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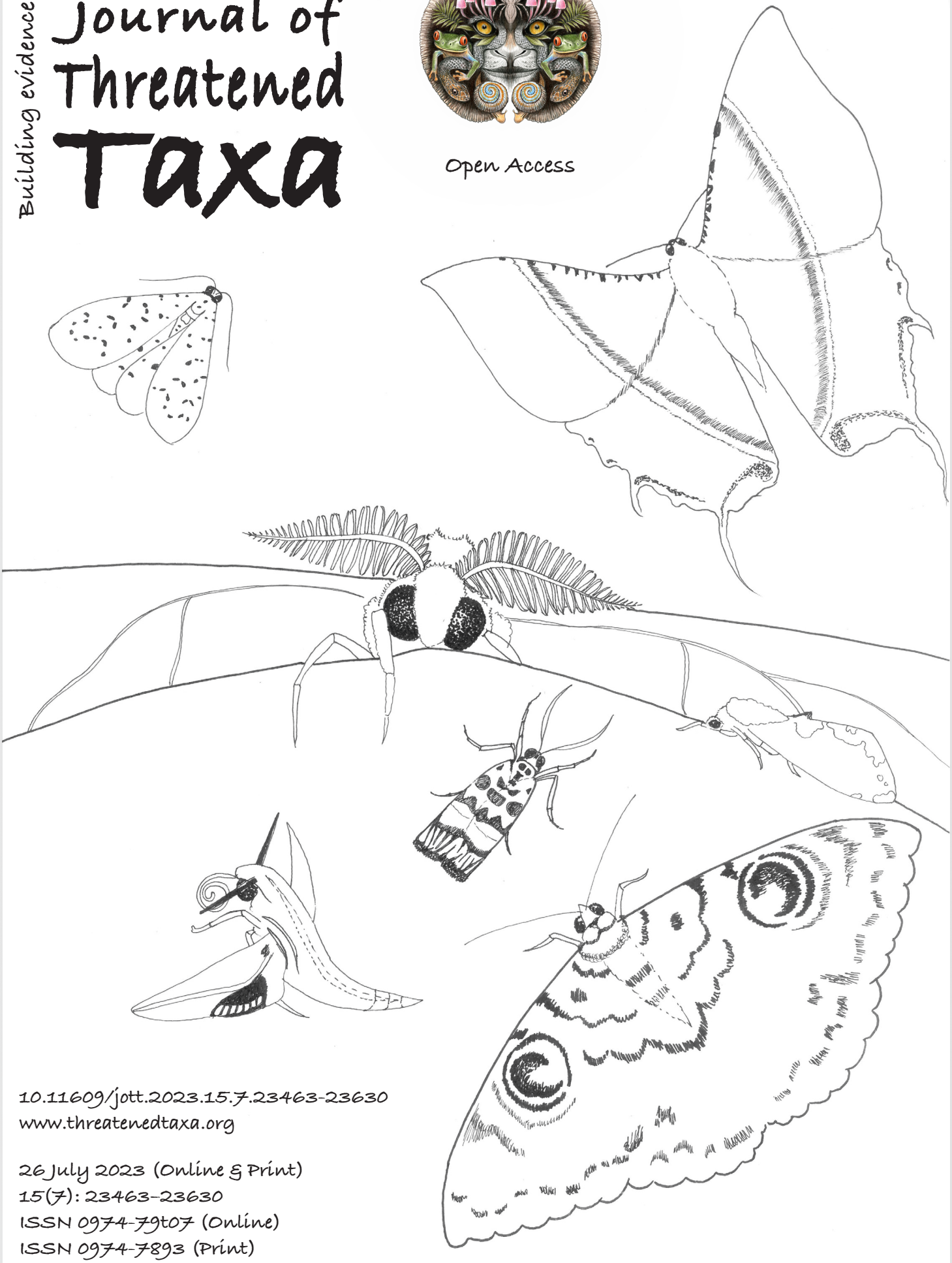

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Cover: Celebrating the unsung heroes—moths, our nocturnal pollinators. © Priyanka Iyer.

