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Cover: *Saproamanita praeclara*: Sporocarp in habitat © Kantharaja. R.

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SHORT COMMUNICATION

Distribution records of Dormer's Bat *Scotozous dormeri* (Dobson, 1875) (Mammalia: Chiroptera: Vespertilionidae) in Nepal

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Abstract: Dormer's Bat is endemic to southern Asia and distributed in tropical, semi-arid, or arid climatic zones in India, Pakistan, Bangladesh, and Nepal (Srinivasulu & Srinivasulu 2019). It is insectivorous in nature and plays an important role in the natural control of insects. Roost search and mist netting were conducted during early evening to 2200 h in three sites and the species was identified by field-based morphology including medium body size, pale gray brown color on the dorsal side, buffy white ventral surface, and face is necked and uniform mid-brown in color. A total of five individuals of *Scotozous dormeri* were recorded from east to west Nepal and the forearm ranged 34.4–36.00 mm in length. An individual was observed in a cavity in a pillar in a wooden house at Ramjhoda, Sunsari District. Two individuals each were trapped at the Morange River, Morang District in the east and Hattikhauwa, Dang District in the west. Three localities of the species' record lie in the dry and arid sub-tropical areas. This study records the second to fourth locality records of the species distribution to Nepal.

Keywords: Dry and arid sub-tropical area, endemic, mist netting, Morange River, roost.

Dobson (1875) reported a new species *Scotozous dormeri* (Dobson 1875) from Bellary hill, Karnataka, India. This species is medium in size (32.7–36.3 mm, n= 25) and tail is shorter than the head and body. The dorsal surface is greyish-brown with silvery hair tips with brown or black roots. The ventral surface is contrastingly paler with all the hair tips white or pale buffy white (Bates & Harrison 1997). Cavities and holes in buildings, trees, under the roof tiles of old constructions are major habitat of the species. It occurs in tropical, semi-arid or arid climatic zone and is found near to or within human settlements (Advani 1981; Sinha 1981; Bates & Harrison 1997; Molur et al. 2002; Srinivasulu & Srinivasulu 2019). However, the species has been observed in arid deciduous forest in Hyderabad, India (Molur et al. 2002). It is a solitary or colonial bat, the size of its colonies varies from two to 24 individuals (Agrawal 1973; Bates & Harrison 1997). Dormer's Bat is fully insectivorous in nature and hunts different species of insects seasonally and plays an importance role in the natural control of pests and other harmful insects (Bates & Harrison 1997; Molur et al. 2002).

It is endemic to southern Asia and is thus far reported from 101 locations in India, two locations each in Bangladesh & Pakistan, and a single location from Nepal (Bates & Harrison 1997; Khan 2001; Molur

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et al. 2002; Thapa et al. 2012; Srinivasulu & Srinivasulu 2019). India has most distribution records of Dormer's Bat and it has been recorded from 25 states; Andhra Pradesh, Assam, Bihar, Goa, Gujarat, Haryana, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharastra, Manipur, Megahalaya, Mijoram, Nagaland, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Tripura, Uttarakhand, Uttar Pradesh, and West Bengal (Bates & Harrison 1997; Molur et al. 2002; Srinivasulu & Srinivasulu 2019). The species has been reported from old temples of Rajshahi in western Bangladesh and a railway station at Dinajpur of northern Bangladesh (Khan 2001). Sialkot and Shikarpur were recorded localities in Pakistan (Bates & Harrison 1997). In Nepal, a male individual of Dormer's Bat was reported from southeastern Kusaha of Koshi Tappu wildlife reserve, Nepal (Thapa et al. 2012). Steamer Ghats, Bangladesh, and Sindh Pakistan are eastern- and western-most record of the species. Likewise Murapanadu Tamil Nadu, India and Firozpur, Punjab, India are southern- and northern-most distribution record of Dormer's Bat till now (Bates & Harrison 1997; Khan 2001; Molur et al. 2002; Srinivasulu & Srinivasulu 2019). It is distributed from sea level to 2,000 m (Bates & Harrison 1997; Srinivasulu & Srinivasulu 2019). Here we add three new distribution localities and second, third, and fourth records of the species from Nepal (Thapa et al. 2012).

