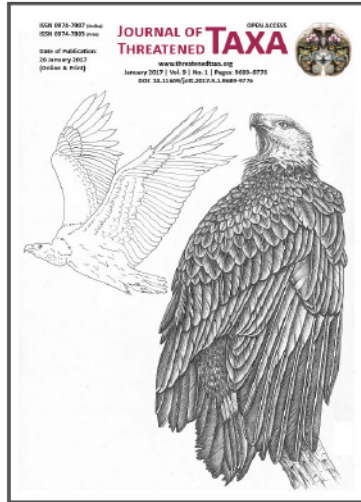


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NOTE

RE-SIGHTING RECORD OF FULVOUS LEAF-NOSED BAT *HIPPOSIDEROS FULVUS* GRAY, 1838 (MAMMALIA: CHIROPTERA: HIPPOSIDERIDAE) FROM THAR DESERT, RAJASTHAN, INDIA

Sumit Dookia, Gajendra Singh & Rajlakshmi Mishra

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In India, 120 species of bats have been reported so far (Talmale & Pradhan 2009), whereas 25 species of bats have been reported from Rajasthan (Srinivasulu et al. 2013a). Out of these, 17 species are found in the Thar Desert (Prakash 1963; Sinha 1979; Dookia 2004; Senacha & Dookia 2013).

Of these 17 species, five species of bats—Greater False Vampire Bat *Megaderma lyra*, Fulvous Leaf-nosed Bat *Hipposideros fulvus*, Indian Leaf-nosed Bat *Hipposideros lankadiva*, Dormer's Pipistrelle *Scotozous dormeri* and Egyptian Free-tailed Bat *Tadarida aegyptiaca*—were not reported since 1979 from the Thar Desert (Senacha 2003; Senacha & Dookia 2013). Bat species are highly habitat specific and require specific temperatures and humidity for roosting.

On 31 October 2015, during regular sighting surveys for bats in the outskirts of Jodhpur City, a large colony (more than 2000 individuals) of genus *Rhinopoma* was found inside a multichannel cave. The cave was located near Daijar Village, 25km north of Jodhpur City, in the premises of an ancient temple (Images 1, 2 and 5). The maximum ambient air temperature of Jodhpur is 49°C in summer and minimum 1°C in winter. A thorough search inside the cave and its channels revealed the presence of more than 20 individuals of leaf-nosed bats in a separate chamber in one of the closed channels. These individuals, bearing typical characteristics of leaf-nosed bats, were roosting inside a man-made cave near

RE-SIGHTING RECORD OF FULVOUS LEAF-NOSED BAT *HIPPOSIDEROS FULVUS* GRAY, 1838 (MAMMALIA: CHIROPTERA: HIPPOSIDERIDAE) FROM THAR DESERT, RAJASTHAN, INDIA

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Daijar (26°23'49.14"N & 73°03'8.19"E). There are many mythological stories associated with the origin of the cave but the actual natural history of the place is not known.

All these individuals were scanned, and two males and one female were captured with the help of a scoop net. At first glance, on the basis of the structure of their noseleaf, they were identified to be members of the Hipposideridae family (Images 3 & 4). Morphometric measurements were taken (Table 1). The individuals were photographed, and one male individual was collected and preserved at University School of Environment Management, GGS Indraprastha University (voucher specimen IPU-Chiro-RJ-51). Cranio-dental measurements were taken using digital vernier calipers nearest to 0.01mm. The specimen was preserved using standard protocol for further analysis of the baculum and DNA. On the basis of the morphological measurements,

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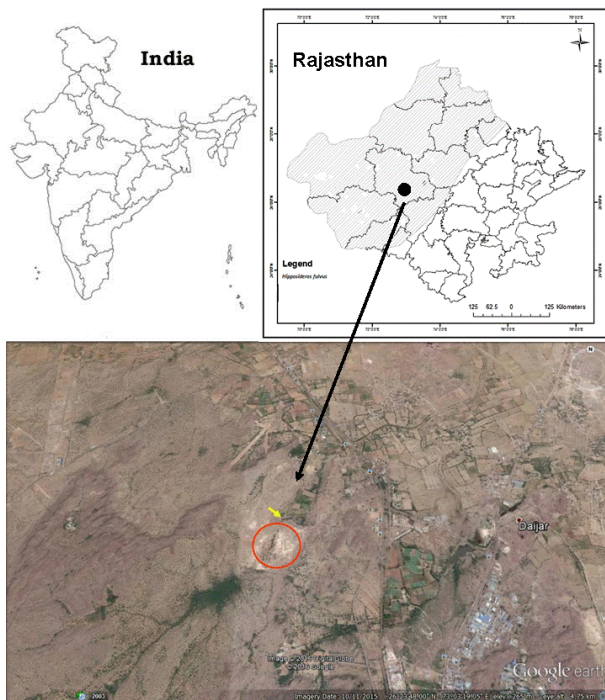


Image 1. Sighting location in Jodhpur District, Rajasthan, India



Image 2. The openings inside the cave



Image 3. *Hipposideros fulvus*

the specimen was identified as *Hipposideros fulvus*.

