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NOTE

DURGA DAS'S LEAF-NOSED BAT

***HIPPOSIDEROS DURGADASI* KHAJURIA, 1970**

(MAMMALIA: CHIROPTERA: HIPPOSIDERIDAE):

A NEW DISTRIBUTION RECORD IN NORTHERN INDIA

HIDDEN IN THE NATIONAL ZOOLOGICAL COLLECTIONS

M. Kamalakannan, Tauseef Hamid Dar & C. Venkatraman

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Durga Das's Leaf-nosed Bat *Hipposideros durgadasi* Khajuria, 1970 is one of the 84 species of leaf-nosed bats (Family: Hipposideridae) of the world (Murray et al. 2012). In India, the genus *Hipposideros* is represented by 13 species, of which, *Hipposideros durgadasi* and *Hipposideros hypophyllus* are endemic to peninsular India.

H. durgadasi (Image 1a) is a medium-sized bat (FA= 34.45–37.50), belonging to bicolor-species group of the family Hipposideridae and it roosts in small colonies of several (> 100) individuals (Khajuria 1980). The roosts are found in the artificial caves in hillocks and under huge granite boulders (Bates & Harrison 1997). In Karnataka, this species has been observed to be sharing its roost with *H. fulvus*, *H. hypophyllus*, *H. speoris*, and *Rhinopoma hardwickii* (Kaur et al. 2014), while in Madhya Pradesh, it occurs in association with *H. fulvus* and sometimes with *Rhinolophus lepidus*, *Taphozous melanopogon*, and *T. theobaldi* (Khajuria 1980). The species forages in tropical dry deciduous and thorn forests. So far, this species has been recorded only from two states, including its type locality in Katanga Village, Jabalpur District, Madhya Pradesh in central India (Khajuria 1970) and Kolar District, Karnataka in southern India (Kaur et al. 2014). It has been found at elevations from 347m to 900m.

While conducting surveys to document the mammalian fauna of Uttar Pradesh in 1998, a team of the Zoological Survey of India (ZSI), headed by Mr. J.P. Srivastava, collected nine individuals (5 males; 4 females)

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INDIA HIDDEN IN THE NATIONAL ZOOLOGICAL
COLLECTIONS**

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Abbreviations: External measurements: FA: Forearm length; HB: Head Body length; T: Tail Length; E: Ear Length; HF: Hindfoot length; Hw: Horseshoe width; Tib: Tibia length; 3mt: Length of the third metacarpal; 4mt: Length of the fourth metacarpal; 5mt: Length of the fifth metacarpal; 1st ph3rd D: First phalanx of the third Digit; 2nd ph3rdD: Second phalanx of the third Digit; 1st ph4th D: Length of the first phalanx of the fourth digit; 2nd ph4th D: Length of the second phalanx of the fourth Digit. Cranio-dental measurements: GTL: Greatest length of skull; CBL: Condylbasal length; CCL: Condyllocanine length; ZB: Zygomatic breadth; BB: Breadth of braincase; C-M³: Maxillary tooththrow length; C-M3: Mandibular tooththrow length; M³-M³: Posterior palatal width; C¹-C¹: Anterior palatal width; M: Mandibular length.

of bats from a roost site near Loyudhan falls, 14km west of Mirzapur District in Uttar Pradesh (25.1213°N & 82.4922°E; Fig. 1). The collection of specimens was done on 25 August 1998 and later deposited in the National Zoological Collections of Mammal & Osteology section, ZSI, Kolkata after registration (# 26394- 26397; 26410- 26414).

