz (but energy distributed fairly evenly throughout call), duration around 2 ms (1-4ms) (Kingston *et al.* 1999).

49. *Murina huttoni* (Peters, 1872)

Common name: White-bellied Tube-nosed Bat

Nepali Name: Hutton ko Nalinaake chamero

IUCN Status (World-wide): LC

National status: DD

Identifying characters:

Pelage is dense and velvety, characteristically browner and less reddish. The dorsal pelage has mid grey hair roots and pale grey to brown hair tips. Ventral pelage is paler in appearance although the hair roots are darker. It distinguishes with *M. cyclotis* by shorter forelimb and longer pinnae. The interfemoral membrane is moderately haired dorsally with long and pale brown hairs and its naked ventrally. Feet are hairy. The posterior border of pinna is smoothly convex and without an emargination. Muzzle is typical of the genus.

Ecology:

It inhabits in montane forests, tropical broadleaved forests and banana

plantations. It roosts among banana leaves, and the bases of banana plants and under tree bark (Molur *et al.* 2002). The specimens captured at Makalu and Kanchenjunga region of Nepal. They were found roosting in leaf tent of banana tree (*Musa species*). One was found roosted in dry leaf tent whereas another was found roosting inside the modifying cylindrical structure of banana leaf. However both captured specimen were solitary sub adults, the exact roost of adults is still unknown. In Sedua, the banana patch is at the farm land irrigated with stream water i.e. marshy or damp type adjacent to stream (Acharya 2010).

HB	48.0-48.0
T	37.0-37.0
HF	6.0-6.0
FA	32.8-35.4
5mt	30.9-33.4
4mt	30.1-33.3
3mt	31.4-34.1
E	17.0-17.0
GTL	16.9-17.8
CCL	14.9-15.5
ZB	9.4-9.8
BB	7.5-8.0
PC	4.3-4.4
C-M ₃	5.8-6.1
C-M ₃	6.4-6.9
M ₃	11.5-12.2
M ₃ -M ₃	5.8-6.2
RW	5.1-5.5

50. *Kerivoula picta* (Pallas, 1767)

Common name: Painted Woolly Bat

Nepali Name: Rangichangi chamero (Baral and Shah 2008), Rangichangi bhuwadar chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

Pinnae are cone shaped; large with distinct concavity below the tip on posterior border. Tragus is tall and narrow; its anterior margin is slightly convex, posterior margin has a small basal projection at the widest part. Muzzle is characteristically very hairy with naked nostrils which are slightly protuberant and directed slightly downwards and outwards. Pelage is long, dense, woolly and bright colored. Dorsal pelage is bright orange to tawny red throughout with uniform hair. Ventral pelage is buff colored with distinct orange hue on flanks. Characteristically wings are bright orange adjacent to the body and on either side of metacarpals, remaining black, dorsally and ventrally. Interfemoral membrane is characteristically orange to scarlet on proximal half of the membrane

HB	46.5-46.5
T	45.5-45.5
HF	34.7-34.7
TIB	34.3-34.3
5mt	35.2-35.2
3mt	34.7-34.7
E	15.0-15.0
GTL	14.8-14.8
CCL	12.8-12.8
ZB	8.6-8.6
BB	6.8-6.8
PC	3.3-3.3
C-M ₃	5.7-5.7
C-M ₃	6.0-6.0
M ₃	10.5-10.5
M ₃ -M ₃	5.7-5.7

(adjacent to body). The proximal half of the membrane, femora, tibiae and feet are hairy and remaining naked. Well developed fringe of hairs are present on posterior border of the interfemoral membrane. Wings are attached to the base of the outer toe.

Ecology:

It may inhabit the dry deciduous forests, dry grassland. It may be roosting among dried leaves of banana and even in sugarcane fields. It flies close to the bushes and exhibit fluttering flight (Molur *et al.* 2002).

51. *Kerivoula hardwickii* (Horsfield, 1824)

Common name: Hardwicke's Woolly Bat

Nepali Name: Hardwicke ko bhuwadar chamero

IUCN Status (World-wide): LC

National Status: LC

Identifying characters:

Pinnae are cone shaped; large with the notch below the tip on posterior border is more concave and less angular. Tragus is narrow, essentially straight and sharply pointed. Face is haired except nostrils that are directed slightly downwards and outwards. Snout is whiskered which is protruding beyond the hairs of snout. Pelage is long and dense and wooly. Dorsal pelage is generally deep clove brown with some paler hair tips to grey brown with dark grey hair bases. Ventral pelage is greyer with dark hair roots and paler grey hair tips. Wings and interfemoral membrane are brown and nearly transparent. Dorsal surface of interfemoral membrane adjacent to the body is slightly haired. Also femur, tibia and foot of each leg are hairy. Wings are attached to the base of the outer toe.

HB	39.0-55.0
T	35.0-45.3
HF	5.0-8.0
FA	31.7-36.0
HF	5.0-8.0
CL	12.4-13
E	10.7-12.9
C-M ³	5.44-5.8
C-M ₃	5.77-6.1
M	9.9-10.6

Ecology:

Local people collected specimens from houses. Six amongst seven were pregnant with one embryo each (Csorba *et al.* 1999). The species was captured from the Arun gorge at the bridge from Num to Seduwa at about 7.45 PM (Acharya 2010).

Family Miniopteridae

52. *Miniopterus schreibersii* (Kuhl, 1817)

Common name: Schreiber's Long-fingered Bat

Nepali Name: Baange chamero (Baral and Shah 2008), Schreiber ko laampakhete chamero

IUCN Status (World-wide): NT

Nepal: LC

Identifying characters:

Tail, interfemoral membrane and hind limbs are long. Characteristically, each wing have highly developed second phalanx of the third digit (about 3 times the first phalanx of the same digit). Pinna is small and broad with rounded tip and its height not exceeds the pelage of the crown significantly. The tragus is also stunt about half the height of the pinna, slightly curved forward, antitragus is low and less distinct. The pelage is soft, silky and dense. The dorsal pelage ranges from blackish brown to black throughout but sometimes with greyish hair tips. Ventral pelage is usually slight paler. Short hairs of the forehead extend to the nostril pads characteristically. Cheeks are naked below the eyes. Membranes are uniformly dark throughout. Especially, the body is usually inundated with numerous ecto-parasites, generally Nycteribiids and streblids.

HB	47.0-65.6
T	44-61
HF	7-12.0
TIB	17.7-20.5
FA	44-7-49-6
WSP	322.0-328.0
5mt	37.0-40.4
4mt	40.5-44.2
3mt	41.1-46.4
E	8.7-12
GTL	15.3-16.4
CCL	13.6-14.8
ZB	8.5-9.1
BB	7.5-8.3
PC	3.8-4.1
C-M ³	5.8-6.3
C-M ₃	6.3-6.8
M ₃	10.7-11.8
M ³ -M ³	6.4-6.9
RW	5.1-5.7

Ecology:

It favorably inhabits the hilly and forested areas. It roosts in large colonies ranging up to 200 individuals in caves and forests. Its colony can co-occur with colonies of other species such as *Rhinolophus sp.* (*R. affinis*, *R. macrotis*, *R. pusillus*, *R. ferrumequinum*) and other species (*Myotis nipalensis*, *M. csorbai* and *Hipposideros armiger*). This species leave their diurnal roosts in mass soon after sunset. Hunt through and between trees, encircles at medium height (about 3-5m above ground) during their flight (even encircles inside the cave) (Thapa and Thapa

2009). Diet may comprise of tiny insects (Diptera and Coleoptera) (Bates and Harrison 1997). This species is common in caves of western Nepal, hundreds of specimens were observed leaving their roost. One specimen were captured in primary forest another in a partly deforested area (Csorba *et al.* 1999). Each individual were inundated by numerous ecto-parasites. They are late evening flier mistnetted at 19:50 (Siddha Cave). Its flight is fast (Ghimire *et al.* 2010). They are direct feeding quite away from their roosting site. They are canopy fliers to catch the insects but adopt low flight above the stream and water surfaces.