Interestingly, many body morphometric measurements were smaller than reported by Bates & Harrison (1997) and Srinivasulu et al. (2010), whereas wing morphometrics were found to be within the range. The area has very high temperature in comparison with the rest of the localities in the distribution range of this species within the country. Further studies are needed to ascertain if this could be a possible reason for the smaller size of bat specimen of this species.

In the past, *Hipposideros fulvus* was first reported only from one locality in Jodhpur in the Thar Desert in 1979 (Sinha 1979), the same was re-quoted by Sinha (1980), Gaur (1981), Bates & Harrison (1997), Srinivasulu et al. (2013a). After the initial sighting report it has not been reported in any publication from anywhere in the Thar Desert and since 2002 it has been mentioned as having locally disappeared from the entire Thar Desert (Purohit & Senacha 2002, 2004a,b; Purohit et al. 2006; Senacha & Dookia 2013). Hence, the present voucher (IPU-Chiro-RJ-51) based information confirms the presence of *H. fulvus* from this part of the Thar Desert after 37 years.

Hipposiderid bats have a short muzzle with a complex noseleaf that bears a horizontal horseshoe surrounding the nostrils, thrown into skin folds and associated leaflets lacking a sella and connecting processes, and with a well-

developed tail enclosed in the interfemoral membrane (Hill et al. 1986). The members of the *bicolor* group (Hill 1963) of genus *Hipposideros* are characterized externally by large rounded ears lacking any sharply defined point or any definite fold or thickening at the antitragal lobe; by the absence of lateral supplementary leaflets beneath the antero-lateral margin of the anterior leaf, which has a shallow median emargination, and by the expansion of the internarial septum to form a small, disc-like structure just anterior to the nostrils (Hill & Yenbutra 1984).

The Fulvous Leaf-nosed Bat is a medium to small species of *bicolor* group of the genus *Hipposideros* with characteristically very large ears, the tips of which are broadly rounded. The forearm length averages 40.4mm (38.4–44.0 mm) and the pelage is variable in colour including dull yellow, pale grey, dull brown and golden-orange (Bates & Harrison 1997). It is endemic to South Asia and is known from Afghanistan, India, Nepal, Pakistan and Sri Lanka (Simmons 2005). In India, it is known from

Table 1. Detailed morphological measurements of *Hipposideros fulvus* (all measurements in mm)

	Morphometric characters	Specimen 1 (IPU-Chiro-RJ-51) (male)	Specimen 2 (female) *	Mean
External Characters (Body)				
1.	Fore Arm	42.30	40.18	41.24
2.	Head Body	41.5	38.52	40.01
3.	Hind Foot	5.75	5.35	5.55
4.	Tibia	15.25	13.65	14.45
5.	Tail	23.75	22.41	23.08
6.	Ear	18.25	17.15	17.70
External Characters (Wing)				
7.	3 rd Mt	30.35	28.75	29.55
8.	4 th Mt	32.40	31.5	31.95
9.	5 th Mt	32.85	31.29	32.07
10.	1Ph 3 rd Mt	18.54	17.18	17.86
11.	2Ph 3 rd Mt	18.57	18.21	18.39
12.	1Ph 4 th Mt	11.35	11.15	11.25
13.	2Ph 4 th Mt	10.20	10.14	10.17
Cranial Characters (n=1) male (voucher number)				
14.	GTL	15.6		
15.	CCL	14.7		
16.	ZB	7.4		
17.	BB	6.6		
18.	CM ³	5.3		
19.	CM ₃	5.8		
20.	M	10.8		
21.	M ³ – M ³	5.4		
22.	C ¹ – C ¹	3.5		

* Specimen 2 (female) was released on site after taking external body and wing measurements.

Andaman & Nicobar Islands, Andhra Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Telangana and Uttar Pradesh (Bates & Harrison 1997; Molur et al. 2002; Srinivasulu et al. 2013b).

The colony was located in the month of October at the onset of winter and its presence was reconfirmed in three more consecutive surveys, the last being on 09 March 2016. For further demographic data collection of this small population as well as ecological information on roosting location, various subsequent visits were made. The colony was found roosting in the cave, and there is a possibility that it might be using it as a winter roost. The cave is man-made in nature having three separate openings, out of which one opening of about 0.914x1.219 m is accessible whereas other openings are



Image 4. Close-up from inside the cave

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Image 5. View of the temple from the hill showing stone quarrying in the distance

closed with the help of boulders. From the inside, the cave has various chambers and gullies in between. A few of these chambers are easily accessible and the rest have very narrow passages, hence it was not possible to reach into these areas of the cave. The nearest human settlement is 700m from the cave and a priest stays here for service to the temple.

