FIRST RECORD OF *HIPPOSIDEROS ATER* TEMPLETON, 1848 FROM ANDHRA PRADESH, INDIA WITH A DESCRIPTION OF A NEW SUBSPECIES

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ABSTRACT

We report the occurrence of Hipposideros ater *Templeton, 1848 for the first time from Andhra Pradesh, India and describe a new subspecies collected from the Nallamala Hills, Eastern Ghats. The new subspecies has been compared with its nearest allies and it differs from the known subspecies* H. a. ater *and* H. a. nicobarulae *in having narrower palate, smaller braincase and U-shaped anterior margin of mesopterygoid.*

KEYWORDS

Chiroptera, H. a. ater, Hipposideros ater nallamalaensis *ssp. nov.,* H. a. nicobarulae, *Nallamala Hills, new description*

The Dusky or Bi-coloured Leaf-nosed Bat *Hipposideros ater* Templeton, 1848 was first described based on the type specimen from Colombo, Western Province, Sri Lanka. This species belongs to the *Hipposideros bicolor* (Temminck, 1834) species group members of which are characterized by the absence of lateral supplementary leaflets in the noseleaf. Earlier literature included forms belonging to *Hipposideros ater* Templeton, 1848 either under *Hipposideros bicolor* (Temminck, 1834) or as *Hipposideros atratus* Kelaart, 1850 (Kelaart, 1850; Wroughton, 1921; Ellerman & Morrison-Scott, 1951). Wroughton (1921) following Andersen (1918) reallocated forms of this species assigned under *Hipposideros bicolor* (Temminck, 1834) recorded from the Indian subcontinent to *Hipposideros atratus* Kelaart, 1850. Further, Hill (1963) opined that the designation of a lectotype for *Rhinolophus bicolor* Temminck by Tate (1941) transfers that name to the species formerly called *Hipposideros pomona* or *Hipposideros gentilis*. The earliest name identifiable with certainty for *Hipposideros bicolor* (Temminck, 1834) (as used by Anderson, 1918) appears to be *Hipposideros ater* Templeton, 1848 (Hill *et al.,* 1986).

Hipposideros ater Templeton, 1848 is a widely distributed species extending in range from Sri Lanka and India in South Asia to the Philippine Islands in Southeast Asia and the Papua New Guinea and northern Australia. In India this species is known from Andaman & Nicobar Islands, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Tamil Nadu (Bates & Harrison, 1997; Molur *et al*., 2002).

Two subspecies, namely - *H. a. ater* Templeton, 1848 and *H. a. nicobarulae* (Miller, 1902) are known from the Indian subcontinent. The former subspecies is known from India and Sri Lanka, while the latter is restricted to Nicobar Islands, India. Further, in the Southeast Asia and Oceanic regions the following subspecies - *H. a. amboinensis* Peters, 1871; *H. a. antricola* Peters, 1861; *H. a. aruensis* Gray, 1858; *H. a. gilberti* Johnson, 1959; and *H. a. saevus* K. Andersen, 1918 are recognized.

While studying bats in the Nallamala Hills, Eastern Ghats in Andhra Pradesh in southern India the first author collected two specimens of *Hipposideros ater* Templeton, 1848 which had not been, until this collection, recorded from Andhra Pradesh. Through this report we put on record the occurrence of *H. ater* Templeton, 1848 in Andhra Pradesh and describe a new subspecies.

MATERIALS AND METHODS

Materials: Two adult female specimens were collected in June 2003. The first specimen was collected at 22.45hr on 8 June 2003 using a hoop net when it was picking up a moth from the ground, while the second specimen (which got caught in the lowest tier of a mist net, about 3in above ground level) was collected at 23.55hr on 10 June 2003 about 50m southwest from where the first specimen was collected.

Study site: The specimens were collected outside the Shikaram temple near Srisailam, Kurnool district Andhra Pradesh. The study site is a part of Nagarjunasagar-Srisailam Tiger Reserve located in the Nallamala Hills ($14^0$26'-$16^0$3l'N & $78^0$30'-$80^0$10'E), Eastern Ghats. For details on Nallamala Hills refer Srinivasulu and Das (*in press*).