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COMMUNICATION

Re-sighting record of Kelaart's Pipistrelle *Pipistrellus ceylonicus* (Kelaart, 1852) (Mammalia: Chiroptera: Vespertilionidae) from Rajasthan, India

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Abstract: Despite numerous studies and surveys targeting Chiroptera in Rajasthan since 1955, *Pipistrellus ceylonicus* has not been observed in the state for more than a century since 1913. Based on an adult male specimen recovered from Kusthala village in Sawai Madhopur district of Rajasthan, we report the occurrence of this species from the state after more than a century.

Keywords: Bat, occurrence, population, rediscovery, Sawai Madhopur,

Hindi: वर्ष 1955 से राजस्थान में काईरोप्टेरा से जुड़े कई अध्ययनों और सर्वेक्षणों के बावजूद, 1913 के बाद से, यानी लगभग एक सदी से भी अधिक समय से राज्य में पिपिस्ट्रेलस सीलोनिकस नहीं देखी गयी है। राजस्थान के सवाई माधोपुर जिले के कुस्तला गांव से प्राप्त एक वयस्क नर चमगादड़ नमूने के आधार पर, हम इसे रिपोर्ट करते हैं, जो एक सदी से भी अधिक समय के बाद राज्य में इस प्रजाति को देखा गया है।

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Competing interests: The authors declare no competing interests.

Author details: Dr. Dharmendra Khandal has served as conservation biologist with Tiger Watch since 2003. His work with Tiger Watch has involved pioneering ground breaking initiatives in proactive anti-poaching, the monitoring of wildlife & scientific research. He has also forged new frontiers in the world of community based conservation through the Village Wildlife Volunteer program in the Ranthambhore Tiger Reserve. He is also the co-author of Unexplored Ranthambhore, a first of its kind book on the canids and Striped Hyena in Ranthambhore. Dr. Dau Lal Bohra, is currently head of the Department of Zoology at the Seth Gyaniram Bansidhar Podar College in Jhunjhunu, Rajasthan. He has numerous research papers to his credit and is recognised for his significant contributions to vulture conservation in Rajasthan. Dr. S. Talmale, is a taxonomist working on Indian small mammals and (Insecta) Odonata with several research papers and books to his credit. He is currently affiliated with the Zoological Survey of India.

Author contributions: This bat was spotted and captured in an injured state by DK. Unable to rehabilitate it, after its natural death, its skull was removed by DLB for the identification of the specimen. The morphometric measurements were also carried out by him. SST identified this specimen and prepared the draft of this paper.

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INTRODUCTION

A small-sized bat *Pipistrellus ceylonicus* was initially recorded from Rajasthan at Mt. Abu during the mammal surveys of India, Burma, and Ceylon in 1911–1923 conducted by the Bombay Natural History Society (BNHS). In this survey two males and one female of this species were collected in March–July 1913 (Ryley 1914). Since that time, a large number of surveys targeting the chiropteran fauna of the state were undertaken e.g., Garg (1955); Prakash (1961, 1963, 1973); Agrawal (1967); Biswas & Ghosh (1968); Sinha (1975, 1976a,b, 1977, 1978, 1979, 1980a,b, 1981, 1983, 1996); Gaur (1981); Advani (1982); Ramaswami & Kumar (1963); Kumar (1965); Wason (1978); Agarwal & Gupta (1982); Lall (1985); Bhupathy (1987); Gupta & Trivedi (1989); Trivedi & Lall (1989); Sharma (1986); Agarwal et al. (1981); Trivedi (1991); Purohit & Senacha (2002, 2004a,b); Senacha (2003, 2006); Trivedi et al. (2003); Dookia (2004); Dookia & Tak (2004); Senacha & Purohit (2004); Trivedi & Lall (2004, 2006); Senacha et al. (2006); Srinivasulu & Srinivasulu (2006); Purohit et al. (2006); and Khandal et al. (2022). However, *Pipistrellus ceylonicus* was not recorded in any of these surveys (Figure 1).

