

FIRST RECORD OF DOBSON'S LONG-TONGUED FRUIT BAT *EONYCTERIS SPELAEA* (DOBSON, 1871) (MAMMALIA: CHIROPTERA: PTEROPODIDAE) FROM KERALA, INDIA

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The fruit bats of the family Pteropodidae are an ancient and diverse group of bats, distributed throughout the tropical regions of Africa, Asia and Indo-Australia (Hill & Smith 1984). The fruit bats account for 182 species in 42 genera (Simmons 2005; Wilson & Mittermeier 2009) in the World. India has 13 species of fruit bats in eight genera (Nameer 2000; Menon 2014; Johnsingh & Nameer 2015). As the name indicates, their diet is composed of fruits, flowers, pollen and nectar.

Indian pteropodids belong to the genera *Rousettus*, *Pteropus*, *Cynopterus*, *Megaerops*, *Latidens*, *Sphaerias*, *Macroglossus* and *Eonycteris*. Out of these eight, only three genera were previously recorded in Kerala State: *Rousettus*, *Pteropus* and *Cynopterus*. Here we report the presence of Dobson's Long-tongued Fruit Bat *Eonycteris spelaea*, for the first time from Kerala. This is the only

species of the genus *Eonycteris* Dobson, 1873, known from India.

Dobson's Long-tongued Fruit Bat *Eonycteris spelaea* was initially known only from Myanmar, Thailand, Laos, Vietnam, Cambodia, Malaysia, Indonesia and Philippines (Blanford 1891; Ellerman & Morrison-Scott 1951). In India *Eonycteris spelaea* was reported only in 1967 from the Kumaon Hills, now in Uttarakhand State (Bhat 1968). Subsequently, this species was also reported from other Indian states and union territories such as Assam (Ghose & Bhattacharya 1974) Andaman & Nicobar Islands (Bhattacharya 1975), Karnataka (Bhat et al. 1980), Sikkim (Mistry, 1991), Nagaland (Sinha 1994), Meghalaya (Das et al. 1995), and Andhra Pradesh (Bates & Harrison 1997).

Materials and Methods: The study was conducted at the Parambikulam Tiger Reserve (PkTR), which is situated in Palghat District, Kerala, India, within the Anamalai Hills and borders the Nelliampathy Hills (76°35'–76°50'E & 10°20'–10°26'N) of the southern Western Ghats. The total extent of PkTR is 643.66km². The major vegetation types are west coast tropical evergreen forests, west coast tropical semi-evergreen forests, southern moist deciduous forests, southern dry deciduous forests, bamboo and reed patches and southern montane wet temperate forests (sholas). The altitude of PkTR ranges from 300m to 1438m. PkTR has three man-made reservoirs, namely Parambikulam, Thunacadavu and Peruvapallam, whose cumulative surface water area amounts to 2066ha (Anonymous



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2011).

The bats were captured and handled in the field following approved guidelines of the American Society of Mammalogists (Sikes et al. 2011). Mist nets of various sizes (height 2.4m, length 12m, and mesh size 15x15 mm) were employed to capture the bats.

Morphometric measurements: The following external and cranio-dental measurements were taken using a digital caliper (Mitutoyo) to the nearest 0.1mm as illustrated by Bates & Harrison (1997). The measurements taken include head and body length (HBL), forearm length (FAL), ear length (EL), tail length (TL), hind foot length (HFL), wingspan (WSP), and tibia length (TIB). The cranial measurements taken were: greatest length of the skull (GTL), condylocanine length (CCL), maxillary tooth row (C-M³), mandibular tooth row (C-M₃), mandible length (M), zygomatic breadth (ZB) and breadth of the braincase (BB). Body mass (BM) was taken in the field using a Light Line spring balance (PESOLA, Switzerland).

Molecular studies: For molecular studies, DNA was isolated from tissue collected from the bat using the phenol-chloroform extraction method (Sambrook et al. 1989). The primers with sequence 5'-CCHCCATAAATAGGNGAAGG-3' (forward) and 5'-WAGAAYTTCAGCTTTGGG-3' (reverse) were used for amplifying the Cytochrome b (Cyt-b) DNA fragments (Naidu et al. 2012) in the polymerase chain reaction (PCR). The purified PCR products were sequenced using ABI prism 3730 sequencer (Applied Biosystems, USA) and big dye terminator sequencing kit (ABI Prism, USA). Sequences were analyzed by BLAST tool (Altschul et al. 1990).

Results and Discussion: Three individuals of Dobson's Long-tongued Fruit Bat *Eonycteris spelaea* were caught in mist nets. These include one adult male and one adult female which were collected from Poopara (10°21'14.9"N & 76°48'52.3"E) at an elevation of 840m on 25 May 2011 and one male from Kuriarkutty (10°24'26.8"N & 76°43'10.2"E) at an elevation of 504m on 15 March 2012 in PkTR. The morphometric details of these bats are given in Table 1. These bats had an average forearm length of 75.0 mm (SD=2.41), head to body length of 92.2 mm (SD=6.96), tail length of 14.8mm (SD=0.34), hind foot length of 17.9mm (SD=2.51), ear length of 19.3 mm (SD=0.32) and a body mass of 70.3g (SD=12.85). The wing span of the bats caught at PkTR was considerably less than the range recorded elsewhere in India by Bates & Harrison (1997).