Both the specimens were measured and preserved following standard techniques. Notes on pelage colouration and external measurements were taken in the field soon after euthanizing the bats. Skulls were extracted in the laboratory. All measurements are in mm. Specific measurements taken are: HB - Head and body length, from the tip of the snout to the base of the tail; T - Tail length, from the base of the tail to the tip of the tail; HF - Hindfoot length, from the extremity of the heel to the end of the longest claw; FA - Forearm length, from oleocranon process of ulna to outside edge of the wrist; E - Ear length, from bottom of notch at the base of the ear to distal-most edge of pinna; GTL - Greatest skull length, from anterior-most point of I^1 to posterior-most part of occipital; CCL - Condylo-canine length, from anterior alveolus of canines to exoccipital condyle; CBL - Condylo-basal length, from anterior alveolus of incisors to exoccipital condyle; ZB - Zygomatic breadth, greatest width of the skull across the zygomatic arches; BB - Braincase breadth, greatest width of the braincase at the posterior roots of the

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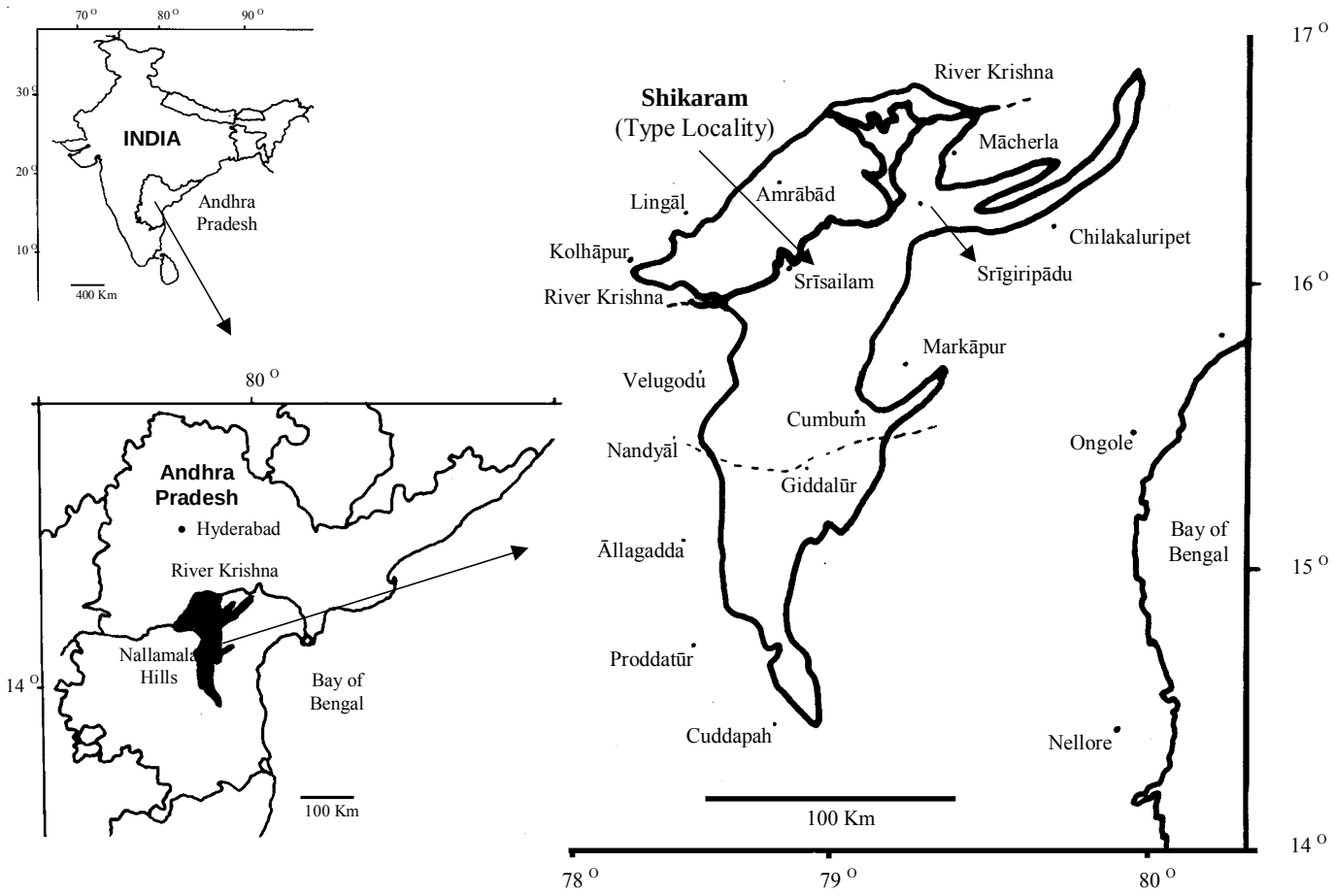