Echolocation: Magenta Mklb bat detector detected the frequency of echolocation call of 70 kHz at Siddha Cave (Ghimire *et al.* 2010) and 50-80 kHz at Paanimuhan (Thapa *et al.* 2010).

53. *Miniopterus pusillus* Dobson, 1876

Common name: Small Long-fingered Bat **Nepali Name:** Sano baange chamero (Baral and Shah 2008), Sano laampakhete chamero

IUCN Status (World-wide): LC

National Status: DD

Identifying characters:

This species is similar to *M. schreibersii* but it is significantly smaller in measurements. According to Dobson 1878, the fur extends on the interfemoral membrane up to the third caudal vertebra (whereas in case of *M. schreibersii* the fur extends to the end of the first caudal vertebra). The pelage is black throughout but sometimes with grayish hair tips.

Ecology:

It inhabits the humid areas. It roosts in large colonies ranging up to 700 individuals in limestone caves, houses and forests (Molur *et al.* 2002).

T	40.1-44.1
FA	39.6-41.6
5mt	33.6-34.1
4mt	53.3-36
3mt	36.4-37.5
GTL	13.1-13.7
CCL	12.0-12.7
ZB	7.5-8.0
BB	6.8-7.1
PC	3.4-3.7
C-M ³	5.1-5.3
C-M ₃	5.4-5.6
M	9.3-10.0
M ³ -M ₃	5.5-5.7
RW	4.6-4.7

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APPENDIX

SPECIES DISTRIBUTION TABLE

Species	Locations and altitudes	References
<i>Arielulus circumdatu</i> s	Suki Patyl Forest, Num VDC (87° 17' E, 27 33' N), Sankhuwasabha district at an altitude of 2031m.a.s.l. (FMNH)	Bates and Harrison, 1997 as <i>Pipistrellus circumdatu</i> s
	Lam Pokhari, Terhathum district (87° 32' E, 27° 15' N) at an altitude of 3000m.a.s.l.; Sudame (83° 25' E, 28° 20' N) at an altitude of 1500m a.s.l., Banthanti (83° 44' E, 28° 23' N) at an altitude of 2200-2300m a.s.l.; Kaski district	Csorba <i>et al.</i> 1999
<i>Barbastella leucomelas</i>	5 Unconfirmed localities	Corbett and Hill, 1992 [cited in Suwal <i>et al.</i> 1995 (BPP) and Bates and Harrison 1997]
	Annapurna CA, Makalu-Barun NP, Rara NP	Suwal <i>et al.</i> 1995 (BPP)
	Banthanti (83° 44' E, 28° 23' N) at an altitude of 2200-2300m a.s.l, Kaski district	Csorba <i>et al.</i> 1999
<i>Cynopterus sphinx</i>	Chatrapati, Kathmandu district	Abe 1971

Chisapani (81° 17' E, 28° 38' N) (Probably Karnali Bridge on Mahendra Highway according to given co-ordinate) (Johnson <i>et al.</i> , 1980)	Bates and Harrison 1997
Salthar (84° 37' E, 28° 01' N) (Probably in Gorkha) (BMNH)	
Barabisse (85° 35' E, 27° 35' N), Sindhupalchowk district: Shebu??? (Probably Shibua in Shyabun V.D.C.), Wana, Tumlingtar; Sankhuwasabha district (FMNH)	
Makalu-Barun NP, Bardia NP, Chitwan NP, Rara NP	Suwal <i>et al.</i> 1995 (BPP)
In the vicinity of The Nepal Conservation Research and Training Center (84° 29.5' E, 27°34.2' N), Sauraha at an elevation of 200m; Nandon Tal (84° 28.7' E, 27°32.1' N); Dudora Nala/Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha: CNP	Myers <i>et al.</i> 2000
Chisapani (Near Kulekhani)	Johnson <i>et al.</i> 1980 (cited in Shrestha 1997)
Banpale forest (83° 59' 22.8" E, 28° 11' 15.6" N), Institute of Forestry, Pokhara, Kaski district at an altitude of 818 m a.s.l.	Giri 2009
Keraghari (84° 25' 48.6" E, 27° 56' 45.2" N), Satrasaya, Tanahun district at an elevation of 344m a.s.l.	Ghimire <i>et al.</i> 2010

	Budhabaare at Jamuna V.D.C., Chisapani (400m a.s.l.), Pyang (1000m a.s.l.); Ilam district: Simwa (900m a.s.l.) in Taplejung district: Maanebhanjyang, Malta, Dangigaun-Wanna (1000ma.s.l.); Sankhuwasabha district	Acharya 2010
	Madan Pokhara valley at an elevation 750 m a.s.l., Siluwa V.D.C (83° 48' 33.6" E, 27° 47' 08.3" N) at an elevation of 800 m a.s.l.; Palpa district: Milan chowk, Amarmarg-3 (83° 27' 50.0" E, 27° 41' 20.2" N), Butwal, Rupendehi District: Hario kharka in Institute of Forestry compound, Pokhara, Kaski district at an elevation of 790 meters.	Adhikari 2010
	Morang-Sunsari corridor	Dibya Dahal pers. observation comment
	T u m l i n g t a r , K h a n d b a r i , Maanebhanjyang; Sankhuwasabha district	Dahal and Thapa 2010
	Kanchanpur district	Choudhary and Ghimire pers. obs.
	Biratnagar, Kusaha, KTWR, Dang district, and Throughout Nepal	Sanjan Thapa pers. observation comment
<i>Eonycteris spelaea</i>	In the vicinity of The Nepal Conservation Research and Training Center (84° 29.5' E, 27°34.2' N), Sauraha, at an elevation of 200m; Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha: CNP	Myers <i>et al.</i> 2000
	Makwanpur, Dhading, Chitwan, Gorkha	Sanjan Thapa Pers. observation comment

<i>Eptesicus serotinus</i>	Makalu-Barun NP	Suwal <i>et al.</i> 1995 (BPP)
	Tumlingtar (87° 16' E, 27° 33' N) at an altitude of 462m a.s.l., Sankhuwasabha district (FMNH)	Bates and Harrison 1997
<i>Eptesicus dimissus</i>	Dudora Nala/Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha; Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha: CNP	Myers <i>et al.</i> 2000
<i>Falsistrellus affinis</i>	Locality not confirmed (outside Protected areas)	Corbett and Hill, 1992 [Cited in Suwal <i>et al.</i> 1995 (BPP)] as <i>P. affinis</i>
	Nagarkot at an altitude of 2000m a.s.l. (85° 20' E, 27° 42' N) (BMNH)	Bates and Harrison, 1997 as <i>Pipistrellus affinis</i>
<i>Hesperoptenus tickelli</i>	Dang-Deokhuri (82° 17'E-28° 09' N) at an elevation of 680m a.s.l. (Mitchell, 1980)	Bates and Harrison 1997
	Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha; Dudora Nala/Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha; Tamar Tal (84° 20.3' E, 27°31.9' N), approx. 13 km E of Sauraha; Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha: CNP	Myers <i>et al.</i> 2000
<i>Hipposideros armiger</i>	Annapurna CA, Makalu-Barun NP, Rara NP	Hodgson, 1835 [cited in Suwal <i>et al.</i> 1995 (BPP)]

