



EASTERN BENT-WING BAT

A new record of *Miniopterus fuliginosus* (Hodgson, 1835) from Wayanad Wildlife Sanctuary, Western Ghats, India



Eastern Bent-wing Bat *Miniopterus fuliginosus* from Wayanad Wildlife Sanctuary, Western Ghats, India

IUCN Red List:
Least Concern
(Chiozza, 2008)

Mammalia
[Class of Mammals]

Chiroptera
[Order of Bats]

Miniopteridae
[Family of Bent-winged Bats]

Miniopterus fuliginosus
[Eastern Bent-wing Bat]

Species described by
Hodgson in 1835

The genus *Miniopterus* (Bonaparte 1837) which has a range distributed throughout most of Africa, the Palearctic (from Iberia to Japan) and Australasia (Simmons 2005) has a complex evolutionary history with several cases of morphologically similar species that have at least partially overlapping geographic distributions (Stoffberg et al. 2004). There are 20 species in the *Miniopterus* genus (Simmons 2005; Goodman et al. 2007) which belong to the family Miniopteridae (Hoofer & van den Bussche 2003; Miller-Butterworth et al. 2007).

The presence of unique features such as the long third finger and presence of extra premolar allow the separation of the family Miniopteridae from other members of the family



Vespertilionidae (Mein & Tupinier 1977). This deviance was affirmed by the molecular level studies by Hooper & van den Bussche 2003. The species *Miniopterus schreibersii* consists of at least three species groups centered in the Palearctic, Ethiopian and oriental-Australasian regions (Appleton et al. 2004; Miller-Butterworth et al. 2005). Maeda (1982) regarded the *M. schreibersii* as three distinct species namely, *M. schreibersii*, *M. fuliginosus* and *M. oceanensis*. He also suggested that these are seen in Europe, Asia (excluding Hainan Island) and Australia respectively.

According to Bates & Harrison (1997), two species of *Miniopterus* are known from South Asia, namely *M. schreibersii* (subspecies *fuliginosus*) and *M. pusillus*. However, Tian et al. (2004) based on morphological and molecular data, have upgraded *M. schreibersii* as a distinct species viz. *M. fuliginosus*.

Global Distribution:

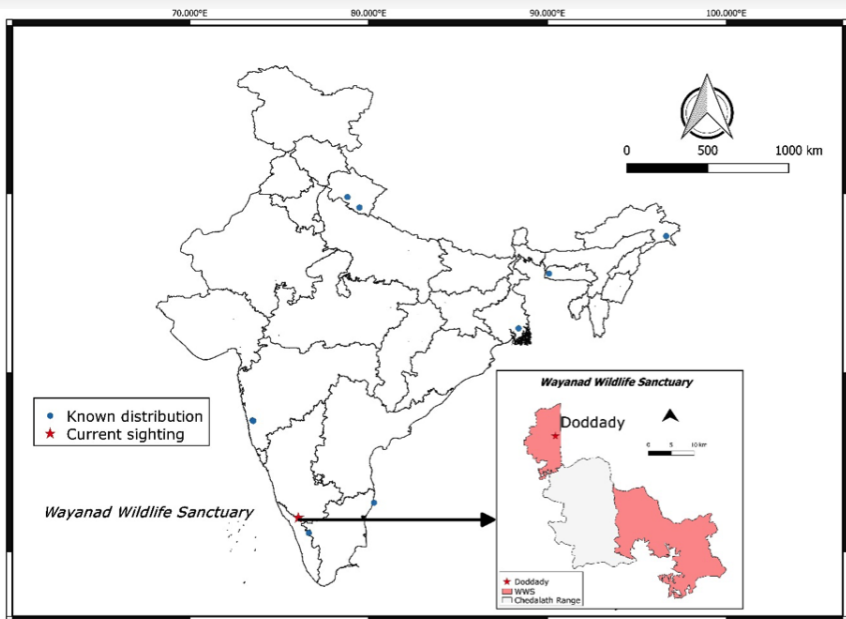
Native: Afghanistan, Armenia (Armenia), Azerbaijan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Hong Kong, India, Indonesia, Iran, Iraq, Japan, Kazakhstan, Korea, Kyrgyzstan, Lao, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Province of China, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Viet Nam (Chiozza, 2008)

Materials and Methods

The study was conducted at Wayanad Wildlife Sanctuary (WWS) which is spread out in an area of 344.4km² in the district of Wayanad, Kerala, southern India. The WWS exists as two disconnected entities, of which, WWS-I, lies within 11°50'–11°59'N and 76°02'–76°07'E and WWS-II lies within the geographical extremes of latitudes 11°35'–11°49'N and longitudes 76°13'–76°27'E. The sanctuary borders the Mudumalai Tiger Reserve, Tamil Nadu and Bandipur National Park, Karnataka. The forest types seen in the sanctuary are southern Indian moist mixed deciduous forests and southern dry mixed deciduous forests along with bamboo brakes, swamps and plantations. The altitude of WWS varies from 700–1,158 m.