Materials and methods

Study area

A total of three sites were surveyed in eastern to western regions of Nepal. Morange River, Letang Municipality, Morang District and Ramjhoda, Barahachettra Municipality, Sunsari District are two localities in the eastern region and Hattikhauwa, Tulsipur municipality, Dang District is in the western region of Nepal (Figure 1).

Morange River is the border of Letang Bazaar and Jante village, which is originated from Mahabharat range, however, the river is dry most of the time and is flooded during monsoon season. The surveyed locality in the Morange River lies at an elevation of 243 m. The locality is an arid subtropical area at the foothills of Churia range. Mist netting site is a small water canal and ditches at the eastern side of the river. Small patches of bamboo and paddy fields are in the surroundings. Ramjhoda,

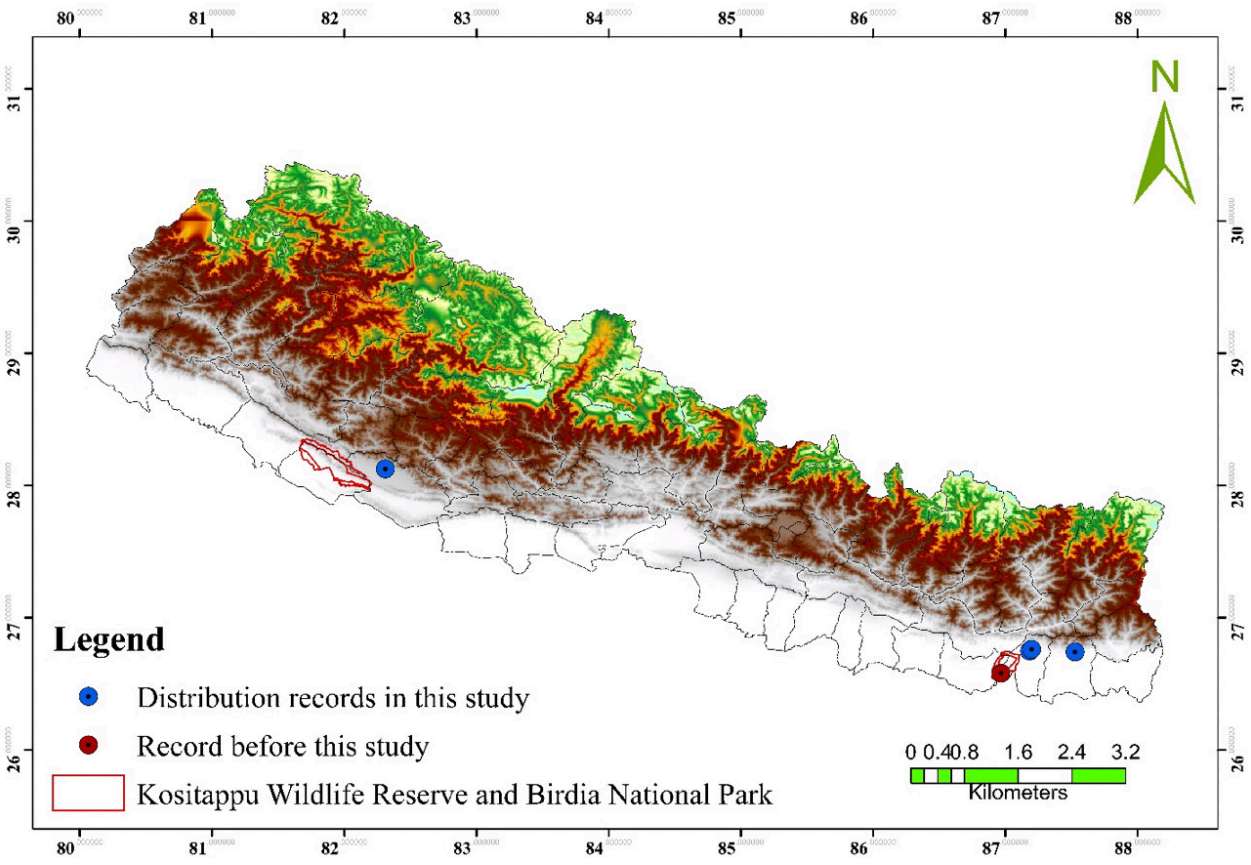

Figure 1. Distribution records of *S. dormeri* in Nepal.

