

A short note on chiropteran status from Kailash cave, Syangja district, Western Nepal

Arjun Thapa and Sanjan Thapa*

Central Department of Zoology
Tribhuvan University, Kirtipur, Kathmandu, Nepal

Abstract

Bats were studied in Kailash Cave, Syangja district in 15 October 2008 and 25 April 2009. Three species of bats *Hipposideros armiger*, *Miniopterus schreibersii* and *Myotis csorbai* were reported from the cave. *M. csorbai* is endemic to Nepal. *M. schreibersii* is the common species in the cave while *M. csorbai* is rare.

Key words: Chiroptera, Kailash Cave, *Myotis csorbai*, *Hipposideros armiger*, *Miniopterus schreibersii*.

Introduction

Nepal is rich in Chiropteran diversity representing 45 percent species of bats found in South Asia and 4.6 percent of the world (Huston *et al.*, 2001). Fifty three species have been reported from Nepal (Baral and Shah 2008) with an estimated number of 87 species (Myers *et al.*, 2000). Thirty eight species are known to live and breed in Nepal (Suwal *et al.*, 1995). Fifteen species of insectivorous bats were reported to be found in western Nepal (Suwal *et al.*, 1995) and Baral and Shah, 2008) added three more species in the region. Specimens of twenty species were collected from different parts of western Nepal and deposited at Hungarian Natural History Museum (HNHM), Budapest, Hungary; Natural History Museum (NHM), London, UK and Zoological Museum of Moscow University (ZMMU), Moscow, Russia (Bates and Harrison 1997; Csorba *et al.*, 1999). Five species has been reported from Syangja district. Bates and Harrison 1997 located *Myotis longipes* from Kailash Cave, Syangja. Topal 1997; Csorba *et al.* 1999 re-identified *M. longipes* as *M. csorbai*, an endemic species to Nepal with its type locality 4 km E of Syangja, 1300 m a.s.l., Syangja District, about 30 km S of Pokhara town, Nepal. Dr. Gabor Csorba collected five specimens of *M. csorbai*: Holotype - adult female: HNHM 97.2.4. (collector's No. CSORON 103), 4 km E of Syangja, 1300 m a.s.l., Syangja District, about 30 km S of Pokhara town, Nepal. Collected on 23 July 1995. Alcoholic specimen, skull extracted. Deposited in the Department of Zoology, Hungarian Natural History Museum, Budapest; Paratypes - four adult females: HNHM 97.2.1., 97.2.2., 97.2.3., 97.2.5. (collector's Nos: CSORON 100, CSORON 101, CSORON 102, and CSORON 104, respectively), from the same locality and same date, deposited in the Department of Zoology, Hungarian Natural History Museum, Budapest. Further five specimens were collected by A. BORISSENKO and S. KRUSKOP, at Bhurungdi river, about 30-40 km NW of Pokhara, Nepal. Alcoholic specimens, with extracted skull, deposited in the Zoological Museum of the Moscow University, Moscow: S-164481 female, S-164487 male, vicinity of Tirkhedunga, 1700 m, 14 May 1996, S-164483 female, S-164484 female, S-164490 male, vicinity of Sudame, 1500 m, 15-16 May 1996 (Topal, 1997).

Materials and Methods

Kailash Cave is a double storied (28° 5'52.34"N, 83°54'19.07"E) which is located at 1130m in Bahakot Village Development Committee (VDC) of Syangja district. It is highly important for Hindus for bathing during Shivaratri every year.

Roosting colonies were searched and observed in 15 October 2008 and 25 April 2009. Individuals in each bat colony were counted. For morphological investigation and proper identification bats were caught by using mist net. Field identification was carried out with available literatures; Bates and Harrison 1997 and Csorba *et al.* 1999. Reproductive stage, particularly genitalia/nipples were noted. All caught bats were released back to the cave.

Bats were photographed with the aid of NIKON D40x digital camera. The body measurements were taken with the help of millimeter and graded steel scale and body weight was measured in grams with the available simple spring balance. Five specimens (CDZTU_BAT 008, CDZTU_BAT 012, CDZTU_BAT 013, CDZTU_BAT 014 and CDZTU_BAT 018) were deposited in 70 % ethanol at the Central Department of Zoology (CDZ) Museum, Tribhuvan University, Kathmandu. Skull of *M. csorbai* was prepared and a number of external and cranio-dental measurements were taken with the help of stainless steel vernier caliper (without error), and those relevant to the taxonomic identification of the species are presented in Table 2. Photographs of skull and dentitions was taken with the aid of AROMA 52mm close-up lenses (+1, +2, +4 and Macro) at 55mm zoom using AF-S NIKKOR 18-55 mm lens fitted with Nikon D40x camera. Their sketches were drawn directly observing skulls with lenses as well as looking photographs.

