*ZOO-Journal* **6**: 35-39, 2021 **Short communication** ***ISSN: 2631-2204***

# DIVERSITY AND DISTRIBUTION OF BATS IN TRIYUGA AND CHAUDANDI MUNICIPALITY, UDAYAPUR, NEPAL

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## ABSTRACT

Eastern Nepal is rich in bats diversity, 34 species of bats have been recorded from 11 eastern districts and three districts remain till now. Even most of the districts surveyed including Udayapur have been focused only at some sites. Most of the area in the previously surveyed district has yet to be conducted. There is a lack of public awareness of the importance and values of bats. Many people have a negative attitude towards bats and there exist some prevailing threats to bats in Nepal. Study area includes 17 sites Churia range and Inner-Terai of Udayapur district. Roost survey and mist netting were conducted during six days of 2015 and 2016. In total four species of bats were recorded. 14 individuals of bats were captured from the roosts by gloved hands. However, bat could not be captured in mist nets. Previously, bat surveys were conducted at Katari in Udayapur District. *Pipistrellus* sp. from 12 sites, *Cynopterus sphinx* from three sites, *Megaderma lyra* from two sites *Taphozous longimanus* was recorded from one site. Similar, most of the people had no idea on the importance and value of bats. No direct threats on bats were observed in the study area during the survey.

**Key words:** Species, Conservation, Survey, Udayapur, Threats.

A few bat surveys have been conducted at 41 different sites in eastern Nepal. The surveys have been focused in Arun Valley (Bates & Harrison 1997), Terhathum and Taplejung districts (Csorba et al., 1999), Makalu Barun National Park, Kanchanjunga Conservation Area and Ilam district (Acharya et al., 2010), Khadbari Municipality, Sankhuwasa (Dahal and Thapa, 2010), Solukhumbu, Udayapur, Khotang and Okhaldunga of Sagarmatha zone (Thapa, 2012), Sunsari morang industrial corridor (Dahal, 2013), Pakali, Sunsari (Dahal et al., 2016). Eastern Nepal is rich in bat diversity, where 34 species of bats has been recorded form different districts of province no. 1. So far, 24 species of bats has been e recorded from Sankhuwasava district and only one species from Tehrathum, district (Corbet & Hill, 1992 Bates & Harrison, 1997; Csorba et al., 1999; Myers et al., 2000; Hutson et al., 2001; Acharya & Ruedas, 2007; Acharya et al., 2010; Thapa, 2014; Dahal et al., 2016). Bhojpur, Dhankuta and Pachthar districts are yet to survey.

Bats are widely distributed and have been recorded throughout the world except from the Antarctic and a few oceanic Islands (Hutson et al., 2001).They have significant ecosystem

services such as supporting pollination and seed dispersal in the forest ecosystem. They are also significant for control of vectors of different diseases and agricultural pests. Altogether, 54 species of bats are reported from Nepal (Thapa, 2014; Sharma et al., 2019; Sharma et al., 2021; Dahal et al., 2022) . Among 54 species, globally, conservation status for *Myotis sicarius* is assessed as vulnerable, *Miniopterus schreibersii*is assessed as near threatened, fifty-one species are assessed as least concern and *Myotis csorbai* and are assessed as data deficient. National conservation status *Ia io* and *Myotisc sorbai* are assessed as Critically Endangered, *Scotomanes ornatus*is Endangered, *Myotis sicarius* and *Phyletor brachypterus* are vulnerable, *Hipposideros Pomona*, *Murina aurata* and *Rhinolophus lipidus* are near threatened, twenty five species are least concern and twenty one species are data deficient (Janawali et al., 2011; Thapa, 2014; Sharma et al., 2021, Dahal et al., 2022)

