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The occurrence of Kelaart's Pipistrelle Bat *Pipistrellus ceylonicus* (Kelaart, 1852) (Chiroptera: Vespertilionidae) in Gondia District, Maharashtra, India

Sudhir Bhandarkar[1*] Shyamkant Talmale[2] and Gopal Paliwal[3]

[1]Department of Zoology, M. B. Patel College Deori, Distt. Gondia, Maharashtra, India
[2]Zoological Survey of India, Western Regional Centre, Akurdi, Pune, Maharashtra, India
[3]Department of Zoology, S. S. Jaiswal College, Arjuni-Morgaon, Disti. Gondia, Maharashtra, India

Corresponding author: sudhirsense@gmail.com

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ABSTRACT

Bats are most diverse and essential small mammals as a part of ecosystem having vast ecological and economic benefits as well many of the bat species are considered as keystone species. The information of the diversity, distribution and biology of bats is incomplete in this region as they are facing the impacts of climate change, anthropogenic disturbance and other crucial grounds. Gondia district harbors diverse flora and fauna as it is densely covered by the forest canopy. In the survey of diversity and distribution of bats (Mammalia: Chiroptera) in forest fragments and forest outskirts in Gondia district the specimen (n=1) of *Pipistrellus ceylonicus* was observed on the floor of open roof of MB Patel College building in Deori of Gondia district. The distribution of *P. ceylonicus* bat species in Deori region of Gondia district is having not previously recorded. The sighting of this bat species, its morphometrical properties compared with standard literature for identification, and its distribution is discussed.

Key words: Bat, Occurrence, *Pipistrellus ceylonicus*, Distribution, Morphometry, Gondia.

INTRODUCTION

Bats are diverse animal facing threats, population declining around the world. Loss of biodiversity is a comprehensive crisis in which the bat facing many anthropogenic activities (Pimm et al. 2014) particularly land use change (Foley et al. 2005.), overexploitation of species (Ripple et al. 2016), introduction of invasive species (McCreless et al. 2016) and climate change (Maclean and Wilson, 2011). According to IUCN Red Data Book the bat (Chiroptera) Listed as Least Concern, wide distribution, presumed large population, occurs in a number of protected areas, has a tolerance of a degree of habitat modification and because it is unlikely to be declining fast enough to qualify for listing in a more threatened category (Srinivasulu and Srinivasulu 2019). Altogether 1116 species of bats are globally known (Wilson and Reeder 2011). Talmale and Saikia (2018) reported 127 species of 41 genera under 9 families from India while 40 species of 20 genera from Maharashtra by Pradhan and Talmale (2012) which is relatively high in diversity. A number of taxonomical and histological studies in Maharashtra state have done by various workers. Some prominent work on bat species in Maharashtra state is existing by Ellerman and Morrison-Scott (1951), Corbet and Hill (1992), Bates and Harrison (1997), Molur et al. (2002), Simmons (2005), Talmale and Pradhan (2009),

Pradhan and Talmale (2012), Gaikwad et al. (2012), Korad (2014) and others.

Gondia district of eastern Maharashtra harbors rich floral and faunal biodiversity. Gondia district is well known for water bodies, freshwater fisheries and rice production. The geographical area of the district is 5733 (Sq.km), among which the total forest area covered is 2833 (Sq.km). The two major protected areas are Navegaon National Park and Nagzira Tiger Reserve (WLS), now jointly established as Navegaon-Nagzira Tiger Reserve. The forest belongs to subgroup 5A-tropical dry deciduous forests. The survey was carried out for Bat's diversity from the year 2008 and documented bat species (Paliwal et al. 2019; Paliwal and Bhandarkar 2018; 2019; Bhandarkar and Paliwal 2013a; 2013b; 2014; 2017; 2018).

In the present paper the specimen based occurrence record of the Kelaart's Pipistrelle Bat, *Pipistrellus ceylonicus* from Gondia district of Maharashtra State is discussed. This bat ranges from India, Pakistan, Bangladesh, China, Malaysia, Sri Lanka, and Vietnam. In India it is distributed in South India, Goa, Gujarat, Madhya Pradesh, Maharashtra, Rajasthan, Jharkhand and West Bengal (Srinivasulu and Srinivasulu 2019). In Maharashtra, the previously recorded sites are Helwak (Wroughton 1916); Chikalda, Ajanta, Nasik, Bombay (Mumbai) and Satara (Brosset 1962c); Junnar (Brosset 1962c); Panchgani (Tiwari et al. 1971); Nanded (Madhavan 1971); Aurangabad, Nagpur (Sabnis 1973); Lonawala, Karla (Topal 1974); Bandra, Thana, Lanje, Andhari (Bates and Harrison 1997); Pune (Brosset 1962c; Korad and Yardi 2004a); Nalganga, Kopargaon and Talegaon-Dabhade (Talmale, 2007); Maval, Mulshi, Ambegaon, Khed, Karjat and Mahad (Korad 2005; Korad 2009; Korad et al. 2010a). Lal (1984) studied on the different subspecies of *P. ceylonicus* found in India. The present study is a distribution report based on measurement of morphometric properties compared with the existing literature.