In the last 3–4 decades, there has been a massive increase in canal irrigation and relative humidity in the entire Thar Desert, because of which the land use system has changed from single cropping to double cropping leading to various modifications in the ecological system. These ecological changes have influenced the introduction of a new record for bats in the Thar Desert, whereas loss of four species is also recorded so far, excluding Fulvous Leaf-nosed Bat, which is reported in this study. In recent years, two species of bats, namely, Short-nosed Fruit Bat *Cynopterus sphinx* and Geoffroy's Trident Leaf-nosed Bat *Asellia tridens*, were recorded from the Thar Desert. The former was reported from Bhinmal (Jalore District) (Dookia 2004), Lathi (Jaisalmer

District) and Tinwari (Jodhpur District) (Senacha et al. 2006), while the latter was reported from Gajroop Sagar (Jaisalmer District) (Senacha & Dookia 2013).

The discovery of a roosting colony of *H. fulvus* observed over a period of five months in this ancient cave is quite noteworthy and very important from the conservation point of view. The cave is in the base of a small hill range, which has legal as well as many illegal open cast stone quarries (Image 5), and the mode of stone extraction involves low level use of explosives as and when necessary. This seems to be one of the major concerns that may be creating some disturbance for the roosting species. Since the cave is situated near the temple, devotees and tourists visit the site frequently. It is urgently needed to use this opportunity to create awareness about the species and about bats in general.

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Article

Influence of substrate features on distribution of polypores (Fungi: Basidiomycota) in central part of Peechi Vazhani Wildlife Sanctuary, Kerala, India

-- Muhammed Iqbal, Kattany Vidyasagaran & Narayan Ganesh, Pp. 9689–9699

Reviews

Nepal's National Red List of Birds

-- Carol Inskipp, Hem Sagar Baral, Tim Inskipp, Ambika Prasad Khatiwada, Monsoon Pokharel Khatiwada, Laxman Prasad Poudyal & Rajan Amin, Pp. 9700–9722

Current status, distribution and conservation status of Algerian bats (Mammalia: Chiroptera)

-- Mourad Ahmim, Pp. 9723–9733

Short Communications

Incipient loss of a rainforest mutualism?

-- Johannes H. Fischer, Heiko U. Wittmer, Endro Setiawan, Sarah Jaffe & Andrew J. Marshall, Pp. 9734–9737

First record of the Woolly-necked Stork *Ciconia episcopus* Boddaert, 1783 (Aves: Ciconiiformes: Ciconiidae) breeding in the lowland wet zone of Sri Lanka

-- Hemachandra Kularatne & Susantha Udagedara, Pp. 9738–9742

Bibliography and checklist of the dragonflies and damselflies of Bhutan

-- T. Gyeltshen, T. Nidup, P. Dorji, T. Dorji & V.J. Kalkman, Pp. 9743–9747

Checklist of terebrantian thrips (Insecta: Thysanoptera) recorded from India

-- R.R. Rachana & R. Varatharajan, Pp. 9748–9755

Notes

Two jasmine (Oleaceae: *Jasminum* L.) taxa newly recorded in Vietnam

-- Bui Hong Quang, Vu Tien Chinh, Le Thi Mai Linh & Ritesh Kumar Choudhary, Pp. 9756–9760

First record of Rusty-spotted Cat *Prionailurus rubiginosus* (Mammalia: Carnivora: Felidae) from Ramgarh-Vishdhari Wildlife Sanctuary in semi-arid landscape of Rajasthan, India

-- Sailaja Nayak, Sunny Shah & Jimmy Borah, Pp. 9761–9763

Re-sighting record of Fulvous Leaf-nosed Bat *Hipposideros fulvus* Gray, 1838 (Mammalia: Chiroptera: Hipposideridae) from Thar Desert, Rajasthan, India

-- Sumit Dookia, Gajendra Singh & Rajlakshmi Mishra, Pp. 9764–9767

Record number of Yellow-billed Oxpeckers *Buphagus africanus* Linnaeus, 1766 (Aves: Passeriformes: Buphagidae) foraging on a single host

-- Diogo Veríssimo, Jean-Christophe Cugnière, Suzanne Cugnière, Julien Cugnière, Géraldine Cugnière & Laure Cugnière, Pp. 9768–9770

First record of the Two-striped Box Crab *Calappa bilineata* Ng, Lai & Aungtonya, 2002 (Brachyura: Calappidae) from St. Martin's Island, Bangladesh

-- Muntasir Akash & Mostafa A.R. Hossain, Pp. 9771–9773

A record of *Limenitis rileyi* Tytler, 1940 (Lepidoptera, Nymphalidae, Limenitidinae) from Arunachal Pradesh, India

-- Purnendu Roy, Pp. 9774–9776