We studied the bats of WWS, using mist nets. Mist netting was the standard methodology adopted for capturing bats (Kunz & Kurta 1988). Mist nets of dimensions (height 2.4m, length 12m, and mesh size 15×15 mm) were erected to capture the bats. Mist netting was done 3–10 m from the ground in various sites in WWS. The bats were captured and handled according to the guidelines of the American Society of Mammalogists specified for the use of wild animals in research (Sikes et al. 2011).

Morphometric measurements: The external, cranial and dental measurements were taken according to Bates & Harrison (1997) using the Mitutoyo digital calliper with a precision of 0.01mm. Body mass up to 0.01mm precision was measured in the field using a light line spring balance (PESOLA, Switzerland) of 100gm. The major external measurements taken on the bats were head to body length (HBL), forearm length (FAL),



The current distribution map of *Miniopterus fuliginosus* from India (modified after Bates & Harrison 1997)

ear length (EL), tail length (TL), hind foot length (HFL), wingspan (WSP), and tibia length (TIB). The cranial and dental measurements taken are 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).



Results and Discussion

During the course of the study we recorded one *Miniopterus* sp. which was initially identified as *Miniopterus schreibersii* after comparing the morpho-cranial details with Bates & Harrison (1997). The morphometric details of the specimen collected (KAUNHM 201654) are given in Table. The forearm length (FAL) was 48.35mm, head to body length (HBL) 58.59mm, hind foot length (HFL) 8.15mm, tail length (TL) 46.64mm, ear length (EL) of 7.12mm, wing span of 310mm and body mass of 12g.

Later, we compared the morphometric details of the bat with Srinivasulu & Srinivasulu (2017), who recently recorded *M. fuliginosus* from Silent Valley National park, within the Nilgiris in Kerala. The most striking morphological character of *M. fuliginosus* is that the second phalanx of the 3rd metacarpal is highly developed in *M. fuliginosus* than in *M. schreibersii* (Tian et al. 2004; Srinivasulu & Srinivasulu 2017). The 3rd metacarpal of the specimen that we obtained from Wayanad was highly developed and the measurement also fell within the range of measurements given by Srinivasulu & Srinivasulu (2017) for *M. fuliginosus*. The individual was a male and was collected from Begur section of Tholpetty range within Wayanad Wildlife Sanctuary on 24 November 2016. The Wayanad also falls within the Nilgiris region of the Western Ghats.

According to Bates & Harrison (1997), *Miniopterus schreibersii fuliginosus* is a medium-sized Vespertilionid with long tail, interfemoral membrane and long hind limbs. Its wing is characterised by a highly developed second phalanx of the third finger 37.91mm (36.0–40.1 mm) which is approximately three times the length of the first phalanx. The



Table: The morphometric and cranio-dental measurements of *Miniopterus fuliginosus* from Wayanad Wildlife Sanctuary, Western Ghats, India

Parameter (mm)	n = 1	Srinivasulu & Srinivasulu (2017) for <i>Miniopterus fuliginosus</i>	Range (Bates & Harrison 1997) for <i>Miniopterus schreibersii</i>
FA	48.35	47.51–47.53	44.7–49.6
HBL	58.59	50.06–55.23	47.0–65.0
TL	46.64	48.83–48.98	44.0–61.0
HF	8.15	8.16–9.38	7.0–12.0
EL	7.12	10.51–11.95	8.7–12.0
WSP	310	-	322–328
TIB	19.92	19.1–21.1	17.7–20.5
3mt	47.13	44.42–45.27	41.12–46.40
4mt	43.48	41.97–42.95	40.50–44.20
5mt	39.93	37.83–38.96	37.0–40.40
1ph3mt	11.63	11.16–11.29	-
2ph3mt	37.91	34.94–37.41	-
1ph4mt	9.09	9.19–9.48	-
2ph4mt	16.68	16.72–19.38	-
GTL	15.94	16.17	15.3–16.4
CCL	14.31	14.43	13.6–14.8
C_M ³	6.18	6.18	5.8–6.3
C_M ³	6.71	6.73	6.3–6.8
M	11.53	11.39	10.7–11.8
ZB	7.72	8.86	8.5–9.1
BB	8.37	8.13	7.5–8.3
BM (g)	12	Not available	Not available

membranes are uniformly dark and the pelage is soft, silky and dark throughout. The dorsal surface is a rich russet brown in some individuals and deeper, blackish brown in others. The ventral surface is usually slightly paler with a greyer tinge. The dense short pelage of the forehead extends to the nostril pads. The cheeks are naked below the eyes; the ears small, each with broadly rounded tip which scarcely projects above pelage of the crown. The tragus is half the height of the pinna and slightly curved forward; the antitragus is low and ill-defined.

There is only a single record of the *M. fuliginosus* from Kerala, which is from Silent Valley National Park (Srinivasulu & Srinivasulu 2017). The present finding of the Eastern Bent-wing Bat from the WWS is the second report of this species from Kerala. Both these records however, are from the north of the Palghat Gap, Kerala. The previous records of



this species from southern India were from Mahabaleshwar (Wroughton 1916), Panchgani (Brosset 1962) and Satara (Hill 1976) and St. Thome Island (Bates & Harrison 1997). The updated distribution map is given.

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