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FIRST RECORD OF BATS (Mammalia: Chiroptera) FROM MANGROVE IN DAM NAI AREA, NINH THUAN PROVINCE, CENTRAL VIETNAM

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ABSTRACT

Dam Nai is one of the twelve best known lagoons in south central Vietnam. Habitats in and around the largoon and its surroundings are quite diverse including mangrove, bushes, rice fields and fruit tree farms which are ecologically suitable for many animals including bats. However, bats in this area still receives very little attention from scientists. The author conducted a series of bat surveys since 2017 for the primary understanding of bats inhabiting this area before the establishment of a wind farm. The results show the records of two nationally rare fruit bat species, *Cynopterus brachyotis* and *Macroglossus minimus*, from mangrove in this area. Morphological features and detailed records of these two species are given in this paper with recommendations for further researches for conservation.

Keywords: Bats, morphology, conservation, Dam Nai Vietnam.

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INTRODUCTION

Dam Nai area includes the Dam Nai wind farm which has been located across Thuan Bac and Ninh Hai Districts, Ninh Thuan province, south central Vietnam. The area contains a wide range of habitats including wetlands, rice fields and fruit tree plantations. Although Dam Nai area was listed as a proposed nature reserve in 2020 with expectation of establishment by 2030 in the National Strategy for Biodiversity Conservation, this area has still received very little attention from scientists (GOV, 2014; DEP, 2015). The results from several floral and faunal surveys at the Dam Nai lagoon, a section of the Dam Nai area, exhibited high biodiversity values (Vu Manh Hung et al., 2014). Unfortunately, mangrove and other natural habitats of the area were critically decreased between 1975 and 2014 (Vu Manh Hung et al., 2014; Nguyen Van Quan et al., 2015). Ecologically, the natural habitats may support highly diverse flora and fauna. However, bats and other mammal species inhabiting this area have not been included in any previous documents. The author conducted a series of bat surveys since 2017 in this area. This paper provides details of two nationally rare species of fruit bats recorded in this area over the surveys.

MATERIALS AND METHODS

Two field surveys were carried out at the Dam Nai area between July 2017 and May 2018 with an emphasis on remaining mangrove habitats. Bats were captured and handled in the field following the guidelines approved by the American Society of Mammalogists (Sikes & ACUCASM, 2016). Five mist nets of various sizes (3.0–5.0 m [height] × 6.0–20.0 m [length], mesh size: 16 mm × 16 mm) were employed to capture bats. Geographical coordinates of the netting sites with captured bats are given in the "Results and discussion" section. Every captured bat was removed carefully from the nets and then placed individually in a cotton bag and identified following Bates and Harrison (1997), Borissenko & Kruskop (2003) and Kruskop (2013). Their external measurements were taken using a digital caliper to the nearest 0.1 mm: FA, forearm length-from the extremity of the elbow to the extremity of the carpus with the wings folded; EH, ear height-length of ear conch; EW, ear width-the greatest width of ear conch. Reproductive status and ages were assessed according to Racey (2009) and Brunet-Rossinni and Wilkinson (2009), respectively. To avoid negative impact on bat population foraging at remaining mangrove habitat of the area, all captured individuals were released after taking photos and identification in the field.

RESULTS AND DISCUSSION

The remaining natural mangrove area within the Dam Nai lagoon is quite small, but it is still an important ecosystem for bats and other animal species. At least two fruit bat species, *Cynopterus brachyotis* and *Macroglossus minimus*, were captured over the surveys. These two species were rarely recorded previously from Vietnam. Below are the details of each species recorded from this study area with notes on historical records from Ninh Thuan province.

Cynopterus brachytis

Lesser dog-faced fruit bat

Materials examined and morphological measurements

Over the two surveys within the Dam Nai lagoon, three adult females were captured on 15th April 2017 at the largest remaining mangrove area in the eastern part (11^{o}37'16"N; 109^{o}02'28"E) and two adult females were captured on 21st July 2017 at the mangrove area in the northwestern corner (11^{o}38'18"N; 109^{o}01'29"E). External features of the five captured individuals are identical to the descriptions in the previous publications (Borissenko & Kruskop, 2003; Kruskop, 2013; Fig. 1a). Their FA, EH and EW are in a range of 64.0–66.9 mm, 15.6–18.0 mm and 9.5–9.8 mm, respectively. One of the captured females was lactating (Fig. 1b).