	Bachek ?? (Probably in Gorkha) (84° 37' E, 28° 01' N); Hathiban (on the way to Dakshinkali), Kathmandu district (85° 12' E, 27° 42' N): Danokharka ??? (Fry, 1925)	Bates and Harrison 1997
	Syangja (83° 42' E, 28° 49' N): Bimalnagar (84° 29' E, 27° 45' N), Tanahun district (HNHM)	
	Bouzini ?? (85° 12' E, 27° 42' N) (Probably in Kathmandu valley); Pattibhagan?? (85° 15' E, 27° 48' N) (Patibhanjyang, Probably in Nuwakot district) (Hinton and Fry, 1923)	
	Godawari (85° 24' E, 27° 34' N) (HZM) Near Pokhara at an altitude of 1030m a.s.l. (Kock, 1996)	
	Near Baglung: Gari ?? (Probably Nuwakot Gadhi) at an altitude of 1200m: Suki Patyl Forest, Num VDC (87° 17' E, 27° 33' N), Sankhuwasabha district at an altitude of 2031m.a.s.l. (FMNH)	
	Balaju Forest Reserve (now Shivapuri Nagarjun National Park) at an altitude of 1410m a.s.l., Chobar at an altitude of 1400m a.s.l.; Kathmandu district: Bimalnagar, (84° 26' E, 27° 55' N) at an altitude of 750m a.s.l., Tanahun district: 4 Km E of Syangja (Putalibazaar) (83° 44' E, 28° 08' N) at an altitude of 1300m a.s.l., Saldanda of Syangja (83° 48' E, 28° 07' N) at an altitude of 1100m a.s.l.; Syangja district: Batulechour (83° 58' E, 28° 15' N), Pokhara, Kaski district	Csorba <i>et al.</i> 1999

Nagarjun Cave, Kathmandu, Nagarjun Royal Forest (Shivapuri Nagarjun National Park)	Malla 2000
Dharan, Barahachhetra, Biratnagar (erroneous)	Shrestha 1997
Pokhara Caves	Acharya 2006
World Peace Cave and Birendra Cave, Pokhara	Daniel 2007
Tunnel at Sundarijal, (E 85° 25' 35.4", N 27° 46' 18.5") at an altitude of 1579m a.s.l.	Thapa <i>et al.</i> 2009
Kailash Cave, Syangja district	Thapa and Thapa 2009
Mahendra Cave (83° 58' 45.7" E, 28° 16' 19.6" N) at an altitude of 962m a.s.l., Lamachaur; Bat Cave (83° 58' 33.7" E, 28° 16' 2.5" N) at an altitude of 980m a.s.l., Lamachaur; Putali Cave (84° 00' 10.6" E, 28° 14' 50.4" N), Bhalam; Birendra Cave (84° 00' 15.1" E, 28° 14' 50.2" N) at an altitude of 911m a.s.l., Bhalam; Kachuwa Cave (84° 00' 17.0" E, 28° 14' 54.9" N) at an altitude of 903m a.s.l., Bhalam; Pathikhola Cave (83° 54' 39.3" E, 28° 18' 55.6" N) at an altitude of 903m a.s.l., Lahachowk: Kaski district	Giri 2009
Godawari (85° 22' 40.81" E, 27° 35' 42.08" N), at an altitude 5000ft a.s.l., Lalitpur district; Tunnel at Sundarijal, (E 85° 25' 35.4", N 27° 46' 18.5") at an altitude of 1579m a.s.l.; Nagarko (85° 31' 15.95" E, 27° 43' 15.37" N) at an altitude of 6000 ft., Bhaktapur district	Thapa <i>et al.</i> 2010

Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Tanahun district	Ghimire <i>et al.</i> 2010
Dhaukhani (84° 4' 6.71" E, 27° 45' 3.38" N) at an altitude of 988m a.s.l., Pokhari, Dhaubadi V.D.C. Ward No. 3, Nawalparasi District	Thapa <i>et al.</i> 2010
Pyang V.D.C (1000m a.s.l.), Mai Majuwa V.D.C, Jamuna V.D.C, Sakejung Odar (Cave) (88° 13' 15.9" E, 26° 49' 33.6" N) at an altitude of 1471m a.s.l. ,Maipokhari V.D.C. ; Ilam district: Arun gorge, Karki gaun-Seduwa, Walleshwor and Nageshwor Mahadev Cave at an altitude of 1400m a.s.l. , near Chainpur, Sankhuwasabha district: Nkwaphuko-Tapethok at an altitude of 1350m a.s.l., Taplejung district	Acharya 2010
Chamere Dhulo Kharbare or Arbhu Gufa, Argale V.D.C , (83° 28' 16.3" E, 27° 55' 3.0" N) at an altitude of 553m a.s.l., Shree Siddha Cave, Ramdi Area (83° 37' 54.2" E, 27° 54' 17.9" N) at an altitude of 460m a.s.l., Ghising Odar, Sukekot 9, Sahalkot V.D.C (83° 58' 10.7" E, 27° 48' 57.5" N); Palpa district: Chamere Gupha, Batule Chour (83° 58' 25.6" E, 28° 16' 03.3" N) at an altitude of 981 m a.s.l. , Mahendra Cave, Batule Chour (83° 58' 12.3" E, 28° 15' 59.3" N) at an altitude of 962 m a.s.l. , Banpale Danda forest near Institute of Forestry at an altitude of 815 m a.s.l., Pokhara Sub-Metropolitan; Kaski district	Adhikari 2010

<i>Hipposideros cineraceus</i>	Annapurna CA	Suwal <i>et al.</i> 1995 (BPP)
	Kathmandu Valley (85° 12' E, 27° 42' N) (BMNH)	Bates and Harrison 1997
	Chobar, (E 85° 17' 39.2", N 27° 39' 35.3") at an elevation of 1404m, Kathmandu district	Thapa <i>et al.</i> 2009; 2010
	Tari, Sulubung V.D.C., Ilam district: Walleshwor Cave at an altitude of 1400m a.s.l., near Chainpur, Sankhuwasabha district	Acharya 2010
<i>Hipposideros pomona</i>	Mahendra Gupha, Pokhara (BMNH)	Bates and Harrison 1997
<i>Hipposideros fulvus</i>	Kathmandu Valley (85° 12' E, 27° 42' N) (Scully, 1887)	Bates and Harrison 1997
	Chamere Gupha, Dang district	Lamichhane and Ghimire pers. obs.
<i>Ia io</i>	Bimalnagar (HNHM)	Bates and Harrison 1997
	Bimalnagar (84° 26' E, 27° 55' N) at an altitude of 750m a.s.l., Tanahun district	Csorba <i>et al.</i> 1999
<i>Kerivoula hardwicki</i>	Mamankhe (87° 57' E, 27° 26' N) at an altitude of 1700m, Taplejung district	Csorba <i>et al.</i> 1999
	Arun River gorge in between Num to Seduwa	Acharya 2010
<i>Kerivoula picta</i>	Bardia NP, Chitwan NP	Suwal <i>et al.</i> 1995 (BPP)

	Dhangari Khola (84° 11.5' E, 27° 32.2' N), Tiger Tops, 33 km W of Sauraha, CNP	Myers <i>et al.</i> 2000
<i>Megaderma lyra</i>	Locality not confirmed (Outside Protected areas)	Suwal <i>et al.</i> 1995 (BPP)
	Barabisse(85° 35' E, 27° 35'N) (in Arniko Highway, Sindhupalchowk district) (FMNH) Hazaria (85° 20' E, 26° 51' N) (Hinton and Fry, 1923) Kathmandu (85° 12' E, 27° 42' N) (HNHM)	Bates and Harrison 1997
	Balaju Forest Reserve (now Shivapuri Nagarjun National Park) at an altitude of 1410m a.s.l., Chobar at an altitude of 1400m a.s.l.; Kathmandu district	Csorba <i>et al.</i> 1999
	Nagarjun Cave, Kathmandu, Nagarjun Royal Forest (Shivapuri Nagarjun National Park)	Malla 2000
	Bahundangi-2 (E 88° 27' 58.7", N 26° 32' 33.3") at an altitude of 176m, Jhapa Smriti Library, Taaghandubba-5 (E 88° 09' 5.7", N 26° 17' 33.1") at an elevation of 64m; Jhapa district: Samrat Chowk, Biratnagar SMP-1, Morang district at an altitude of 72m a.s.l.: Kusaha-4 (E 87° 19' 46.5", N 26° 25' 48.7") at an altitude of 71m, Sunsari district	Thapa 2009
	Danabari, Ilam district; Walleshwor Cave at an altitude of 1400m a.s.l., near Chainpur, Sankhuwasabha district	Acharya 2010