Figure 1. Type locality of* Hipposideros ater nallamalensis *ssp. nov.

zygomatic arches; PC - Postorbital constriction, narrowest width across the constriction posterior to the orbits; C-M^3 - Maxillary toothrow, crown length from upper canine to last upper molar; C-M_3 - Mandibular toothrow, crown length from lower canine to last lower molar; M - Mandible length, from alveola of I_1 to midpoint of condyle; C^1-C^1 - Anterior palatal width, greatest breadth across the crowns of upper canines; M^3-M^3 - Posterior palatal width, greatest breadth across upper toothrow on labial side of M^3. Specimens are deposited in the Natural History Museum (NHM.OU), Department of Zoology, Osmania University, Hyderabad, India.

Results

The two adult female individuals of Dusky Roundleaf Bat *Hipposideros ater* Templeton, 1848 collected by the first author from Shikaram in June 2003 constitutes the first record of this species from Andhra Pradesh. The nearest known locality of occurrence of *H. ater* in southern India is Therhalli (17°10'N & 78°23'E) in Karnataka (Bhat & Jacob, 1990; Bates & Harrison, 1997; Molur *et al.*, 2002). Dusky roundleaf bat has never been collected from the Andhra Pradesh and its presence in the Nallamala Hills puts on records for the first time its occurrence in the Eastern Ghats of Andhra Pradesh.

Although morphologically the said specimens tallied closely with *H. a. ater*, detailed cranial and dental studies revealed it to be distinct from the known forms thus prompting us to assign it a new subspecies *nomen*.

Hipposideros ater nallamalaensis ssp. nov. (Images 1-7[w])

Material examined

Holotype: Adult female, 10.vi.2003, Shikaram (16°02'N & 78°55'E), near Srisailam, Kurnool district, Andhra Pradesh, coll. C. Srinivasulu, specimen in alcohol, skull extracted (Regn. No. NHM.OU.CHI.3-2003).

Paratype: Adult female, 8.vi.2003, Shikaram (16°02' N and 78°55' E), near Srisailam, Kurnool district, Andhra Pradesh, coll. C. Srinivasulu, specimen in alcohol, skull extracted (Regn. No. NHM.OU.CHI.4-2003). Forearm and skull partially damaged.

Etymology

The new subspecies of Dusky Roundleaf Bat is named after Nallamala Hills in Eastern Ghats of India from where the specimens were collected. The common name of the subspecies is Nallamala Dusky Roundleaf Bat.

[w] See Images 1-7 in the web supplement at www.zoosprint.org

Table 1. Selected external and cranial measurements of the new subspecies and the two known subspecies from Indian subcontinent. [All measurements are in mm. Measurements that of* H. ater ater *and* H. ater nicobarulae *after Bates and Harrison (1997)]