MATERIALS AND METHODS

In October 2019, the dead bat specimen (n=1) found on the floor of MB Patel College building (21° 3' 56.61" N80° 22' 4.9224" E) under the open roof in Deori (Figure 1) District Gondia. It was photographed and carefully preserved in 4% formalin (Figure 2). The specimen was forwarded to Zoological Survey of India (ZSI), Western Regional Centre, Pune, Maharashtra India for further study and identification. A skull of a specimen of the same bat was prepared (Figure 3) for study according to Bates and Harrison (1997).

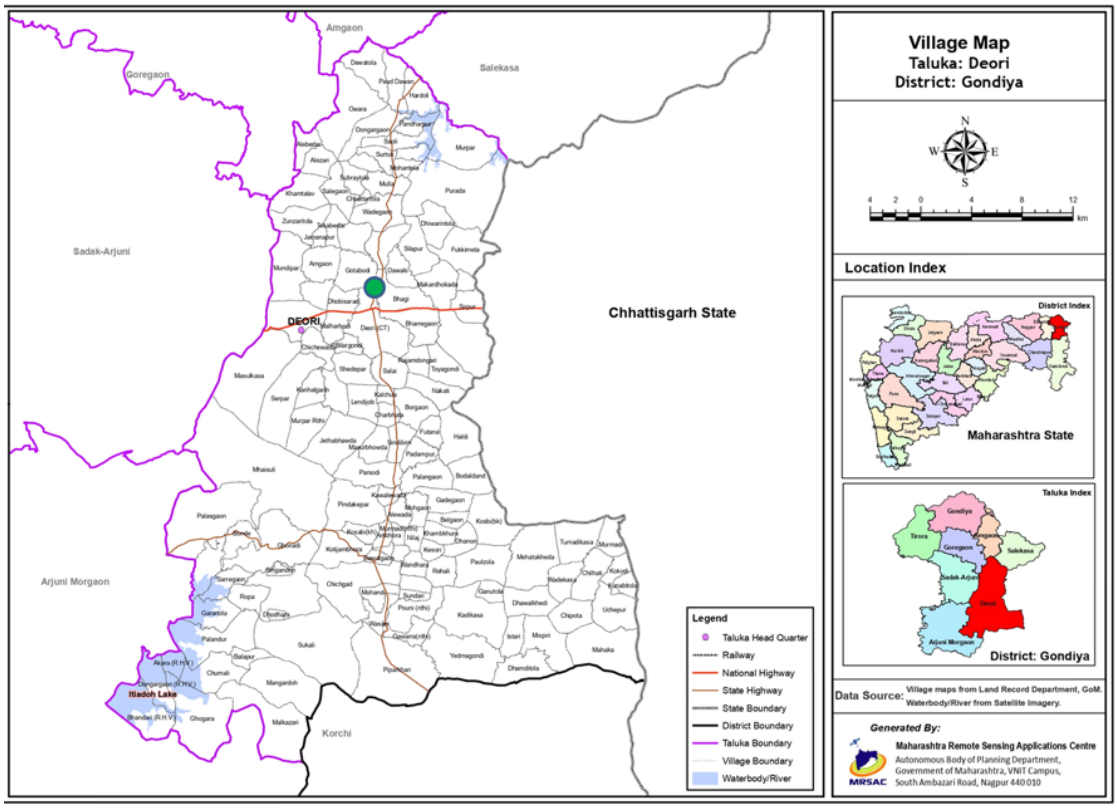

Fig. 1: Map of Deori Taluka showing the location of Bat sighting (Green spot)

RESULTS AND DISCUSSION

The specimen is recorded in deposited in the National Zoological Collection of Zoological Survey of India, Western Regional Centre, Pune as ZSI, WRC/M-868. The specimen was identified as female (Figure 2). Morphological as well as skull measurements (Table 1)

was compared with Bates and Harrison (1997) for the identification of species. The details are as under:
Phylum-Chordata
Class-Mammalia
Order-Chiroptera
Family-Vespertilionidae
Genus & Species-*Pipistrellus ceylonicus* Kellart 1852

Table 1: *Pipistrellus ceylonicus* (Kellart) External, cranial and dental measurement (mm).