<i>Miniopterus pussilus</i>	Pokhara (83° 58' E, 28° 14' N) (Maeda, 1982; Locality queried by Corbett and Hill, 1992)	Bates and Harrison 1997
	Locality not confirmed (Outside Protected areas)	Suwal <i>et al.</i> 1995 (BPP)
	Dhangari Khola (84° 11.5' E, 27° 32.2' N), Tiger Tops, 33 km W of Sauraha, CNP	Myers <i>et al.</i> 2000
<i>Miniopterus schreibersii</i>	Central Nepal	Suwal <i>et al.</i> 1995 (BPP)
	Locality not confirmed (Outside Protected areas)	
	Kathmandu Valley (Scully, 1887) Kakani (85° 11' E, 27° 56' N) Bimalnagar (84° 29' E, 27° 45' N): Syangja (83° 42' E, 28° 49' N) (HNHM)	Bates and Harrison 1997
	Pokhara	Abe 1971 as <i>M. s. fuliginosus</i> (Hodgson, 1835)
	Bimalnagar (84° 26' E, 27° 55' N) at an altitude of 750m a.s.l., Tanahun district: 4 Km E of Syangja (Putalibazaar) (83° 44' E, 28° 08' N) at an altitude of 1300m a.s.l., Syangja district: Sudame (83° 25' E, 28° 20' N) at an altitude of 1500m a.s.l., Banthanti (83° 44' E, 28° 23' N) at an altitude of 2200-2300m a.s.l.; Kaski district: Hattisar at an altitude of 1400m a.s.l., Kathmandu district	Csorba <i>et al.</i> 1999
	Kathmandu (85° 19.6' E, 27° 43.2' N) at an altitude of 1340m a.s.l.,	Myers <i>et al.</i> 2000
	Nagarjun Cave, Kathmandu, Nagarjun Royal Forest (Shivapuri Nagarjun National Park)	Malla 2000

	Kailash Cave (83°54'19.07"E, 28° 5'52.34"N) at an altitude of 1130 m a.s.l., Syangja district	Thapa and Thapa 2009
	Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Tanahun district	Ghimire <i>et al.</i> 2010
	Chamere Dhulo Kharbare or Arbhu Gufa, Argale V.D.C., (83° 28' 16.3" E, 27° 55' 3.0" N) at an altitude of 553m a.s.l.; Electricity Tunnel, Dhovan V.D.C. (83° 27' 56.73" E, 27° 44' 3.76" N) at an elevation of 200 m, on the bank of Tinau river, 350 m NW from Sidda baba Temple of Palpa District and around 1 km from border of Palpa and Rupandehi districts.	Adhikari 2010
	Paanimuhan (Muhan Pokhari) (85°22'52.68"E, 27°47'2.09"N) at an altitude 1992m.a.s.l., Shivapuri Nagarjun National Park HQ	Thapa <i>et al.</i> 2010
<i>Murina aurata</i>	Locality not confirmed (Outside Protected areas)	Hill, 1983 [cited in Suwal <i>et al.</i> 1995 (BPP)]
	Makut ?? (83° 25' E, 28° 50' N) (probably Mukut in Dolpa district) at an altitude of 4154 m a.s.l. (BMNH) Mount Sheopuri (Probably Shivapuri Nagarjun National Park (85° 45' E, 27° 45' N) (Maeda, 1980)	Bates and Harrison, 1997
<i>Murina cyclotis</i>	Locality not confirmed (Outside Protected areas)	Corbett and Hill, 1992 [Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Royal Chitwan NP (Now CNP) (84° 11' E, 27° 37' N) (HNHM)	Bates and Harrison 1997
	Island Jungle Resort (84° 07' E, 27° 40' N), CNP at an altitude of 240m a.s.l.	Csorba <i>et al.</i> 1999

	(84° 28.1' E, 27° 33.7' N), 3.8 km SW of Sauraha, CNP	Myers <i>et al.</i> 2000
<i>Murina huttoni</i>	Kathmandu Valley (Hinton and Fry, 1923)	Bates and Harrison 1997
	Seduwa, Sankhuwasabha district: Simwa, Taplejung district	Acharya 2010
<i>Murina leucogaster</i>	Kathmandu Valley (Scully, 1887)	Bates and Harrison 1997
<i>Myotis blythi</i>	Tumlingtar (87° 16' E, 27° 33' N) (FMNH)	Bates and Harrison 1997
<i>Myotis csorbai</i>	Kailash Cave, Syangja (83° 42' E, 28° 49' N) at an altitude of 1300m a.s.l. (HNHM)	Bates and Harrison 1997 as <i>M. longipes</i>
	4 Km E of Syangja (Putalibazaar Municipality) (83° 44' E, 28° 08' N) at an altitude of 1300m a.s.l., Syangja district: Sudame (83° 25' E, 28° 20' N) 30Km NW of Pokhara at an altitude of 1500m a.s.l., Banthanti (83° 44' E, 28° 23' N) 40 km NW of Pokhara, at an altitude of 2200-2300m a.s.l., Tirkedhunga (83° 45' E, 28° 21' N) 30 Km NW of Pokhara, at an altitude of 1700m a.s.l.; Kaski district	Csorba <i>et al.</i> 1999
	Kailash Cave (83°54'19.07"E, 28° 5'52.34"N), at the head of the Sindur River of Bahakot village development committee. It is located at the altitude of 1130 m (4,225 feet) 1130 m a.s.l., Syangja district	Thapa and Thapa 2009
<i>Myotis formosus</i>	Kathmandu Valley (Scully, 1887) at an altitude of 1231 m a.s.l. (Hinton and Fry, 1923) Ghorepani (83° 35' E, 28° 22' N) at an altitude of 2900m a.s.l. in the foothills of the Annapurna Range (HNHM)	Bates and Harrison 1997

	Annapurna CA	Hodgson, 1835 [Cited in Suwal <i>et al.</i> 1995 (BPP)]
	2 km East of Ghorepani (83° 43' E, 28° 24' N) at an altitude of 2900m a.s.l., ACA	Csorba <i>et al.</i> 1999
<i>Myotis muricola</i>	Swingket (near Pokhara), Kaski district	Abe 1971 as <i>M. mystacinus muricola</i> (Gray, 1846)
	Annapurna CA	Gray, 1846 [Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Kathmandu Valley , at an altitude of 1230 m a.s.l. (Hinton and Fry, 1923) Kontoum ?? (BMNH)	Bates and Harrison 1997
	Langtang at an altitude of 1880m a.s.l. (85° 36' E, 28° 14' N) (HNHM) Those at an altitude of 3200m a.s. l., Ramechhap district (86° 05' E, 27° 36' N) (Kock, 1996)	
	Banthanti (83° 44' E, 28° 23' N) at an altitude of 2200-2300m a.s.l., 40 km NW of Pokhara, Kaski district: Tinjure Phedi (87° 27' E, 27° 12' N) at an altitude of 2900m a.s.l., Terhathum district	Csorba <i>et al.</i> 1999
<i>Myotis nipalensis</i>	Kathmandu Valley	Dobson, 1871 as <i>Vespertilio nipalensis</i> [cited in Suwal <i>et al.</i> 1995]
	Kathmandu Valley	Bates and Harrison, 1997 as <i>M. mystacinus</i>
	Annapurna CA, Makalu-Barun NP	Suwal <i>et al.</i> 1995 (BPP)
	Pathikhola Cave (83° 54' 39.3" E, 28° 18' 55.6" N) at an altitude of 903m a.s.l., Lahachowk, Kaski district	Giri 2009

	Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Tanahun district	Ghimire <i>et al.</i> 2010
	Godawari (85° 22' 40.81" E, 27° 35' 42.08" N), at an altitude 5000ft a.s.l., Lalitpur district: Pharping (85° 17' 22.53" E, 27° 36' 46.97" N) at an altitude 4159ft a.s.l., Kathmandu district	Thapa <i>et al.</i> 2010
<i>Myotis sicarius</i>	Annapurna CA	Suwal <i>et al.</i> 1995 (BPP)
	Bansbahari (84° 57' E, 27° 48' N) (Fry, 1925) Godawari (85° 24' E, 27° 34' N) at an altitude of 1350 m a.s.l., Kathmandu Valley (HZM)	Bates and Harrison 1997
	Sudame (83° 25' E, 28° 20' N) 30Km NW of Pokhara at an altitude of 1500m a.s.l., Kaski district, ACA	Csorba <i>et al.</i> 1999
	Bajrabarahi, 1km E of Chapagaun (85° 20' 6.61" E, 27° 35' 23.30" N) at an altitude 1485m a.s.l., Lalitpur district	Thapa <i>et al.</i> 2010
<i>Myotis siligorensis</i>	Pokhara	Abe 1971 as <i>M. s. siligorensis</i> (Horsfield, 1855)
	Kathmandu Valley (Hinton and Fry, 1923)	Bates and Harrison 1997
	Cental Nepal	Abe 1982 as <i>M. s. siligorensis</i> [cited in Suwal <i>et al.</i> 1995 (BPP)]
	Annapurna CA, Makalu-Barun NP	Suwal <i>et al.</i> 1995 (BPP)
<i>Nyctalus montanus</i>	Annapurna CA, Makalu-Barun NP	Suwal <i>et al.</i> 1995 (BPP)
	Dang-Deokhuri (82° 17' E, 28° 09' N) at an elevation of 680 m a.s.l. (Mitchell, 1980)	Bates and Harrison 1997

<i>Nyctalus noctula</i>	Kathmandu valley, at an altitude of 1231m a.s.l. (Hinton and Fry, 1923) Godavari at an altitude of 2000m a.s.l. (HZM) Gari (probably Nuwakot Gadhi) at an altitude of 1200m a.s.l.: Nuwakot (83° 52' E, 28° 09' N) (Probably Bidur or Trishuli Bazaar) at an altitude of 577m a.s.l. (FMNH)	Bates and Harrison 1997
	Locality not confirmed (Outside Protected areas)	Hodgson, 1835 as <i>Vespertilio labiata</i> [Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Sudame (83° 25' E, 28° 20' N) 30Km NW of Pokhara at an altitude of 1500m a.s.l., Kaski district	Csorba <i>et al.</i> 1999
	Nandon Tal (84° 28.7' E, 27° 32.1' N); Simal Ghol Tal (84° 28.6' E, 27° 33.9' N) 2.5 km SW of Sauraha: CNP	Myers <i>et al.</i> 2000
	Ananda Kuti Bihar, Swoyambhu (85° 17' 15.90" E, 27° 43' 1.19" N) at an altitude 4352 ft a.s.l., Kathmandu MP	Thapa <i>et al.</i> 2010
<i>Philetor brachypterus</i>	Barabisse (85° 35' E, 27° 35' N) at an altitude of 585 m a.s.l. at Sindhupalchowk district: Num Bridge at an altitude of 862 m a.s.l. (87° 17' E, 27° 33' N), Sankhuwasabha district (FMNH, Koopman 1983)	Bates and Harrison 1997
<i>Pipistrellus coromandra</i>	Annapurna CA, Makalu-Barun NP, Bardia NP, Chitwan NP	Suwal <i>et al.</i> 1995 (BPP)
	Central Zoo, Jawalakhel, Lalitpur, Kathmandu Valley: Forestry Campus, IOF, Pokhara	Daniel 2007
	Hazaria (85° 20' E, 26° 51' N); Bairia (85° 23' E, 27° 00' N); Bairaglia (85° 23' E, 26° 45' N): Probably in Sarlahi district along Bagmati River (Hinton and Fry, 1923) Barabisse (85° 35' E, 27° 35' N), Sindhupalchowk district (FMNH)	Bates and Harrison 1997

	Dudora Nala/Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha; Tamar Tal (84° 20.3' E, 27°31.9' N), approx. 13 km E of Sauraha ;Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha; Simal Ghol Tal (84° 28.6' E, 27°33.9' N) 2.5 km SW of Sauraha; Bardhaha Khola (84° 28.2' E, 27°30.8' N),in the Churia range of Siwalik hills at an elevation of 500m a.s.l., 3 km SW of Bwanipur Chowki: CNP	Myers <i>et al.</i> 2000
	Kusaha, Koshi Tappu Wildlife Reserve	Thapa 2010
	Tumlingtar; Sankhuwasabha district	Dahal and Thapa pers. obs.
<i>Pipistrellus javanicus</i>	Bouzinii ?? (85° 13' E, 27° 42' N) (Probably in Kathmandu valley), Shivapuri (Shivapuri Nagarjun NP); Kathmandu district: Nagarkot, Bhaktapur district (BMNH) Godawari (85° 24' E, 27° 34' N) (HZM) Kakani (Hinton and Fry, 1923), Rasuwa district (Kock, 1996),	Bates and Harrison 1997
	Annapurna CA, Makalu-Barun NP	Suwal <i>et al.</i> 1995 (BPP)
	Pokhara and Biratanti (Birethanti), Kaski district	Abe 1971 as <i>Pipistrellus babu</i> Thomas 1915
	Banthanti (83° 44' E, 28° 23' N) at an altitude of 2200-2300m a.s.l., 40 km NW of Pokhara; Sudame (83° 25' E, 28° 20' N) 30Km NW of Pokhara at an altitude of 1500m a.s.l.: Kaski district	Csorba <i>et al.</i> 1999
	In the vicinity of The Nepal Conservation Research and Training Center (84° 29.5' E, 27°34.2' N), Sauraha, CNP at an elevation of 200m ;Dudora Nala/Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha; Tamar Tal (84° 20.3' E, 27°31.9' N), approx. 13 km E of Sauraha ;Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha; Simal Ghol Tal (84° 28.6' E, 27°33.9' N) 2.5 km SW of Sauraha: CNP	Myers <i>et al.</i> 2000

	Central Zoo, Jawalakhel, KTM	Daniel 2007
	Paanimuhan (Muhan Pokhari) (85°22'52.68"E, 27°47'2.09"N) at an altitude 6535 ft. a.s.l., Shivapuri Nagarjun National Park HQ	Thapa <i>et al.</i> 2010
<i>Pipistrellus tenuis</i>	Hazaria (85° 20' E , 26° 51' N); Bairia (85° 23' E, 27° 00' N): probably in Sarlahi district along Bagmati River (Hinton and Fry, 1923) Banke (81° 47' E , 27° 57'N) at an altitude of 160 m a.s.l. (Mitchell, 1980)	Bates and Harrison 1997
	In the vicinity of The Nepal Conservation Research and Training Center (84° 29.5' E, 27°34.2' N), Sauraha, CNP at an elevation of 200m ;Dudora Nala/Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha; Tamar Tal (84° 20.3' E, 27°31.9' N), approx. 13 km E of Sauraha ;Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha; Simal Ghol Tal (84° 28.6' E, 27°33.9' N) 2.5 km SW of Sauraha: CNP	Myers <i>et al.</i> 2000
	Central Zoo, Jawalakhel, Lalitpur	Daniel 2007
	Kusaha, Koshi Tappu Wildlife Reserve	Thapa 2010
<i>Plecotus homochrous</i>	Jomsom (83° 42' E , 28° 49' N), on the bank of Kali Gandaki River at an altitude of 2831m a.s.l., Mustang district (Sanborn, 1950)	Bates and Harrison 1997 as <i>P. auritus</i>
	Makalu-Barun NP, Rara NP	Hodgson, 1847 [Cited in Suwal <i>et al.</i> 1995 (BPP)]
<i>Plecotus wardi</i>	Ringmo at an altitude of 3600m a.s.l., Shey Phoksundo National Park, Dolpa district (Kock 1996)	Bates and Harrison 1997 as <i>P. austriacus</i>