	H. ater nallamalaensis ssp. nov. Holotype Female	Paratype Female	*H. ater ater* Mean [Range]	*H. ater nicobarulae* Mean [Range]
HB	38.5	39.3 [38.0-48.0]	42.3	—
TL	23.0	22.1 [20.0-30.0]	24.7 [27.3-29.8]	28.0
HF	6.1	6.5 [5.3-7.2]	6.7 [6.5-7.2]	6.9
FA	37.5	33.5	36.3 [34.9-38.0]	41.0 [39.5-42.3]
WSP	235.0	221.0 [217.0-241.0]	228.3	—
E	16.1	14.8	17.6 [14.8-20.0]	16.9 [16.3-18.0]
GTL	14.82	14.9	16.0 [15.4-16.7]	17.1 [16.9-17.4]
CCL	12.8	—	13.6 [13.2-14.2]	14.6 [14.3-15.0]
CBL	13.9	—	—	—
ZB	7.3	—	8.1 [7.7-8.3]	8.6 [8.4-8.7]
BB	7.32	7.0	8.1 [7.5-8.5]	7.9 [7.5-8.4]
PC	2.2	2.2	2.3 [2.1-2.6]	2.5 [2.4-2.6]
C-M^3	4.7	4.8	5.3 [5.1-5.7]	5.8 [5.7-5.9]
C-M_3	5.3	5.3	5.7 [5.2-6.1]	6.2 [6.0-6.4]
M	8.6	8.4	9.8 [9.4-10.2]	10.4 [10.2-10.6]
C^1-C^1	3.0	3.0	3.6 [3.3-3.8]	3.8 [3.6-3.9]
M^3-M^3	5.0	4.9	5.5 [5.1-5.8]	5.9 [5.7-6.1]

HB - Head-Body Length; TL - Tail Length; HF - Hindfoot; FA - Forearm Length; WSP - Wingspan; E - Ear Length; GTL - Greatest Skull Length; CCL - Condylocanine Length; CBL - Condylobasal Length; ZB - Zygomatic Breadth; BB - Braincase Breadth; PC - Postorbital Constriction; C-M^3 - Maxillary Toothrow; C-M_3 - Mandibular Toothrow; M - Mandibular Length; C^1-C^1 - Anterior Palatal Width; M^3-M^3 - Posterior Palatal Width

Figure 1. External measurements of* Hipposideros ater ater, Hipposideros ater nicobarulae *and* Hipposideros ater nallamalaensis *ssp. nov.

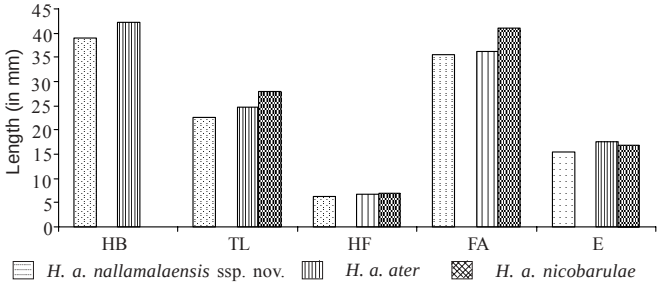
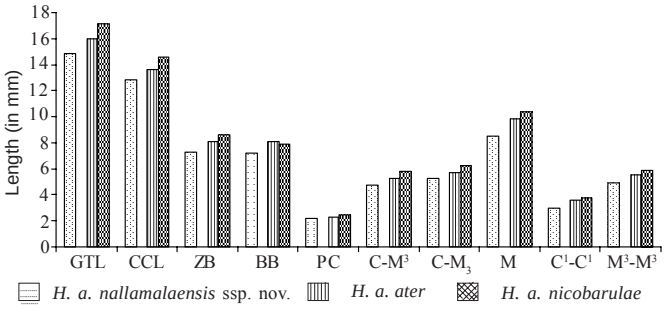


Figure 2. Cranial measurements of* Hipposideros ater ater, Hipposideros ater nicobarulae *and* Hipposideros ater nallamalaensis *ssp. nov.



Diagnosis

Size small for species; forearm from 33.5 to 37.5mm; similar to *H. a. ater* but differing from this and other known subspecies in possessing distinctly smaller skull with smaller braincase, narrower palate and a U-shaped anterior border of mesopterygoid.

Measurements

External, cranial and dental measurements (in mm) for the holotype followed by paratype are – HB: 38.5, 39.3; T: 23.0, 22.1; HF: 6.1, 6.5; FA: 37.5, 33.5: E: 16.1, 14.8; GTL: 14.82, 14.86; CCL: 12.84, —; CBL: 13.38, —; ZB: 7.35, —; BB: 7.32, 7.01; PC: 2,18, 2.21; C-M^3: 4.72, 4.81; C-M_3: 5.28, 5.27; M: 8.61, 8.40; C^1-C^1: 3.05, 3.0; M^3-M^3: 5.05, 4.94.