Sr.No.	Measurement (mm)	Bates and Harrison (1997)		Present study Value (mm)
		Range	Mean	
1	HB (Head and body length)	45.5 - 64.0	53.5	43.30
2	T (Tail length)	30.0 - 45.0	38.2	29.70
3	HF (Hindfoot length with claw)	6.0 - 11.0	8.3	8.45
4	FA (Forearm length)	33.0 - 42.0	37.2	37.55
5	3MT (3rd Metacarpel length)	33.0 - 39.0	35.8	31.40
6	4MT (4*th* Metacarpel length)	32.6 - 38.5	35.1	31.20
7	5MT (5*th* Metacarpel length)	30.7 - 36.7	33.6	31.70
8	E (Ear length)	9.5 - 14.0	12.2	10.92
9	GTL (Greatest length of skull)	14.4 - 15.8	15.0	14.60
10	CCL (Condylocanine length)	13.1 - 14.3	13.7	13.98
11	ZB (Zygomatic breadth)	9.2 - 11.0	9.8	8.30
12	BB (Breadth of braincase)	6.8 - 7.8	7.3	7.22
13	POC (Postorbital constriction)	3.7 - 4.3	4.0	4.10
14	CM^3 (Maxillary toothrow length)	5.2 - 5.9	5.5	5.71
15	CM_3 (Mandibular tooth row length)	5.7 - 6.5	5.9	6.75
16	ML (length of mandible)	10.6 - 12.0	11.2	11.0
17	M3M3 (Width across third molars)	6.2 - 7.2	6.7	6.72

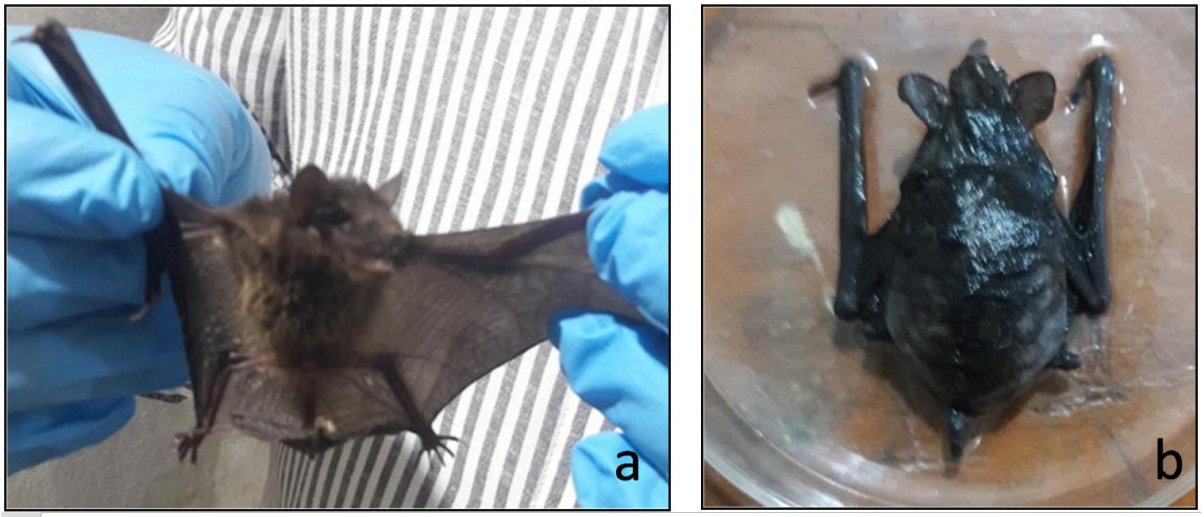

Fig. 2: *Pipistrellus ceylonicus* a) frontal view, b) preserved specimen

The Kelaart's Pipistrelle bat, *P. ceylonicus* ranges from tropical thorn forest to highlands from altitude of up to 2153 meters (Phillips 1980), old houses and dilapidated buildings roost between wooden rafters and inside cracks of walls and ceilings (Gopalkrishna and Madhavan 1971), roost include holes in trees, hollow branches (Phillip 1980) caves wells, temples and even roller blind in a hotel (Brosset 1962c). Their roost are single or in colonies up to 200 of individuals (Gopalkrishna and Madhavan 1971). They fly at evening and feeds on small beetles and other insects (Phillips 1980). The family Vespertilionidae is a largest family of Indian bat, shows diverse range of morphological variation. According to Bates and Harrison (1997) Members of the Genus Pipistrellus are similar to the genus Myotis, but have smaller muzzles and fewer teeth. They are plain-faced bats, eyes are usually small, tragus is simple-well developed and tail is not free from uropatagium. They are mostly brown, grey or blackish brown in color (Elangovan 2018).