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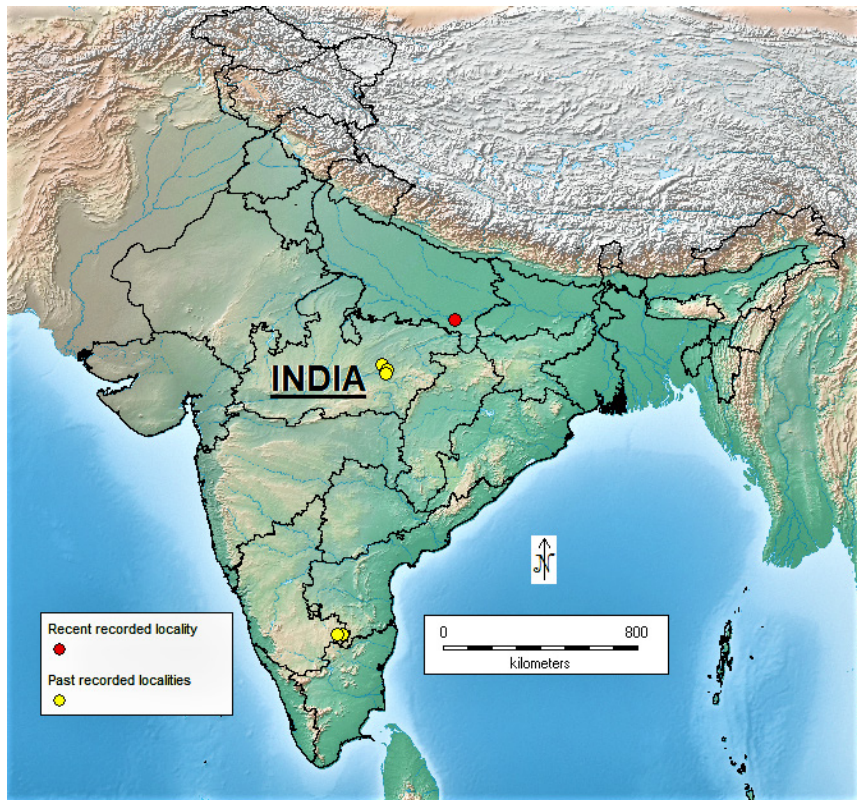


Figure 1. Distribution map of Durga Das's Leaf-nosed Bat *Hipposideros durgadasi*, showing detailed recorded localities

Table 1. Morphological measurements of Durga Das's Leaf-nosed Bat *Hipposideros durgadasi*

External measurements	Morphological measurements (mm)									Present study	Kaur et al. (2014)	Bates & Harrison (1997)
	Registration No.											
	26410 (male)	26411 (male)	26412 (female)	26413 (female)	26414 (male)	26394 (female)	26395 (female)	26396 (female)	26397 (male)			
FA	35.05	35.68	36.81	35.47	36.15	36.10	35.08	35.74	35.75	35.05–36.81	34.45–35.95	36.0–37.5
HB	36.02	35.71	36.14	37.32	40.02	36.12	36.26	36.45	36.38	35.71–40.02	36.45–41.12	-
T	20.30	22.72	21.69	24.64	Damaged	23.33	22.94	23.64	23.50	20.30–24.64	21.21–22.94	21.5–29.0
Tail tip length	3.16	3.88	3.40	3.08	Damaged	3.15	3.21	3.06	3.04	3.04–3.88	1.22–2.38	-
HF	5.66	5.49	5.78	5.47	5.62	5.40	5.87	5.42	5.35	5.35–5.87	5.1–6.7	5.5–8.0
Tib	15.89	16.44	17.28	16.78	17.43	17.08	16.20	17.39	17.01	15.89–17.43	15.38–16.43	-
E	13.60	13.72	13.67	13.91	14.33	14.88	13.64	13.91	13.68	13.60–14.88	12.70–13.48	13.0–19.0
3mt	24.55	26.40	28.33	26.68	27.02	27.20	27.16	27.32	27.37	24.55–28.33	26.12–28.0	-
4mt	26.70	28.67	30.03	29.52	28.58	29.01	29.31	28.68	29.31	26.70–30.03	27.62–29.61	-
5mt	24.57	26.78	27.15	26.70	26.42	26.57	26.43	26.91	26.91	24.57–27.15	25.75–27.71	-
1 st ph3 rd D	14.37	15.30	15.27	15.02	14.22	14.30	13.77	15.02	14.05	13.77–15.30	13.78–15.11	-
2 nd ph3 rd D	14.36	14.49	14.73	15.27	15.03	15.08	14.18	15.25	14.39	14.18–15.27	14.0–15.47	-
1 st ph4 th D	8.68	8.84	8.42	8.30	8.25	7.65	7.78	8.28	8.30	7.65–8.84	8.24–8.76	-
2 nd ph4 th D	8.26	8.47	8.32	8.19	8.10	7.06	6.63	8.10	8.03	6.63–8.47	7.63–8.26	-
Hw	3.69	3.75	3.75	3.69	3.86	3.25	3.30	3.72	3.57	3.25–3.86	-	-