Results

Three species of bats *H. armiger*, *Myotis csorbai* and *Miniopterus schreibersi* were identified from the Kailash cave. Among them *M. schreibersi* was observed dominant following *H. armiger* and *M. csorbai* (Table 1).

Table 1: Status of bat species in Kailash cave, Syangja

Bat species	Reproductive status	Population	Remarks
<i>Hipposideros armiger</i>	-	25	Confirmed at the site and not collected
<i>Myotis csorbai</i>	A/F/NR	15	A dead specimen Accession no: CDZTU_BAT 008)
<i>Miniopterus schreibersi</i>	A/F/R	200	Four specimens preserved at CDZ (Accession nos: CDZTU_BAT 012 CDZTU_BAT 013, CDZTU_BAT 014, CDZTU_BAT 018)

Note: A=Adult; F=Female; R= Reproducing individual (swollen testes/flaccid mammae), NR= Non-Reproducing individual (small testes/ mammae).

Altogether five specimens, four individuals of *M. schreibersi* were caught and collected including one dead specimen of *M. csorbai*. The measurements of the caught and collected individuals are given in Table 2.

Table 2: Measurements (in mm) of *M. schreibersi* caught during the survey (25 April 2009)

Body parts	<i>Miniopterus schreibersi</i>					<i>Myotis csorbai</i>
	Ms1	Ms2	Ms3	Ms4	Average	
HB	55	56	56	55	55.5	41
T	47	48	47	46	47	33
TIB	19	19	20	18	19	16
HF	14	12	14	12	13	11
FA	50	49	51	49	49.75	35.5
Thumb		7	7	7	7	7
5mt	41	40	40	39	40	33
4mt	44	44	43	42	43.25	35
3mt	45	45	46	44	45	36
1ph5mt	11	12	12	11	11.5	9
1ph4mt	10	10	11	10	10.25	10
1ph3mt	12	12	11	12	11.75	12
2ph5mt	8	8	9	8	8.25	10
2ph4mt	20	19	20	20	19.75	9
2ph3mt	40	39	41	39	39.75	16
E	14	14	12	12	13	15
Tragus length	5	5	5	5	5	7
GTL	-	-	-	-	-	13.2
CCL	-	-	-	-	-	11.6
ZB	-	-	-	-	-	7.8
BB	-	-	-	-	-	6.6
PC	-	-	-	-	-	3.1
C-M ³	-	-	-	-	-	5
C-M ₃	-	-	-	-	-	5.3
M	-	-	-	-	-	9.8
M ³ -M ³	-	-	-	-	-	5.3
C ¹ -C ¹	-	-	-	-	-	3.4
CBL	-	-	-	-	-	12.6
RW	-	-	-	-	-	4

Note: HB=Head Body; T=Tail; TIB=Length of Tibia; HF=Hind Foot; FA=Forearm; WSP=Wingspan; 3mt=Third Metacarpal; 4mt=Fourth Metacarpal; 5mt=Fifth Metacarpal; 1ph3mt=First Phalange Third Metacarpal; 1ph4mt=First Phalange Fourth Metacarpal; 1ph5mt= First Phalange Fifth Metacarpal; 2ph3mt=Second Phalange Third Metacarpal; 2ph4mt= Second Phalange Fourth Metacarpal; 2ph5mt= Second Phalange Fifth Metacarpal; E=Ear (Pinna from base to tip); Wt. =Weight; GTL=Greatest Length of Skull; CCL=Condylo-Canine Length; ZB=Zygomatic Length; BB=Breadth of Braincase; PC=Post Orbital Constriction; C-M³=Maxillary Toothrow (upper Canine to upper 3rd Molar); C-M₃= Mandibular Toothrow (lower Canine to lower 3rd Molar); M= Mandible Length;

M^3 - M^3 =posterior Palatal Width (Across the outer borders of the last upper molars); C^1 - C^1 = Anterior Palatal Width (Across the outer borders of the upper canines); CBL=Condylal-Basal Length.

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 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.