Dobson's Long-tongued Fruit Bat *Eonycteris spelaea* (Dobson, 1871) is a medium-sized fruit bat. It resembles



Image 1. Dobson's Long-tongued Fruit Bat *Eonycteris spelaea* collected from Parambikulam Tiger Reserve, Western Ghats, Kerala, India

Rousettus leschenaulti but differs in the absence of the claw on the first finger. One striking morphological character of *Eonycteris spelaea* is a large kidney shaped gland on either side of the anal opening (Image 1). The pelage is short and velvety, dark brown above, paler on the back of the head and shoulders. The underside is mottled grey-brown. The muzzle and the tibiae are naked. The wing membranes are uniformly dark brown, and the forearm is moderately hairy below (Bates & Harrison 1997).

Molecular data for the specimens of *Eonycteris spelaea* from the PkTR have been deposited in GenBank (National Centre for Biotechnology Information, NCBI) with accession number JN627514.1.

The present finding of this species from Kerala is the first report of *Eonycteris spelaea* from Kerala and the second one from the Western Ghats. The previous record from the Western Ghats was from Karnataka (Bhat et al. 1980). The updated distribution map of *Eonycteris spelaea* is given in Fig. 1.

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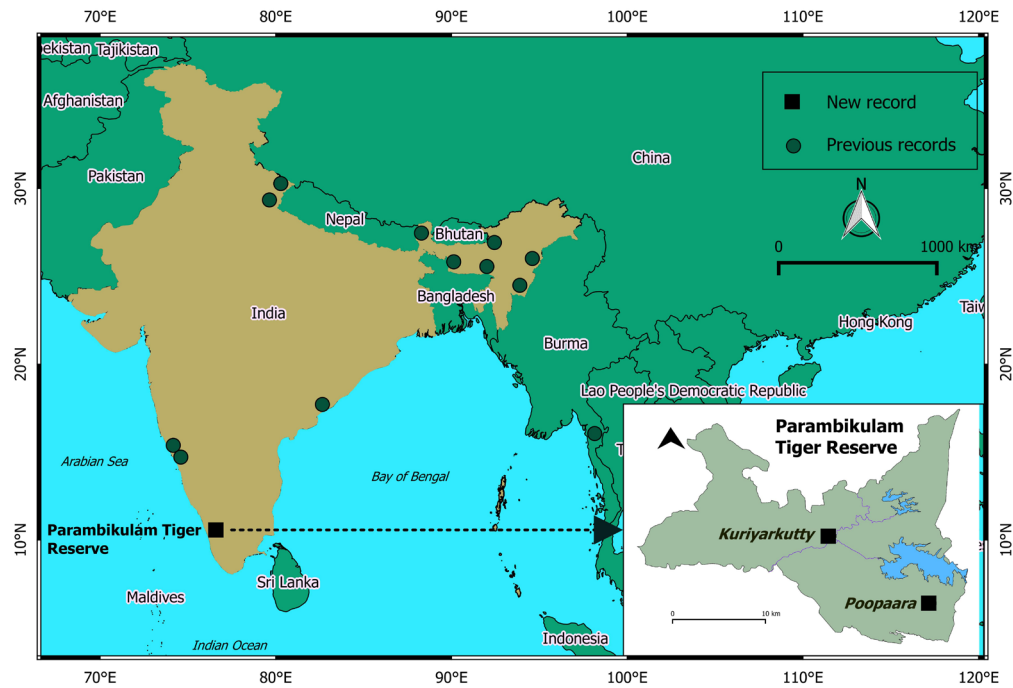


Figure 1. Known distribution of Dobson's Long-tongued Fruit Bat *Eonycteris spelaea*

Table 1. The morphometric and cranio-dental measurements of *Eonycteris spelaea* from Parambikulam Tiger Reserve, southern Western Ghats, India.

Parameter (mm)	Mean (n=3)	Range	SD	Range (Bates & Harrison 1997)	PKLM250511-1	PKLM250511-2	PKLM250511-3
FA	75.0	72.23–76.69	2.41	66.0–78.0	76.06	72.23	76.69
HBL	92.2	84.21–96.82	6.96	92.0–130.0	96.82	84.21	95.66
TL	14.8	14.4–15.08	0.34	11.5–23.0	15.08	14.4	14.8
HF	17.9	15.06–19.7	2.51	17.0–21.0	19.06	15.06	19.7
EL	19.3	19.06–19.65	0.32	16.9–21.0	19.65	19.06	19.14
WSP	317.7	293–340	23.58	370.0–400.0	340	293	320
TIB	38.0	35.21–39.75	2.44	Not available	39.75	35.21	39.05
GTL	35.9	34.09–36.8	1.55	33.3–37.5	36.8	34.09	36.75
CCL	32.5	31.66–33.23	0.78	31.7–36.3	33.23	31.66	32.52
C-M ²	12.9	12.82–13.09	0.15	11.9–13.4	12.82	13.09	12.83
C-M ₂	14.1	13.56–14.41	0.47	13.0–13.7	14.37	13.56	14.41
M	26.9	26.35–27.16	0.43	25.1–28.8	27.16	26.35	27.04
ZB	21.9	19.49–23.31	2.08	19.0–22.1	23.31	19.49	22.85
BB	15.1	14.82–15.4	0.29	14.0–15.1	15.4	14.82	15.21
BM (g)	70.3	61–85	12.85	Not available	85	61	65

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