External measurements (both morphological and cranio-dental; Table 1 & 2) were taken using digital Vernier calliper (Mitutoyo) to the nearest 0.01mm. The photomicrographs of the baculum were captured using an optical light microscope (LEICA M205 A; Image 1d). Photographs of the skull of one of the specimens were taken from all aspects (Image 2a–f). Upon careful examination of the external morphology and cranio-dental characters of all specimens and bacular structure of the male specimens (Khajuria 1970; Topál 1975; Khajuria 1980; Bates & Harrison 1997; Srinivasulu et al. 2010; Kaur et al. 2014), they were identified as Durga Das's Leaf-nosed Bat *Hipposideros durgadasi* Khajuria, 1970.

Diagnostic characteristics: Fur is soft, brown to reddish-brown on the dorsal surface (Image 1e), whitish on the ventral surface (Image 1a). Supplementary leaflets are absent. The anterior leaf has a median emargination and is covered throughout with short, stiff black hair. The internarial septum is well-developed, with a short base and a bulbous apex (Image 1b). Nostrils are oval in shape and possess narial lappets on the outer margin. Compared to *H. cineraceus*, forearm length is longer and ears are shorter; the tail projects further beyond the interfemoral membrane (> 1mm; Image 1c), unlike *H. cineraceus*, where it is less than 1mm (Table 1 & 3). The cranio-dental (Table 2) measurements such as condylobasal length (CBL): 13.0–13.9 mm; condylocanine length (CCL): 12.65–12.78 also distinguish this species from other leaf-nosed bats of *bicolor*-species group, namely, *H. ater*, *H. fulvus*, and *H. cineraceus* (Table 2 & 3). The baculum is small (1.3mm) with semi-circular ('C') shape. The base of baculum is rounded,

wider, and the tip is pointed (Image 1d).

The morphological and cranio-dental measurements of these voucher specimens were also compared with that of other species of *bicolor*-species group (Table 3). The presence of a well-developed internarial septum of peculiar shape (with a short base and a bulbous apex), tail projecting beyond the interfemoral membrane (>1mm), and the conspicuous semi-circular shape ('C' shape) of the baculum are some of the characters attributed to *H. durgadasi* which render this species distinct from its sister species.

When this species was first reported from its type locality (Katanga Village in Jabalpur District of Madhya Pradesh), it was considered as a subspecies of *Hipposideros cineraceus* Blyth, 1853 (Khajuria, 1970). Later, Topál (1975) distinguished this species as *Hipposideros durgadasi* based on its distinct baculum structure. Further, this species was also known to be present in the villages of Katangi, Richhai and Gwarighat in Jabalpur district of Madhya Pradesh (Topál 1975; Khajuria 1980) and recently from Hanumanhalli and Therhalli villages of Kolar District in Karnataka (Kaur et al. 2014; Fig 1). The specimens of *H. durgadasi* collected from Mirzapur District in Uttar Pradesh were identified correctly as *H. durgadasi* (Image 1e) but were not reported or published in any of the subsequent communications. This might be due to lack of knowledge on taxonomy of bats at the time of collection. Through this communication, we report and confirm the presence of *H. durgadasi* from Uttar Pradesh for the first time. This also extends the distribution of this species further north in peninsular India by 400km from the type locality.