MATERIAL AND METHODS

In November 2021, an injured adult male *Pipistrellus* was rescued from Kusthala village (25.9694^{0}N, 76.2929^{0}E) in Sawai Madhopur, Rajasthan (Image 1 & 2). The bat was treated at home and kept in a box but did not survive. The specimen collection site is near the state highway close to the village of Kusthala, in the district of Sawai Madhopur. The landscape is dominated by agricultural fields close to a small human settlement. The area lies near a very significant ecosystem, i.e., the forests of Ranthambhore Tiger Reserve which is barely 4.5 km away. Specimen and habitat photographs were taken with a Nikon D850 DSLR equipped with a 17–35 mm lens. Morphological data was taken by manual examination in which measurements were taken with a digital caliper.

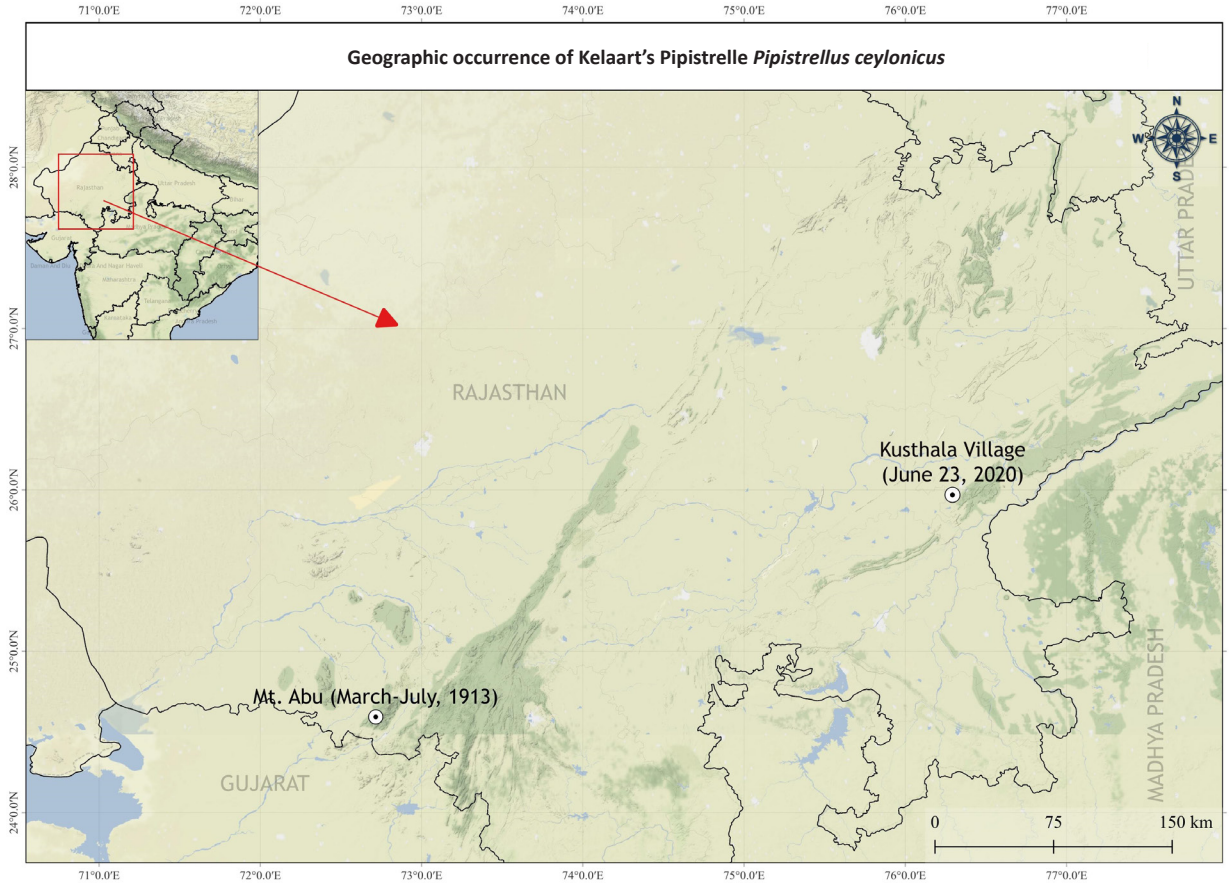

Figure 1. Map showing the new and old distribution localities for Kelaart's Pipistrelle in Rajasthan state.

Image 1. Portrait of Kelaart's Pipistrelle *Pipistrellus ceylonicus* (Kelaart, 1852) (present study)

Image 2. Close up of Kelaart's Pipistrelle *Pipistrellus ceylonicus* (Kelaart, 1852) (present study)

Table 1. Morphological, cranial and dental measurements of *Pipistrellus ceylonicus* (Kelaart, 1852) (all measurements are in millimeters)

	Measurement (mm)	Bates & Harrison (1997)	Korad & Yardi (2004) (n=7)	Present study (n=1)
1	Head and body length (HB)	45.5 - 64.0	46-51.4	41.2