Description

Size small for genus and species; forearm from 33.5 to 37.5mm; colour of dorsum dull yellow, hairs becoming lighter in colour towards belly; venter a shade lighter than the dorsum; hair bases paler than the tips; wings and interfemoral membrane dark brown, naked above and below; ears slightly lighter in colour than membranes, broadly rounded tips and well defined antitragus; tail long, enclosed, all but the extreme tip, in well developed interfemoral membrane; length of metacarpals: 3<5<4; noseleaf has a greatest width of about 3.6-3.8mm; anterior leaf lacks supplementary leaflets and median emargination, lightly covered with short fine hairs, internarial septum swollen and inflated, triangular with short base and a bluntly pointed tip; intermediate leaf simple; posterior leaf slightly wider than the intermediate and anterior leaf, anterior border evenly rounded and convex, subdivided by three ill-defined septa in to four cells; skull small in size for genus as well as species; four nasal inflations on slightly rounded rostrum; post nasal depression inconspicuous; braincase bulbous and smaller for species, being smaller than zygomatic breadth; jugal bone of each zygoma has well defined dorsal process posteriorly; anterior border of the mesopterygoid space U-shaped; coronoid process slightly exceeds the height of the lower canine; upper and lower toothrow small for genus.

Comparison

Compared to the nominate subspecies *Hipposideros ater ater* from mainland India, *H. a. nallamalaensis* ssp. nov. differs in having smaller overall external and cranial size (Table 1; Figs. 1 & 2), particularly with respect to braincase breadth and palatal width. *H. a. nallamalaensis* sp. nov. has smaller braincase, narrower palate and U-shaped anterior border of mesopterygoid as compared to broader braincase, palate and V-shaped anterior border of mesopterygoid of the nominate subspecies examined from India and Sri Lanka. This new subspecies differs from the nominate subspecies in being much smaller (Figs. 1 & 2).

Hipposideros ater nallamalaensis ssp. nov. can be distinguished from other similar looking *Hipposideros* species and subspecies reported from India basing on the following characters: from *H. ater ater* in being smaller and possessing smaller braincase, narrower palate and U-shaped anterior border of mesopterygoid; from *H. ater nicobarulae* in being smaller and possessing dorsal process on the jugal bone of each

zygoma; from *H. cineraceus* in possessing dorsal process on the jugal bone of each zygoma; from *H. durgadasi* by its smaller external and cranial size, and presence dorsal process on the jugal bone of each zygoma; from *H. fulvus* and *H. pomona* by its smaller external and cranial size. In comparison to other known subspecies of *Hipposideros ater* from southeast Asia, the new subspecies differs generally in being smaller externally and cranially.

Remarks

Due to the similarities in the external characters, morphology and variable pelage colouration, forms belonging to *Hipposideros ater* and *Hipposideros cineraceus* had been confused and many authors from the region have misquoted the species in their works. The most reliable difference between the two species is with respect to dorsal process and upper premolar. In *H. ater*, the dorsal process on the jugal bone of each zygoma is present (exceptionally *H. ater nicobarulae* lacks the dorsal process) while in *H. cineraceus* it is absent. In *H. ater*, the upper premolar are externally displaced and touches upper canine at some point, while in *H. cineraceus* the upper premolar is not extruded and does not touch the upper canine. Bates and Harrison (1997) assigned earlier records of *H. cineraceus* form southern India to *H. ater*.

Comparative material

We examined all specimens belonging to *Hipposideros* genus housed in the National Zoological Collection of the Zoological Survey of India, Kolkata, India. Detailed study on cranial characteristics was done on four specimens of *Hipposideros ater ater* [bearing registration numbers ZSI 19931, ZSI 20511, ZSI 20521, ZSI 20522], two specimens of *Hipposideros ater nicobarulae* [bearing registration numbers ZSI 19001, ZSI 20535].

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