Table 2. Cranio-dental measurements (in mm) of Durga Das's Leaf-nosed Bat *Hipposideros durgadasi*

	Registration no.			Present study	Kaur et al. 2014	Bates & Harrison 1997
	26411 (male)	26413 (female)	26414 (male)			
GTL	14.97	14.99	15.47	14.97–15.47	14.82–15.42	14.5–16.1
CBL	13.35	12.95	13.45	12.95–13.45	12.8–13.25	13.0–13.90
CCL	12.65	12.51	12.78	12.65–12.78	12.5–12.97	-
ZB	7.35	7.45	7.48	7.35–7.48	6.98–7.97	6.8–9.0
BB	7.87	7.80	8.08	7.80–8.08	7.61–7.97	7.0–8.5
C ¹ -C ¹	2.91	2.99	3.13	2.91–3.13	2.83–2.89	3.0–3.7
C-M ³	4.71	4.64	4.48	4.48–4.71	4.67–4.78	5.0–6.0
M ³ -M ³	4.89	4.96	4.95	4.89–4.96	4.75–5.07	-
C-M ³	4.88	4.89	4.99	4.88–4.99	4.57–5.1	5.0–6.0
M	8.45	8.62	8.95	8.45–8.95	8.34–8.76	9.0–9.5
M ³ -M ³	4.64	4.65	4.85	4.64–4.85	-	5.0–5.8
Dental formula	Incisor: 1/2; Canine:1/1; Premolar: 2/2; Molar: 3/3 = 30					