<i>Pteropus giganteus</i>	Baglung (83° 35' E , 28° 16' N); Chitwan NP; Dharan, Sunsari district; Nepalgunj, Banke district	Shrestha 1997
	Jhapa, Pokhara, Kathmandu	Bates and Harrison 1997
	Annapurna CA, Makalu-Barun NP, Chitwan NP, Koshi Tappu Wildlife Reserve, Ilam	Suwal <i>et al.</i> 1995 (BPP)
	Pokhara-18, Radha Krishna Tole(28 15 31 N, 83 05 54 E); Pokhrel Tar, Pokhara-18; Chineadanda: Kaski district	Acharya 2006
	Royal Palace, Kathmandu MP	Shrestha 1997; Majupuria 2006; Acharya 2006
	Sallaghari, Bhaktapur district	Rachal 2007; Shrestha 1997 ; Majupuria 2006 ; Acharya 2006 ; Koju 2008
	Biratnagar (Golchha House, C.D.O Office): Pathari V.D.C (Saptari district, Koshi Tappu Wildlife Reserve), Rajdevi Temple, Rajbiraj, Gadiyadhuri V.D.C ; Saptari district: Shantinagar, Prakashpur, Tanmuna V.D.C, Nepal Army, East division HQ, Itahari; Sunsari district: Kerkha, Taagandubba-5, Old Jhapa HQ; Jhapa district	Thapa 2008
	Two roosts at Chindanda (84° 01' 20.5" E , 28° 10' 12.3" N) and (84° 01' 32.4" E , 28° 14' 37.7" N)	Giri 2009
	Madan Pokhara valley (83° 34' 17.5" E, 27° 49' 31.5" N) at an elevation 704m a.s.l., Naranthan, Tansen Municipality (83° 32' 52.3" E, 27° 52' 03.9" N) at an elevation 1221m a.s.l.; Palpa district	Adhikari 2010

<i>Rhinolophus affinis</i>	Annapurna CA	Suwal <i>et al.</i> 1995 (BPP)
	Central Nepal	Abe 1982
	World Peace Cave, Birendra Cave, Institute of Forestry Campus: Pokhara	Daniel 2007
	Barabisse (85° 35' E , 27° 35' N), Sindhupalchowk district; Shebu (Probably Shibua in Sankhuwasabha district) (FMNH) Bouzinii (84° 29' E, 27° 45' N) (Fry, 1925) Bimalnagar (84° 29' E , 27° 45' N), Doulegounda at an altitude of 670m a.s.l.; Tanahun district: Balaju Forest Reserve (Shivapuri Nagarjun National Park) at an altitude of 1400m a.s.l., Kathmandu district: Syangja district (83° 42' E, 28° 49' N) (HNHM)	Bates and Harrison 1997
	Balaju Forest Reserve (now Shivapuri Nagarjun National Park) at an altitude of 1410m a.s.l., Chobar at an altitude of 1400m a.s.l.; Kathmandu district: ChunPahad (84° 27' E, 27° 45' N), 10 km W of Doulegounda at an altitude of 670m a.s.l., Bimalnagar, (84° 26' E, 27° 55' N) at an altitude of 750m a.s.l.; Tanahun district: 4 Km E of Syangja (Putalibazaar Municipality) (83° 44' E, 28° 08' N) at an altitude of 1300m a.s.l., Syangja district: Tawa (87° 49' E, 27° 30' N) at an altitude of 1200m a.s.l.; Taplejung district	Csorba <i>et al.</i> 1999
	Mahendra Cave (83° 58' 45.7" E, 28° 16' 19.6" N) at an altitude of 962m a.s.l., Lamachaur; Birendra Cave (84° 00' 15.1" E, 28° 14' 50.2" N) at an altitude of 911m a.s.l., Bhalam ; Banpale forest (83° 59' 22.8" E, 28° 11' 15.6" N), Institute of Forestry, Pokhara at an altitude of 818 m a.s.l.: Kaski district	Giri 2009

	Godawari (85° 22' 40.81" E, 27° 35' 42.08" N), at an altitude 5000ft a.s.l., Lalitpur district: Pharping (85° 17' 22.53" E, 27° 36' 46.97" N) at an altitude 4159ft a.s.l.; Nagarjun Cave (Shivapuri Nagarjun NP) (E 85° 17' 39.4", N 27° 44' 43.7"), Kathmandu district: Nagarkot (85° 31' 15.95" E, 27° 43' 15.37" N) at an altitude of 6000 ft., Bhaktapur district	Thapa et al. 2010
	Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Tanahun district	Ghimire et al. 2010
	Khandrelung (Chihanghat) (84° 04' 44.1" E, 27° 44' 58.4" N) at an elevation 1338m, Pokhari, Dhaubadi V.D.C-3, Nawalparasi district	Thapa et al. 2010
	Ghising Odar, Sukekot 9, Sahalkot V.D.C (83° 58' 10.7" E, 27° 48' 57.5" N), Palpa district	Adhikari 2010
	Pakku at an altitude of 1360 m, Mabu, Ilam district: Hururu-Matsyapokhari, Sankhuwasabha district: Tawa; Samdorje Odar (88° 13' 19.5" E, 27° 26' 53.4" N) at an altitude of 2172 m a.s.l., Yamphudin V.D.C.-9: Taplejung district	Acharya 2010
<i>Rhinolophus ferumequinum</i>	Annapurna CA	Hodgson, 1835 as <i>R. tragatus</i> [Cited in Suwal et al. 1995 (BPP)]
	Annigera??? (BMNH); Kathmandu valley; Nagarkot; Num V.D.C (FMNH); Ramechhap (Kock, 1996); Ghorepani; Langtang (HNHM)	Bates and Harrison 1997
	3 Km South-east of Syabru (85° 21' E, 28° 07' N) at an altitude of 2820m a.s.l.; Rasuwa district: 2 km East of Ghorepani (83° 43' E, 28° 24' N) at an altitude of 2900m a.s.l.; ACA: Chobar at an altitude of 1400m a.s.l., Kathmandu district	Csorba et al. 1999

	Mahendra Cave (83° 58' 45.7" E, 28° 16' 19.6" N) at an altitude of 962m a.s.l., Lamachaur, Kaski district	Giri 2009
	Nagarjun Cave (Shivapuri Nagarjun NP) (E 85° 17' 39.4", N 27° 44' 43.7"), Kathmandu district: Bajrabarahi, 1km E of Chapagaun (85° 20' 6.61" E, 27° 35' 23.30" N) at an altitude 4872ft a.s.l., Lalitpur district	Thapa et al. 2010
	Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Bandipur V.D.C, Tanahun district	Ghimire et al. 2010
	Mahendra Cave, Batule Chour (83° 58' 12.3" E, 28° 15' 59.3" N) at an altitude of 962 m a.s.l., Kaski district	Adhikari 2010
	Sakejung Odar (Cave) (88° 13' 15.9" E, 26° 49' 33.6" N) at an altitude of 1471m a.s.l., Maipokhari V.D.C., Ilam district: Samdorje Odar (88° 13' 19.5" E, 27° 26' 53.4" N) at an altitude of 2172 m a.s.l., Yamphudin V.D.C.-9, Taplejung district	Acharya 2010
<i>Rhinolophus lepidus</i>	Ilam district (87° 59' E, 27° 01' N): Sindhupalchowk district (85° 33' E, 28° 03' N) (Mitchell, 1980)	Bates and Harrison 1997
<i>Rhinolophus luctus</i>	Forest of Hattiban, Chalnakhel (85° 14' E, 27° 42' N), Bouzini (Hinton and Fry, 1923); Banssbahari (on the way to Dakshinkali) (Fry, 1925); Num V.D.C, Sankhuwasabha district (FMNH)	Bates and Harrison, 1997
	Chitwan NP	Hodgson, 1843 as <i>R. perniger</i> [Cited in Suwal et al. 1995 (BPP)]
	Patal Dwar (84° 25' 48.2" E, 27° 56' 45.2" N) located at the altitude of 456 m a.s.l., 3 km E of Bimalnagar, Tanahun district	Ghimire et al. 2010