2	Tail length (T)	30.0 - 45.0	29-38.5	31
3	Hind foot length, including claw (HF)	6.0 - 11.0	6-8.5	8.4
4	Forearm length (FA)	33.0 - 42.0	35-38.2	39
5	Wingspan (WSP)	227-262	227-252	243
6	5th Metacarpal length (5MT)	30.7 - 36.7	33.0-34.5	33.7
7	4th Metacarpal length (4MT)	32.6 - 38.5	34.4-35.8	34.8
8	3rd Metacarpal length (3MT)	33.0 - 39.0	34.5-36.4	33.1
9	Ear length (E)	9.5 - 14.0	9.5-14	11.2
10	Tibia length (Tb)	NA	13.5-15.0	14.1
11	Greatest length of skull (GTL)	14.4 - 15.8	13.5-15.5	14.9
12	Condylocanine length (CCL)	13.1 - 14.3	13.0-14.0	13.6
13	Zygomatic breadth (ZB)	9.2 - 11.0	9.0-10.0	9.2
14	Breadth of braincase (BB)	6.8 - 7.8	7.7-8.0	7.1
15	Postorbital constriction (PC)	3.7-4.3	3.8-4.5	3.9
16	Maxillary toothrow length (CM^3)	5.2 - 5.9	5.4-6	5.8
17	Mandibular toothrow length (CM_3)	5.7 - 6.5	5.6-6.6	6.2
18	Width across third molars (M^3-M^3)	6.2 - 7.2	6.6-7.8	6.8
19	Mandible length (M)	10.6 - 12.0	10.6-11.6	10.9
20	Width of rostrum (RW)	5.7-7.1	5.5-7.0	5.9

The specimen was preserved in 70% ethanol. Standard morphological measurements of the specimen and cranio-dental measurements of the extracted skull were taken using a digital calliper accurate to the nearest 0.1 mm and 0.01 mm, respectively. The morphological and craniodental description (Table 1) of the bat matched with descriptions provided by Bates & Harrison (1997) and Korad & Yardi (2004) confirming the specimen as *Pipistrellus ceylonicus* (Kelaart, 1852).