Habitat degradation, disturbance of rusting sites, forest fire, hunting, Using of poisons in agricultural lands, using of traditional ethno medicine and killing for bush meat are main threats of bats in Nepal (Acharya et al., 2010; Dahal et al., 2016). Most the people think that bats are a sign of bad luck. Local remote peoples believe that bats are responsible for damage of horns and ears of domestic animals and urine of bats causes blindness and irritation of the body (Acharya et al., 2010). 67 possible species of bats are in Nepal (Acharya & Ruedas, 2007). Many areas in Nepal still remain to survey. The main aim of this survey was identification of species diversity of bats in study of the area. Perceptions of people on bats in different areas are different. Therefore, another aim of this study was to know the people's perceptions in the Gaighat area. Altogether 17 survey spots are belonging in Triyuga and Chaudandi Municipalities of Udayapur district (fig 1 and 2). Most of the study areas are in the innerslie in terai region and few are in the churiya range. Almost 67 % of the study area is covered with Sal dominated forest and approximately 25 % area cultivated land. Average maximum and minimum temperature of Triyuga and Chaudandi municipalities are 40o C and 22o C. Average annual rainfall is 1900 mm. The study area lies in between 142 m to 223 mabove sea level. Mix sociocultural system dominated by Hindus is found in the study area.

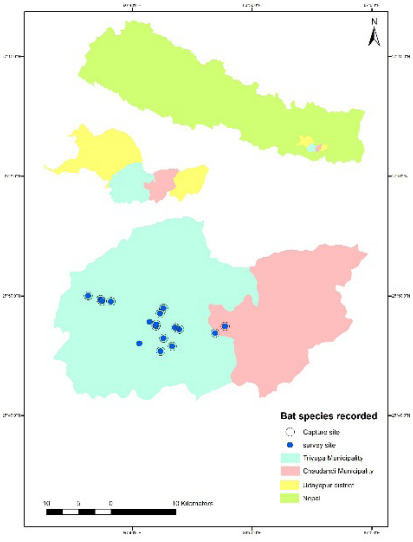


**Figure 1.** Study area

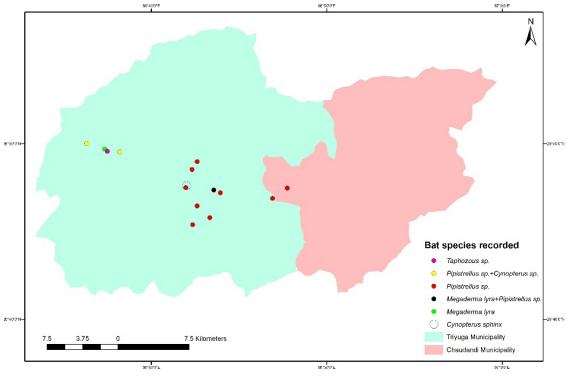


**Figure 2**. Species wise location in study area.

Surveys were conducted for six days (give date 2015 and 2016 (table 1). Roost surveys were conducted during day time and bats were captured by gloved hands from roosts. Mist nets of sizes 6m× 2.5m and 9m × 2.5 m were used for bat capture near the sources of waters from early evening to 10:00 PM. Identification of species was based on morphometrics and morphological characteristics referring to taxonomic keys; Bates & Harrison, (1997); Srinivasulu et al.,(2010) and Acharya et al., (2010). After identification captured individuals were released immediately in the same location without any stress. Photographs of captured bats focusing face, from lateral dorsal and ventral sides as well as dorsal and ventral pelages were taken using EOS 1100 DSLR Canon camera. the co-ordinates of the mist netting and the presence of roosts were recorded by using an Etrex Garmin 10 GPS device. Species distribution map was prepared using ArcGIS 10.2.

Six days of the survey which include two days in August, 2015 and 4 days in April 2016 were conducted in 17 different places of Triyuga municipality Gaighat (Table no. 1). Bats could not becaptured with mistnets during two nights at ChanppurbaTole and near Kalikhola. All species were recorded from a roost survey. Two colonies of *Megaderma lyra* were recorded from old abandoned houses at Asaritole and near Pipalchowk, Chuhade. The colony of Chuhade was larger and more than 50 individuals of bats were estimated. Another colony was smaller with about 15 individuals only. Three colonies of *Cynopterus sphinx* were recorded from three different places. Altogether, nine individuals of *Cynopterus sphinx* were observed roosting under banana leaf at Toribari and three individuals were observed in the remaining two roosts in banana leaf in Pipalboat and Rajabash. Colony of *Taphozous* sp. with 40 individuals were observed in *Saraca asoca* tree in the erea of Jhayan Joyti Secondary School, Chuhade, Gaighat. Eight individuals of *Pipistrellus* sp. were captured in bamboo holes of huts and four from wooden gapes and cavities of houses in 12 different sides of Gighat.