<i>Rhinolophus macrotis</i>	Locality not confirmed	Blyth, 1844[Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Batulechour (83° 58' E, 28° 14' N), Kaski district: Dulegounda (84° 29' E, 27° 45' N), Tanahun district: Syangja (HNHM): Kathmandu valley: Kerabari at an altitude of 1661 m a.s.l. (Probably in Gorkha district) (FMNH)	Bates and Harrison 1997
	ChunPahad (84° 27' E, 27° 45' N), 10 km W of Doulegounda at an altitude of 670m a.s.l., Tanahun district: 4 Km E of Syangja (Putalibazaar Municipality) (83° 44' E, 28° 08' N) at an altitude of 1300m a.s.l., Syangja district: Batule chour (83° 58' E, 28° 15' N) at an altitude of 1150m a.s.l., 8 km N of Pokhara, Kaski district	Csorba <i>et al.</i> 1999
	Nagarjun Cave (Shivapuri Nagarjun NP) (E 85° 17' 39.4", N 27° 44' 43.7"), Kathmandu district: Godawari (85°22'40.81"E, 27°35'42.08"N), at an altitude 5000ft a.s.l., Lalitpur district	Thapa <i>et al.</i> 2010
	Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Bandipur V.D.C, Tanahun district	Ghimire <i>et al.</i> 2010
<i>Rhinolophus pearsoni</i>	Godawari	Abe 1971 as <i>R. P. pearsonii</i>
	Central Nepal	Abe 1982 [cited in Suwal <i>et al.</i> 1995]
	Bimalnagar (84° 29' E, 27° 45' N) (HNHM) Dima near Num at an elevation of 1123m a.s.l., Suki Patyl Forest near Num (87° 17' E, 27° 33' N) at an elevation of 2031 m a.s.l. (FMNH) Parchung??? (85° 12' E, 28° 01' N) at an altitude of approx. 3384 m a.s.l. (Hinton and Fry, 1923) Sundarijal	Bates and Harrison 1997

	Bimalnagar, (84° 26' E, 27° 55' N) at an altitude of 750m a.s.l., Tanahun district: Mamankhe (87° 57' E, 27° 26' N) at an altitude of 1700m a.s.l., Taplejung district	Csorba <i>et al.</i> 1999
	Shree Siddha Gufa (83° 32' 11.0" E, 27° 53' 41" N) at an elevation 930 m a.s.l., Awal, Located on the border of Bougha Ghumba V.D.C and Boughapokharathok V.D.C, Palpa district	Adhikari 2010
<i>Rhinolophus pusillus</i>	Locality not confirmed (Outside Protected areas)	Cited in Suwal <i>et al.</i> 1995 (BPP)
	Kathmandu valley (HZM), Nagarjuna forest (85° 12' E, 27° 46' N) (BMNH) Bimalnagar (84° 29' E, 27° 45' N) (HNHM) Pokhara (83° 58' E, 28° 14' N) (Kock, 1996) Sundarijal (85° 15' E, 27° 48' N) (Sinha, 1973)	Bates and Harrison 1997
	Chobar at an altitude of 1400m a.s.l.; Kathmandu district: Banthanti (83° 44' E, 28° 23' N) at an altitude of 2200-2300m a.s.l.; Kaski district: Bimalnagar, (84° 26' E, 27° 55' N) at an altitude of 750m a.s.l.; Tanahun district: 4 Km E of Syangja (Putalibazaar Municipality) (83° 44' E, 28° 08' N) at an altitude of 1300m a.s.l., Syangja district: Tawa (87° 49' E, 27° 30' N) at an altitude of 1200m a.s.l., Taplejung	Csorba <i>et al.</i> 1999
	Nagarjun Cave, Kathmandu, Nagarjun Royal Forest (Shivapuri Nagarjun National Park) ; Nagarjun Cave (Shivapuri Nagarjun NP) (E 85° 17' 39.4", N 27° 44' 43.7"), Kathmandu district	Malla 2000; Thapa <i>et al.</i> 2009

	Siddha Cave (84° 25' 13.49" E, 27° 56' 55.24" N) at an altitude 588m a.s.l., Bimalnagar, Bandipur V.D.C., Patal Dwar (84°25'48.2"E, 27° 56'45.2"N) located at the altitude of 456 m a.s.l., 3 km E of Bimalnagar; Tanahun district	Ghimire <i>et al.</i> 2010
	Chobar, (E 85° 17' 39.2", N 27° 39' 35.3") at an elevation of 1404m, Kathmandu district	Csorba <i>et al.</i> 1999
	Subedigaun, Makalu Region	Acharya 2010
<i>Rhinolophus sinicus</i>	Godawari, Lalitpur district	Abe 1971 as <i>R. affinis himalayanus</i> Andersen, 1905 and <i>R. rouxii rouxii</i> Temminck 1835
	Central Nepal	Abe, 1982 as <i>R. r. rouxii</i> [Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Godawari (85° 24' E, 27° 34' N); Pulchowki (Phulchowki) (85° 12' E, 27° 42' N) (HZM) Num (87° 17' E, 27° 33' N) at an elevation of 862m a.s.l. (FMNH) Thankot (85° 17' E, 27° 42' N); Parchung (85° 12' E, 28° 01' N) (BMNH) Sipuri (Shivapuri Nagarjun NP) (Fry, 1925)	Bates and Harrison 1997 as <i>R. rouxii</i> and specimens from Parchung and Thankot, listed as <i>R. a. himalayanus</i> by Hinton and Fry, 1923 were referred as <i>R. rouxii</i> by Bates and Harrison 1997
	Banthanti (83° 44' E, 28° 23' N) 40 km NW of Pokhara, at an altitude of 2200-2300m a.s.l, Kaski district: Mamankhe (87° 57' E, 27° 26' N) at an altitude of 1700m; Above Yamphudin (87° 59' E, 27° 28' N) at an altitude of 2650m: Taplejung district	Csorba <i>et al.</i> 1999
	Pakku, Mabu at an altitude of 1600m, Ilam district: Hururu-Matsaya Pokhari at an altitude of 1818, Sankhuwasabha district: Samdorje Odar (88° 13' 19.5" E, 27° 26' 53.4" N) at an altitude of 2172 m a.s.l., Yamphudin V.D.C.-9, Taplejung district	Acharya 2010

<i>Rhinolophus subbadius</i>	Locality not confirmed (Outside Protected areas)	Blyth, 1844[Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Kathmandu Valley (Scully, 1887)	Bates and Harrison 1997
<i>Rousettus leschenaulti</i>	Boitari ?? (Probably in Gorkha district) (84° 37' E, 28° 01' N) (Fry, 1925) Kathmandu (Scully, 1887)	Bates and Harrison 1997
	Annapurna CA, Makalu-Barun NP, Chitwan NP, Rara NP	Hodgson , 1835[Cited in Suwal <i>et al.</i> 1995 (BPP)]
	25 km South of Jomsom (83° 39' E, 28° 36' N) in Eastern Slope of Kaligandaki Valley	Csorba <i>et al.</i> 1999
	Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha, CNP	Myers <i>et al.</i> 2000
	World Peace Cave, Pokhara	Daniel 2008
	A cave in North-west face of the the hill adjacent to Tamor River, Tarikhet, Phurumbu V.D.C., Taplejung district	Acharya 2010
	Salyan district	Lamichhane and Ghimire pers.obs.
Arghakhachi district	Krishna Bhusal pers. obs.	
<i>Scotomanes ornatus</i>	Sankhuwasabha district (87° 17' E, 27° 33' N) (FMNH)	Bates and Harrison 1997
	Sudame (83° 25' E, 28° 20' N) 30Km NW of Pokhara at an altitude of 1500m a.s.l., Kaski district, Annapurna Conservation Area	Csorba <i>et al.</i> 1999
<i>Scotophilus heathii</i>	Raxaul	Johnson <i>et al.</i> 1980 (Cited in Majpuria 2006)
	Bardia NP	Suwal <i>et al.</i> 1995 (BPP)