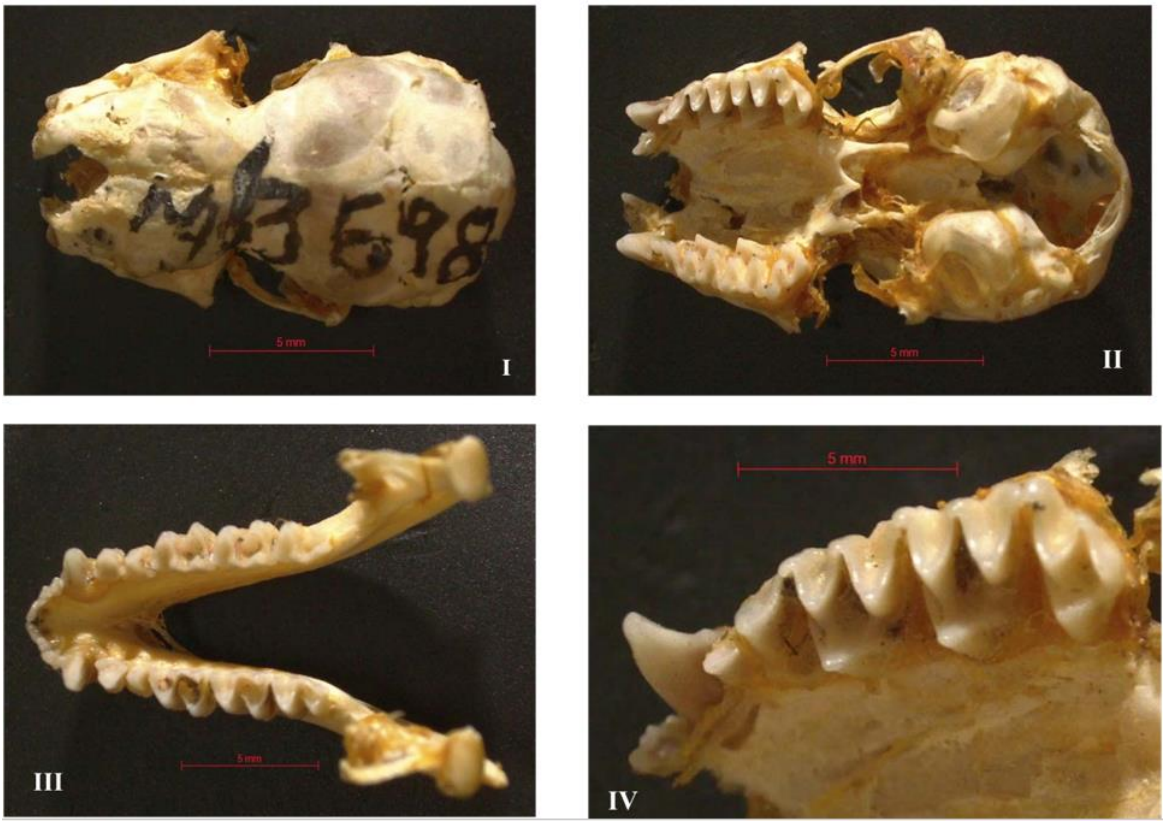

Fig 3: *Pipistrellus ceylonicus* I) Skull: dorsal view, II) Skull: ventral view, III) Lower jaw, IV) Upper tooth row

According to Lal (1984), taxonomic studies have been made on subspecies of *P. ceylonicus* found in India. All specimens from India should be referred to as *P. c. indicus* with the taxa *chrysothrix* and *subcanus* included as synonyms. There is a considerable individual variation in pelage colour with reddish brown and grey individuals found in the same colony (Brosset 1962c). Phillips (1980) suggests that older individuals assume a more reddish golden hue. Kellart in 1852 illustrated the species *Scotophillus ceylonicus* from Trincomalee, Ceylon. Dobson in 1878 described *Vesperugo indicus* from Manglore, Malabar Coast, India. Wroughton in 1899 described *Pipistrellus chrysothrix* from Mheskatri, Surat Dangs, India and Thomas in 1915b depicts *P. c. subcanus* species from Yalala, Junagarh and Kathiawar India. After comparative studies on colorations as well as external and skull measurements among Indian subspecies of *P. ceylonicus* disclose that no specific differences in previously recognized Indian subspecies and considered as *P. ceylonicus indicus* is only a valid subspecies occurring in India while rest were only the synonyms of it (Lal 1984). The measurements (Table 1) of the specimen (present study) and other morphological, cranial and dental structures matches with the study by Bates and Harrison (1997) is in large extent and identified as *Pipistrellus ceylonicus* (Kelaart 1852).

Pipistrelle species were found to be highly generalist and apparently tolerated wide range of habitats (Deshpande 2012), no major threats to this widespread and somewhat adaptable species but it is threatened locally in some areas by hunting for local consumption and medicinal purposes (Molur et al. 2002). The protected forest area of Deori forest range is disturbed by some anthropogenic activities but this species has not been seems to be endangered.

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