Discussion

The diversity of bats seems to be higher than in any other caves as more than single species is recorded from this cave as earlier two species were only recorded at the cave in Kathmandu (Thapa *et al.*, 2009). *H. armiger* was observed roosting. The population of the *M. schreibersii* was observed maximum and that of *M. csorbai* minimum as well as declining where as five specimens were collected and deposited at HNHM and 16 specimens were collected and deposited at ZMMU (Csorba *et al.*, 1999). Among the five species of bats recorded from the Syangja district three species were found from the study area. However, only *Myotis longipes* was recorded before from this cave (Bates and Harrison, 1997). This study added *Miniopterus schreibersii*, and *Hipposideros armiger* to the species list of this cave (Bates and Harrison, 1997), However, the locality were not clearly defined before for most of the species and only district was listed. The external and cranio-dental measurements of the specimen collected from the site are slightly smaller to those of *M. longipes* presented in Bates and Harrison, 1997 while similar to those of *M. csorbai* mentioned in Topal, 1997; Csorba *et al.*, 1999. Also the coloration is different than that of Bates and Harrison, 1997 and slightly different than those of Topal, 1997.

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Fig.1. Lateral View of left maxillary incisors of *Myotis csorbai*. CDZ TU_BAT 008, Kailash Cave, Bahakot V.D.C., Syangja, Nepal.

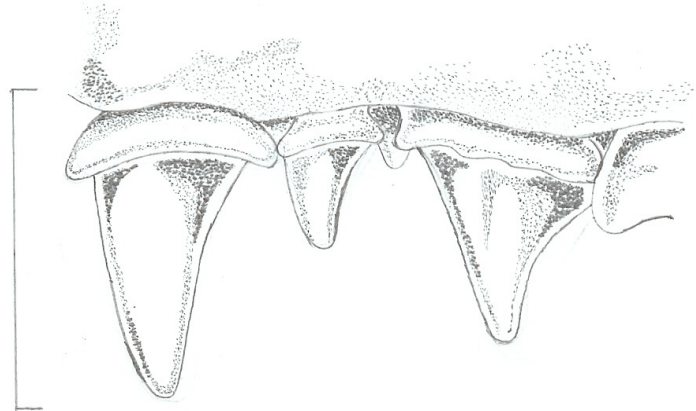


Fig.2. Lateral View of left maxillary canine and premolars (pm², pm³ and pm⁴) of *M. csorbai*. CDZ TU_BAT 008, Kailash Cave, Bahakot V.D.C., Syangja, Nepal. (Scale=1mm.)