	Banke district (81° 47'E, 27° 57' N) at an altitudinal range of 180-500m a.s.l., Dang-Deokhuri at an altitude of 680m a.s.l. (Mitchell, 1980) Bhojbawanpur (81° 45' E, 28° 05' N) Banke district (Agrawal and Chakraborty, 1971) Darakhutti (FMNH) Raxaul-Birgunj (84° 57' E , 27° 00' N) (Johnson et al. 1980)	Bates and Harrison 1997
	In the vicinity of The Nepal Conservation Research and Training Center (84° 29.5' E, 27°34.2' N), Sauraha: Nandon Tal (84° 28.7' E, 27°32.1' N) at an elevation of 200m ;Dudora Nala/ Park rd (84° 27.4' E, 27°33.6' N), 4.3 km SW of Sauraha; Dhangari Khola (84° 11.5' E, 27°32.2' N), Tiger Tops, 33 km W of Sauraha; Bardhaha Khola (84° 28.2' E, 27°30.8' N),in the Churia range of Siwalik hills at an elevation of 500m a.s.l., 3 km SW of Bwanipur Chowki: CNP	Myers <i>et al.</i> 2000
	Keroun (E 87° 30' 12.4", N 26° 35' 34.2") at an altitude of 87m, Morang district: Inaruwa (E 87° 26' 27.9", N 26° 24' 56.1") at an altitude of 67m, Sunsari district: Taaghandubba-5 (E 88° 09' 5.7", N 26° 17' 33.1") and at an elevation of 64m, Jhapa district	Thapa 2009
	Morang-Sunsari corridor	Dibya Dahal pers. observation comment
	Kanchanpur district	Choudhary and Ghimire pers. obs
<i>Scotophilus kuhli</i>	South-west Nepal	Corbett and Hill 1992 [Cited in Suwal <i>et al.</i> 1995 (BPP)]
	Raxaul-Birghanj (84° 57' E, 27° 00' N) [Johnson et al., 1980. was cited in Shrestha, 1997]???	Molur <i>et al.</i> 2002
<i>Sphaerias blanfordi</i>	Eastern Nepal	Leekagul and McNeely, 1977 [Cited in Suwal <i>et al.</i> 1995 (BPP)]

	Eastern Nepal - no further details (Leekagul and McNeely, 1977)	Bates and Harrison 1997
<i>Taphozous longimanus</i>	No exact Location (Worth and Shah, 1969)	Bates and Harrison 1997
	Jhapa (87°51'E, 26°29'N)	R.M. Mitchell collected six specimens in January, 1966 (Worth & Shah, 1969; Mitchell, 1978) [cited in Thapa <i>et al.</i> in press.]
	Samrat Chowk, Pokharia, Biratnagar SMP-1, Nepal (87°17'8.18"E, 26°28'46.30"N) at an elevation 72 m. a.s.l.	Thapa <i>et al.</i> in press.
	Morang-Sunsari corridor	Dibya Dahal pers. observation comment

ACA= Annapurna Conservation Area: CA= Conservation Area: CNP= Chitwan National Park: MP= Metropolitan city: NP= National Park: SMP= Sub-Metropolitan city: V.D.C. = Village Development Committee
BMNH= The Natural History Museum, London: FMNH= Field Museum of Natural History, Chicago: HHNM= Hungarian Natural History Museum: HZM: Harrison Zoological Museum



Meaning of the terms

Alveolus- socket in jaw where tooth is implanted

Angular process- a projection at the lower posterior part of each half mandible

Antitragus- a lobe at the basal part of the outer margin of the ear

Auditory meatus- structure in between tympanic membrane to external ear

Baculum (os penis)- supporting bone of the penis

Bicuspidate- with two cusps

Bifid- with two distal processes

Buccal pad- an oval epithelial structure of the lipid substances, situated in the angles of the mouth between the cheeks and posterior teeth

Calcar - a cartilaginous spur supporting the free margin of the tail membrane from the ankle

Canine - tall and pointed tooth immediately behind the incisors in each jaw

Condyle- an articular projection at the upper posterior part of each half mandible

Diastema- gap between the constituent teeth of a tooth row

Digit- a finger or toe

Echolocation- Navigation through release of high frequency sound and detection of echo

Endemic- peculiar taxa prevailing in some specified country or area

Exoccipital condyles- a pair of projections from the occipital bone, on either side of the foramen

magnum for articulating skull to cervical spine

Fauna- animals inhabiting in the given area in totality

Femur- one of the longest bones of the body extending from hip to the knee

Genitalia- sexual or reproductive organs

Genus- a taxonomic category comprising of a single or group of species

Gestation period- time period during which pregnant female carries the developing embryo before birth

Glans penis- expanded and rounded extremity on the penis

Gular sac- a glandular pouch in the skin of the throat

Hallux- the first finger or first toe

Holotype- a specimen from which name of the species is designated

Incisor- a tooth in series present on premaxilla at the front part of upper jaws and mandibles

Insectivorous- feeding on insects

Interfemoral membrane (Uropatagium)- membrane extending immediately after the body and from the inner margins of legs, enclosing whole or a part of the tail

Lactation- milk production by mammary gland actively

Lancet- erected sub-triangular posterior part of noseleaf in Rhinolophid bats

Mandible- one half lower jaws

Maxilla- principal bone of one half upper jaws consisting of canine and cheekteeth

Monospecific- genus with single species

Morphology- outer appearance, form and structure

Nocturnal- active at darkness

Palearctic- one of zoogeographical regions comprising temperate Eurasia, northern Africa and Arabian Peninsula

Pararhinal glands- specialized sebaceous glands developed in the skin at the either side of muzzle

Paratype- specimen/s of a taxon collected from the same locality at the same time when holotype is collected

Parturition- delivery of infants or pups

Pelage- hairs

Phalanx- a bone of digit

Pinna- external ear

Premaxilla- anterior bone of the upper jaw consisting of incisors and supporting the nose and rostrum and palate

Radio-metacarpal pouch- a pouch developed on the ventral aspect of the wrist extending from distal radius to the base of the fifth metacarpal

Rhinarium- area of naked and moist skin surrounding the nostrils and nostril pads

Rostrum- anterior part of the skull in front of the orbits

Sella- saddle-like median anterior projection of the noseleaf, overhanging at the top of the horseshoe

Sub-adult- individual yet not reached maturity

Sympatric- species or populations that occur together without inbreeding

Tarsus- the part of foot in between lower leg and the metatarsals

Taxon- a group defined and distinguished characteristically

Testes- male reproductive organs in which spermatozoa and hormones

are produced

Tibia- a long bone at lower leg extending from knee to ankle

Tragus- a cutaneous and cartilaginous projection arising from the emergence of pinna

Vibrissae- large rigid hairs on the rostrum of head with tactile functions

Zygoma- arch of cheekbones, formed of maxilla in the front, jugal bone in centre, while squamosal posteriorly

Species Index

Andersen's Leaf-nosed Bat
 Big-eared Horseshoe Bat
 Blanford's Fruit Bat
 Blyth's Horseshoe Bat
 Bronze Sprite
 Brown Big-eared Bat
 Chinese Horseshoe Bat
 Chocolate Pipistrelle
 Coromandel Pipistrelle
 Csorba's Mouse-eared Myotis
 Dawn Bat
 Eastern Barbastelle
 Fulvus Leaf-nosed Bat
 Gray Big-eared Bat
 Greater Asiatic Yellow House Bat
 Greater False Vampire
 Greater Horseshoe Bat
 Great Evening Bat
 Great Himalayan Leaf-nosed Bat
 Greater Short-nosed Fruit Bat
 Great Woolly Horseshoe Bat
 Hardwicke's Woolly Bat
 Harlequin Bat
 Himalayan Whiskered Myotis
 Hodgson's Bat
 Indian Flying Fox
 Intermediate Horseshoe Bat

Javan Pipistrelle
 Least Horseshoe Bat
 Least Leaf-nosed Bat
 Least Pipistrelle
 Leschenault's Rousette
 Lesser Asiatic Yellow House Bat
 LESSER MOUSE-EARED MYOTIS
 Little Nepalese Horseshoe Bat
 Longed-winged Tomb Bat
 Mandelli's Mouse-eared Myotis
 Mountain Noctule
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 Nepal Myotis
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 Round-eared Tube-nosed Bat
 Rufous Tube-nosed Bat
 Schreiber's Long-fingered Bat
 Serotine
 Surat Serotine
 Short-winged Pipistrelle
 Small Long-fingered Bat
 Tibetan Tube-nosed Bat
 Tickell's Bat
 White-bellied Tube-nosed Bat

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