Barahakshetra Municipality ward #5 in Sunsari District lies at an elevation of 119 m. The locality is also an arid area. It is a small village with traditional wooden houses in the human settlement surrounded by small patches of forest, fishponds and paddy croplands with water canals. Tulsipur municipality wad #6, Hattikhauwa is 635 m and in the eastern border of Tulsipur town. This locality is a small stream flowing through an arid area with red soil surrounded by patches of bamboo forest and maize and millet croplands.

Bat survey and identification

Field surveys were conducted during three months of January, October, and November 2020. Roost searches were conducted by direct observation of possible sites during daytime to select the mist netting sites in stream, pounds, walking trails or tree canopies. We searched for bats in cavities of wooden houses and huts, bamboo holes, old buildings, holes, and bark of dead trees. Cavity dwelling individuals were captured by gloved hands and released immediately after taking photographs and measurements of fore arm (FA) (Kunz et al. 2009). Six monofilament mist nets with 14 mm mesh size and of three sizes 6*3 m^2, 9*3 m^2 and 3*2.5 m^2 dimensions were installed over the stream, in the bank of pond, riverbank and edge of forest. At each site, mist-nets were opened at sunset just before the time of emergence of the bats (normally 1730 h) and closed after the bats activities came to an end (normally 2300 h) for a single night (Collins 2016). Captured bats were immediately taken out of mist-net by loose gloved hand without any stress. Morphology characters and morphometrics (forearm length 'FA') were recorded. Measurements of FA were taken by FREEMANS IP54 digital vernier caliper. Captured bats were photographed from dorsal, ventral and lateral views using 18–55 mm and 75–300 mm lens (Cannon EOS 1100D). Bats were carefully released soon after handling. Bat capture and handling methods followed standard procedures and recommendations described in Kunz & Parsons (2009). The species was identified in the field based upon the morphological characters and morphometrics (Bates & Harrison 1997; Molur et al. 2002; Acharya et al. 2010; Srinivasulu et al. 2010; Thapa et al. 2012).

Results

Four species of 18 bats were tapped in Hattikhuwa and Morange River survey stations but no bat was trapped in Ramjhoda (Table 1). Two males of *S. dormeri*, two individuals (male and female each) of *Scotophillus heathii* were trapped at Hatikhauwa and two individuals (male and female each) of *S. dormeri*, one male *Megaderma lyra*, one female *Cynopterus sphinx*, and 11 individuals (four male and seven female) of *S. heathii* were trapped in Morange River site. Densities of flight were extremely high from early evening until about two hours after sun set. All captured bats were released immediately after taking photographs and measurement without any stress.

Two roosts of *Pipistrellus* sp. and a roost of *S. dormeri* were reported from Ramjhoda. A colony of 10 individuals of *C. sphinx* was found in the canopy of *Saracaasoca* in Sikha School, more or less one kilometer west of the mist netting site at Tulsipur Municipality # 4 (Table no. 1). A colony of *Pipistrellus* sp. in a bamboo hollow of a cattle shed near the house was found and two male individuals

Table 1. Bat species identification three survey stations with sex, forearm (FA) length and types of survey.

	Date	Location	Species of bats	Ind. & sex	FA length (mm)	Type of survey	Elevation (meter)
1	22.i.2020	Ramjhoda, Barahachettra, Sunsari	*Pipistrellus* sp.	Male		Roost search	107
2	22.i.2020	Ramjhoda, Barahachettra, Sunsari	*Scotophilus heathii*	1 Ind.		Roost search	119
3	22.i.2020	Ramjhoda, Barahachettra, Sunsari	*Scotozous dormeri*	1 Male	34.31	Roost search	122
4	23.i.2020	Ramjhoda, Barahachettra, Sunsari	*Pipistrellus* sp.	1 Male		Roost search	118
5	4.x.2020	Hattikhauwa, Tulsipur, Dang	*Scotophilus heathii*	1 Male, 1 Female	Male: 63.39 & Female: 64.72	Mist netting	635
6	4.x.2020	Hattikhauwa, Tulsipur, Dang	*Scotozous dormeri*	2 Males	Male1: 36.01 & Male2: 34.64	Mist netting	636
7	5.x.2020	Hattikhauwa, Tulsipur, Dang	*Cynopterus sphinx*	10 Ind.		Roost search	663
8	4.xi.2020	Morange River, Letang, Morang	*Scotophilus heathii*	4 Male, 7 Female	Male1: 61.91 & Female1: 61.67	Mist netting	243
9	4.xi.2020	Morange River, Letang, Morang	*Cynopterus sphinx*	1 Female		Mist netting	243
10	4.xi.2020	Morange River, Letang, Morang	*Megaderma lyra*	1 Male		Mist netting	243
11	4.xi.2020	Morange River, Letang, Morang	*Scotozous dormeri*	1 Male, 1 Female	Male: 34.65 &Female: 34.04	Mist netting	243