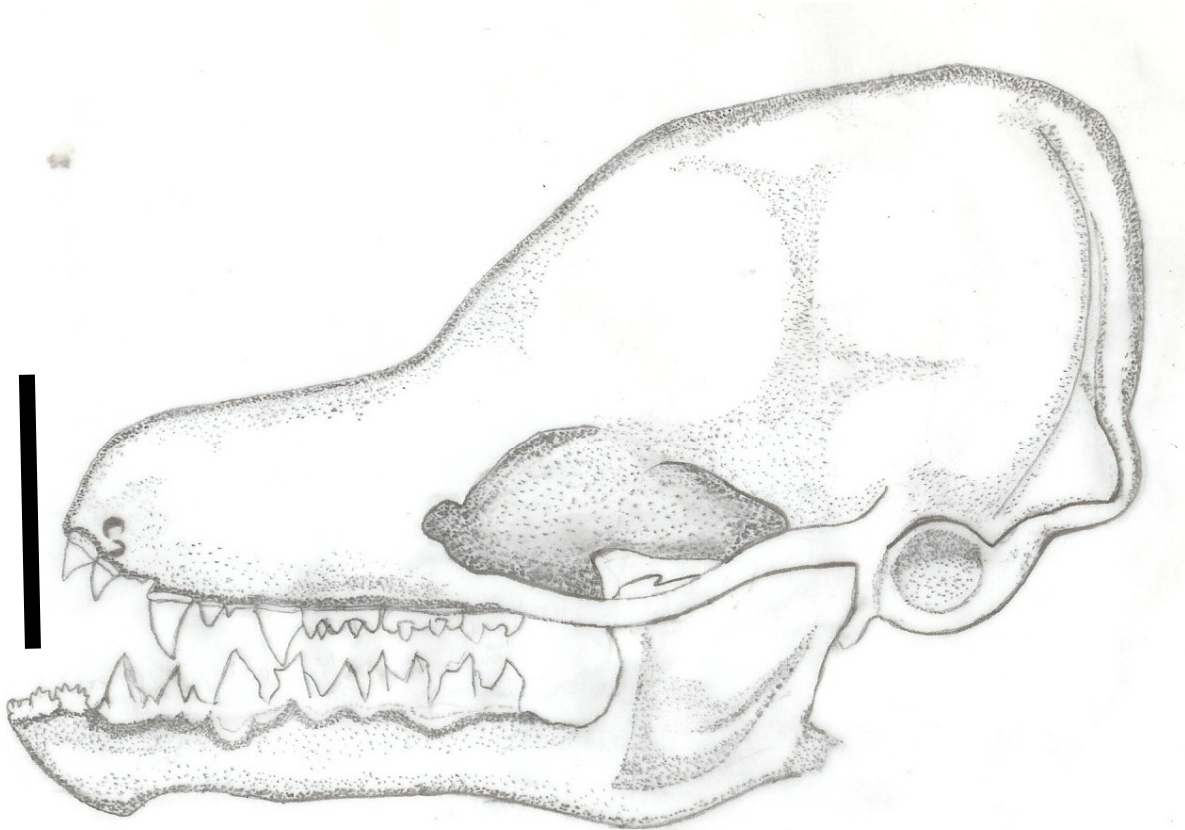


Fig.3. Lateral View of skull of *M. csorbai*. CDZ TU_BAT 008, Kailash Cave, Bahakot V.D.C., Syangja, Nepal. (Scale=3mm.)

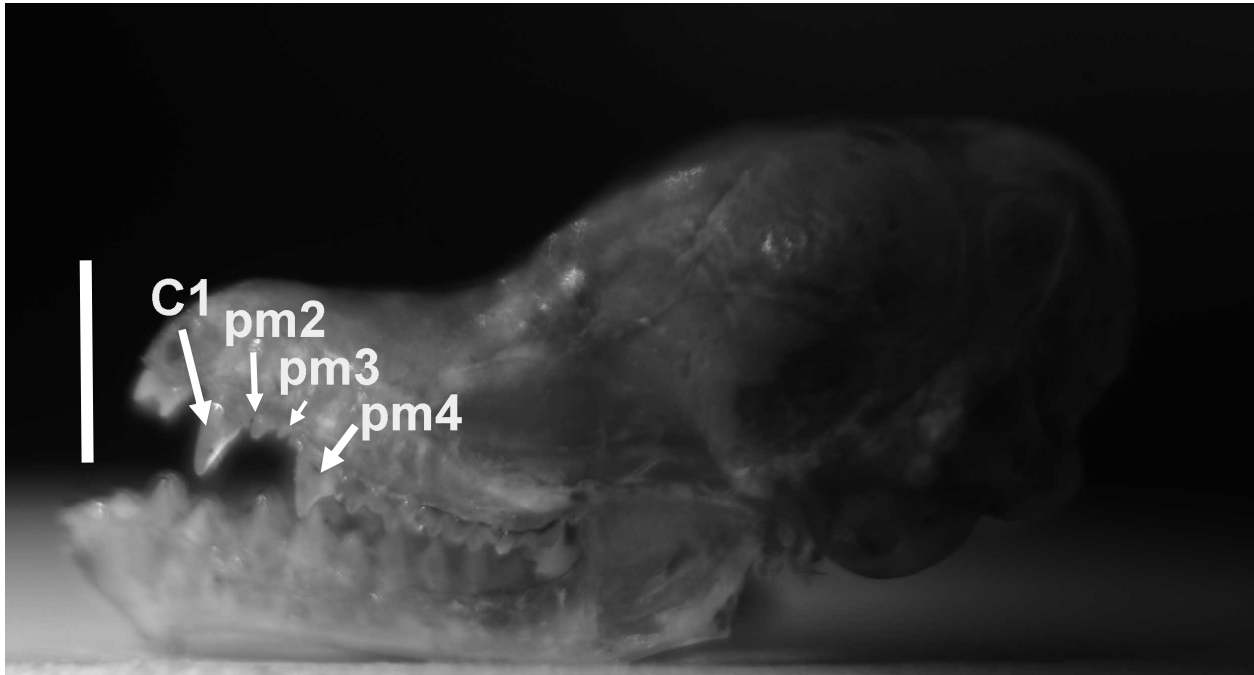


Photo.1. Skull of *M. csorbai* Lateral View of skull of *M. csorbai*. CDZ TU_BAT 008, Kailash Cave, Bahakot V.D.C., Syangja, Nepal. (Scale=3mm)



Photo.2. *Hipposideros armiger* roosting in the cave



Photo3. A dead *Myotis csorbai* specimen



Photo.4. A captured *Miniopterus schreibersii*