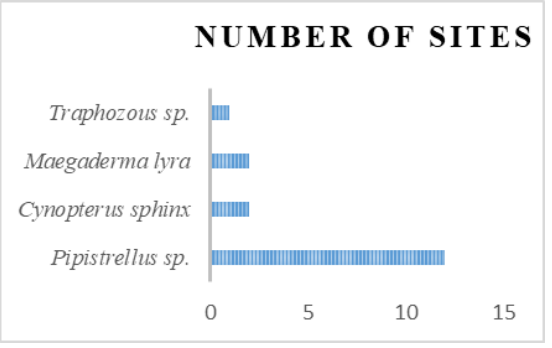


**Figure 3**: Species distribution in no sites

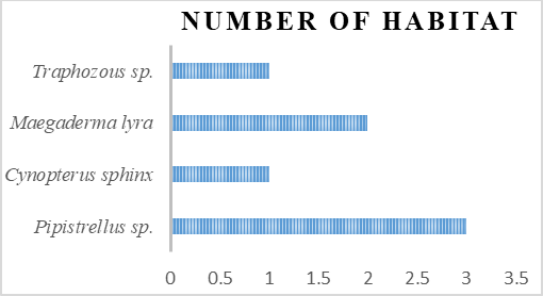


**Figure 4.** Number of habitat preferred by species

No direct threats was noted in the study area. Based on the informal talks with the local people, most of them were unaware of theimportance of bats. Few senior citizens perceived bats as gods and signs of good luck but some people reported bats as signs of bad omen. Some senior people used house bats as an ethnomedicine to treat ill cattle. Most of the people were irritated by order of urine and guano of house bats.

**Table 1:** Species recorded from the field.

| Name of place | Date | Species |
|---|---|---|
| GhayanjoyitiSecondary School, Chuhade (Triyuga) | 10/08/2015 | *Taphozous* sp. |
| Pipalbot, Gaighat (Triyuga) | 15/08/2015 | Cynopterus sphinx |
| Near Kali Khola (Triyuga) | 03/04/2016 | No capture |
| Sanuwa (Triyuga) | 04/04/2016 | *Pipistrellus* sp. |
| Chanppurbatole (Triyuga) | 04/04/2016 | No capture |
| Gaighat Bazaar (Triyuga) | 04/04/2016 | *Pipistrellus* sp. |
| Milanchowk (Triyuga) | 04/04/2016 | *Pipistrellus*sp. |
| PuranoGaighat (Triyuga) | 04/04/2016 | *Pipistrellus* sp. |
| Toribari (Triyuga) | 05/04/2016 | *Pipistrellus* sp., *Cynopterus sphinx* |
| Near Hotel Khobar (Triyuga) | 05/04/2016 | *Pipistrellus* sp. |
| Rajabas (Triyuga) | 05/04/2016 | *Pipistrellus* sp., *Cynopterus sphinx* |
| Near Pipalchowk, Chuhade (Triyuga) | 05/04/2016 | Megaderma lyra |
| Chapan (Triyuga) | 05/04/2016 | *Pipistrellus* sp. |
| AsariTole (Triyuga) | 06/04/2016 | *Megaderma lyra*, *Pipistrellus* sp. |
| AsariKhola (Triyuga) | 06/04/2016 | *Pipistrellus* sp. |
| Khairahajhora ( Cahudandi) | 06/04/2016 | *Pipistrellus* sp. |
| Ikraha (Triyuga) | 06/04/2016 | *Pipistrellus* sp. |

This survey is the first survey of bats in Triyuga and Chaudandi municipalities and second survey in Udayapur district. In the first survey, four individuals of Pipistrellus sp. and only a few presence-signs of Cynopterus sphinx were recorded from Bhulke Katari (Thapa, 2014). *Taphozous sp.* was the first record in Udayapur district. *Megaderma lyra* is new record for Udayapur district. Before this record *Megaderma lyra* was recorded from five different districts of province no. 1. *Pipistrellis coromendra, Plipstrellus javanicus and Pipistrellus tenues* were reported from six different sites of province no. 1. In this survey *Pipistrellus sp.* were reported from 12 different sites. Like other three districts (Okhaldhunga, Khotang and Solukhumbu) of Sagarmatha zone most of the people do not know the values of bats (Thapa, 2014). Most of the people of study area perceived bats as a signal of badluck, however, some people respected bats as a god and considered as a signal of goodluck.

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Received Date : 2021/05/27
Accepted Date : 2021/09/13