RESULTS AND DISCUSSION

Kelaart's Pipistrelle, *Pipistrellus ceylonicus* is a large sized *Pipistrellus* with a forearm length of 33–42 mm (Bates & Harrison 1997). They have variable dorsal pelage coloration ranging from grey-brown to chestnut, reddish or golden-brown colour. The ears, naked areas of the face, wings and interfemoral membrane are a uniform dark brown. The present specimen was grayish-brown dorsally and had dark hairs with pale grey tips on the ventrum (Image 1 & 2). The skull is robust with condylo-canine length of 13.6 mm and the upper toothrow length (cm^3) is 5.8 mm (Image 3 A & B). The first upper incisor (i^2) is bicuspidate; the second incisor (i^3) is larger in size and two-thirds the height of i^2. The first small premolar (pm^2) intruded into the toothrow, and was not visible on the outside (Image 4 A & B). The upper canine and posterior premolar (pm^4) are almost in contact. The lower incisors are trifid and overlap slightly (Image 5).

Three subspecies under *P. ceylonicus* recognized from India by Ellerman & Morrison-Scott (1951), viz., *Vesperugo indicus* Dobson, 1878 (type from Mangalore, Malabar Coast, Karnataka), *Pipistrellus chrysothrix* Wroughton, 1899 (type from Mheskatri, Surat Dangs, Gujarat) and *P.c. subcanus* Thomas, 1915 (type from Yalala, Junagarh, Kathiawar, Gujarat). Individual body color variation was observed in individuals of the same colony of *P. ceylonicus* by Brosset (1962). Based on variation in colour, Khajuria (1978, 1980) has synonymised *crysothrix* with *indicus.* Lal (1984) has considered both *crysothrix* and *subcanus* as synonyms of *Pipistrellus cylonicus indicus.* Moratelli & Burgain (2019) considered all populations of *P. ceylonicus* from the mainland Indian subcontinent with distribution in eastern and southeastern Pakistan, India and Bangladesh are to represent a single subspecies,

Image 3. *Pipistrellus ceylonicus* skull: A—Dorsal view| B—Ventral view. © Dharmendra Khandal.

Image 4. *Pipistrellus ceylonicus*, skull: A—Lateral view | B—Front view. © Dharmendra Khandal.

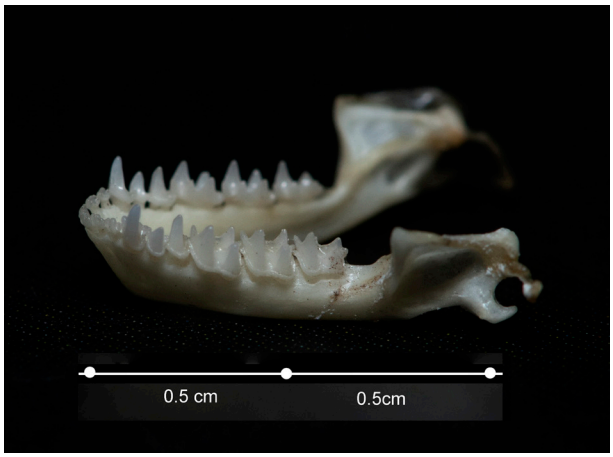

Image 5. *Pipistrellus ceylonicus,* lower jaw with dental arrangement. © Dharmendra Khandal.

Pipistrellus ceylonicus indicus Dobson, 1878.

Some of the earlier works on taxonomy, biology and ecology of bats of Rajasthan (Prakash 1961; Agrawal 1967; Biswas & Ghosh 1968; Sinha 1976a,b, 1978, 1980a,b) did not report any new occurrence data of *P. ceylonicus* from the state. Ghosh (2008), while preparing a catalogue of bats specimens available in the National Zoological Collection at Zoological Survey of India, Kolkata, mentioned the distribution of the species in Rajasthan based only on the past record by Ryley (1914) and without any new collection data.

In view of its widespread distribution and adaptable

nature, IUCN Red List categorized the species as 'Least Concern' (LC) (Srinivasulu & Srinivasulu 2019). It is apparently of rare occurrence and extensive surveys are needed to determine the status of the species in the state.

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