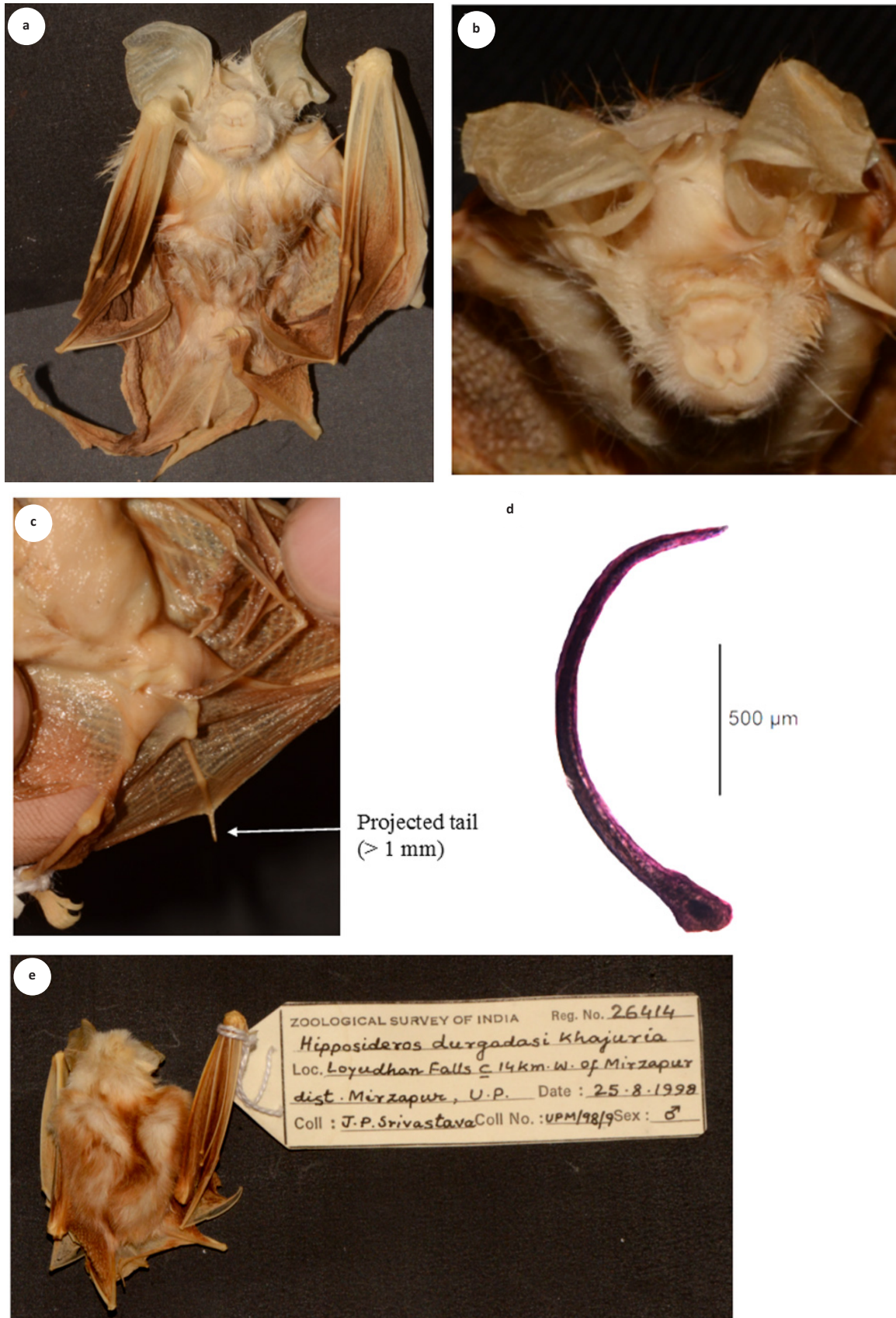


Image 1. Reg. No. 26414: (a) Durga Das's Leaf-nosed Bat *Hipposideros durgadasi*; (b) leaf-nose showing the well-developed internal septum with a short base and a bulbous apex; (c) projected tail; (d) baculum; (e) dorsal view of specimen with tag. © M. Kamalakannan



Image 2. Reg. No. 26414: Skull and mandible of Durga Das's Leaf-nosed Bat *Hipposideros durgadasi* scale 1cm: (a) dorsal view of maxilla; (b) ventral view of maxilla; (c) dorsal view of maxilla showing the upper canines and incisors; (d) lateral view of maxilla; (e) occlusal view of mandible; (f) lateral view of mandible. © M. Kamalakannan

The Durga Das's Leaf-nosed Bat is a rare species in India and it has been classified as 'Vulnerable' by the IUCN Red List of Threatened Species (Mishra & Dookia 2016). Anthropogenic activities like stone quarrying near roosting sites of the species is causing habitat loss, which is the major threat to this species (Kaur et al. 2014).

Habitat protection and public awareness would help in mitigating further threats to this species (Molur et al. 2002; Mishra & Dookia 2016). Further studies on the taxonomy, ecology and the range extension of the species throughout the country will help in understating the present status of this species.

Table 3. Morphological and cranio-dental measurements of *H. ater*, *H. fulvus*, *H. cineraceus* and *H. durgadasi* as per Bates & Harrison (1997).