Image 1. A—*S. dormeri* captured in Ramjhoda 1.i.2011 | B—*S. dormeri* in Ramjhoda 22.i.2020 | C—*S. dormeri* Morange River 11.iv.2020 | D—*S. dormeri* Hattikhauwa 10.iv.2020. © A—Dibya Raj Dahal | B–D—Sanjan Thapa.

was captured and measurement of FA and close up photographs were taken and then released immediately at Ramjhoda. A male individual of *Pipistrellus* sp. was roosting in a cavity of the wooden ceiling of a house, 500 m east of the first colony. A single individual of the Greater Asiatic Yellow House Bat *S. heathii* was found in a cavity of a bamboo cottage close to the second colony of *Pipistrellus* sp. This was identified by direct observation and photography without capture. Male *S. dormeri* was found in a small cavity in a wooden pillar of an old house in southern Ramjhoda.

Five individuals (four males and one female) of Dormer's Bats were captured in Morange River, Letang, Morang District; Ramjhoda, Barahachetrra, Sunsari

District and Hattikhauwa, Tulsipur, Dang District. Four of them were trapped by mist netting in Morang and Dang districts whereas an individual was found roosting in Sunsari District (Table 1). A male was trapped in early evening and a female was netted in 2100 h at Morange River whereas both were netted in early evening just after sunset in Hattikhauwa. Forearm lengths of the five individuals measured were 34.04–36.01mm (n= 5, Mean= 34.04, Sd= 0.7591) (Table 1). Dorsal pelage was greyish-brown with silvery hair tips and ventral pelage was pale with buffy white hair tips (Image 1 A & B). Ear, face, and membranes of all individuals were brownish in color (Image 1C). Wing and inter femoral membrane were naked (Image 1C,D).

Discussion

After the first national record of *S. dormeri* by Thapa et al. (2012), the second locality record of Dormer's Bats from Nepal was found about 20 km north-east from the first locality record at Paschim Kusaha. Another roost of the species was reported from a wooden house at southern Ramjhoda in 22 January 2020. The latter locality is 300 m east of the second record at Ramjhoda, which is the third report of the species in the country. The species at Ramjhoda was found in narrow cavities of wooden pillar of old wooden houses. A mature male and female of Dormer's bats were trapped in Morange River, Letang, Morang District on 4 November 2020, which is the eastern most record from Nepal. Morange River is around 36 km and 50 km east from Ramjhoda and and Paschimkusaha, respectively. Two male individuals were captured in Hattikhauwa, Dang District in 4 October 2020, which is the fourth locality record and is 540 km west from Morange River and it is also the westernmost record for Nepal (Figure 1). Dormer's bats were roosting in cavities, cracks, holes of old building, temple and huts (Molur et al. 2002; Thapa et al. 2012; Srinivasulu & Srinivasulu 2019). The recent records were also found roosting in cavities of wooden pillars of old wooden houses at Ramjhoda. Thapa et al. (2012) reported the species from the bamboo hollow in a hut at Paschim Kusaha.

S. dormeri is distributed in tropical, semi-arid or arid climatic zone of near or within human settlements (Srinivasulu & Srinivasulu 2019). All reported sites during the current surveys of Dormer's bat were arid and dry red soil. Suburban areas which contain wooden houses and agricultural terraces and croplands surrounded the surveyed sites. *Noelamarkia cadamba*, *Ficus benjamina* and *Pseudosasa japonica* were the dominant vegetation in surveyed sites throughout Nepal. *C. sphinx* and *S. kuhlii* were reported from the vicinity of the Dormer's Bat recorded sites.

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