External characters	<i>H. ater</i>	<i>H. fulvus</i>	<i>H. cineraceus</i>	<i>H. durgadasi</i> (present study)
FA	34.9–38.0	38.4–44.0	33.0–36.3	35.05–36.81
HB	38.0–48.0	40.0–50.0	33.0–42.0	35.71–4.02
T	20.0–30.0	24.0–35.0	22.0–30.0	20.30–24.64
Tail tip length	–	–	–	3.04–3.88
HF	5.3–7.2	6.0–9.8	6.0–7.0	5.35–5.87
Tib	15.2–17.8	16.5–20.7	13.8–16.7	15.89–17.43
E	14.8–20.0	19.0–26.0	13.0–17.0	13.60–14.88
3mt	26.1–30.1	27.3–31.2	24.4–26.6	24.55–28.33
4mt	27.2–32.2	28.3–33.9	26.9–28.8	26.70–30.03
5mt	26.2–31.2	28.7–33.1	26.2–27.8	24.57–27.15
1 st ph3 rd D	14.3–17.5	16.1–18.9	14.3–16.2	13.77–15.30
2 nd ph3 rd D	14.3–17.4	16.2–19.5	12.5–15.3	14.18–15.27
1 st ph4 th D	8.7–10.9	10.0–12.0	8.4–11.2	7.65–8.84
2 nd ph4 th D	7.0–9.2	8.2–11.2	6.2–8.6	6.63–8.47
Cranio-dental characters				
GTL	15.4–16.7	17.2–18.6	15.2–16.2	14.97–15.47
CBL	–	–	–	12.95–13.45
CCL	13.2–14.2	15.0–16.4	12.7–13.7	12.65–12.78
ZB	7.7–8.3	8.6–9.6	6.9–7.6	7.35–7.48
BB	7.5–8.5	7.5–9.4	7.2–8.2	7.80–8.08
C ¹ –C ¹	3.3–3.8	3.6–4.4	2.7–3.1	2.91–3.13
C–M ³	5.1–5.7	6.0–6.9	4.9–5.3	4.48–4.71
M ³ –M ³	5.1–5.8	5.8–6.8	4.6–5.1	4.89–4.96
C–M ³	5.2–6.1	6.4–7.5	5.2–5.8	4.88–4.99
M	9.4–10.2	11.1–12.0	8.8–9.4	8.45–8.95

References

- Bates, P.J.J. & D.L. Harrison (1997). *Bats of the Indian Subcontinent*. Harrison Zoological Museum, Sevenoaks, England, UK, 258pp.
- Kaur, H., S. Chelmala, B. Srinivasulu, T. Shah, G. Devender & A. Srinivasulu (2014). Taxonomic notes and distribution extension of Durga Das's leaf-nosed bat *Hipposideros durgadasi* Khajuria, 1970 Chiroptera: Hipposideridae from south India. *Biodiversity Data Journal* 2: e4127; <http://doi.org/10.3897/BDJ.2.e4127>
- Khajuria, H. (1970). A new leaf-nosed bat from central India. *Mammalia* 34: 622–627.
- Khajuria, H. (1980). *Taxonomical and ecological studies on bats of Jabalpur district, Madhya Pradesh, India. Part II. Families Megadermatidae, Rhinolophidae and Vespertilionidae*. Records of the Zoological Survey of India, Miscellaneous Publications, Occasional Paper 19: 1–69.
- Mishra, R. & S. Dookia (2016). *Hipposideros durgadasi*. The IUCN Red List of Threatened Species 2016: e.T10131A22090631. Downloaded on 01 February 2018. <http://doi.org/10.2305/IUCN.UK.2016-2.RLTS.T10131A22090631.en>
- Molur, S., G. Marimuthu, C. Srinivasulu, S. Mistry, A.M. Hutson, P.J.J. Bates, S. Walker, K. Padmapriya & A.R. Binupriya (2002). Status of South Asian Chiroptera: Conservation Assessment and Management Plan C.A.M.P. Workshop Report. Zoo Outreach Organization/CBSG-South Asia, Coimbatore, India.
- Murray, S.W., P. Campbell, T. Kingston, A. Zubaid, C. M. Francise & T.H. Kunz (2012). Molecular phylogeny of hipposiderid bats from Southeast Asia and evidence of cryptic diversity. *Molecular Phylogenetics and Evolution* 62: 597–611.
- Srinivasulu, C., P.A. Racey & S. Mistry (2010). A key to the bats *Mammalia: Chiroptera of South Asia*. *Journal of Threatened Taxa* 27: 1001–1076; <http://doi.org/10.11609/JoTT.o2352.1001-76>
- Topál, G. (1975). Bacula of some old world leaf-nosed bats Rhinolophidae and Hipposideridae, Chiroptera: Mammalia. *Vertebrata Hungarica* 16: 21–53.





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