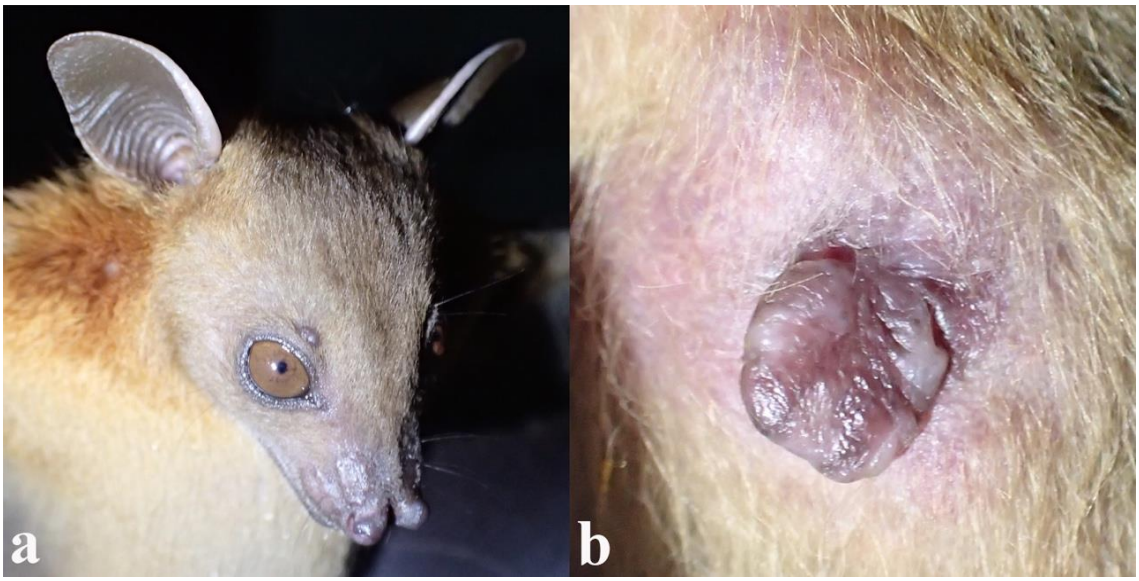

Figure 1. Cynopterus brachyotis captured at mangrove of Dam Nai area.
a. Frontolateral view; b. Thoracic nipple indicating the lactating stage of a captured female.

Historical records from Ninh Thuan province and conservation status

Dang Huy Huynh et al. (1994) included "Ninh Thuan (Nha Hố)", which is referred to a village in Nhon Son Commune of Ninh Son District, as a distributional locality of *Cynopterus brachyotis*. This species was listed as a national "Rare" in the current Vietnam Red Data Book and globally "Least Concern" in the IUCN Red List (MOST & VAST, 2007; Csorba et al., 2019). Its distributional range in Vietnam must be restricted to southern provinces (Borissenko & Kruskop, 2003; Kruskop 2013). The present results exhibit the second record from Ninh Thuan province with reference to materials.

Macroglossus minimus

Dagger-toothed long-nosed fruit bat

Two adult females of this species were captured on 03rd January 2018 at the mangrove area in the eastern part of Dam Nai lagoon (11°37'16"N; 109°02'28"E). External characteristics of the captured individuals are similar to those described in the previous publications (Borissenko & Kruskop, 2003; Kruskop, 2013; Fig. 2a). Their FA, EH and EW are in a range of 42.2−44.2 mm, 12.7−13.1 mm and 8.6−9.9 mm, respectively. The captured individuals were both post-lactating (Fig. 2b).

Historical records from Ninh Thuan province and conservation status

Dang Ngoc Can et al. (2008) included "Ninh Thuan (Nui Chua)", which referred to Nui Chua National Park, as a distributional locality of *Macroglossus minimus* without reference to any material. However, this record was regarded as misidentification of *M. sobrinus* (Kruskop, 2013; Hoang Trung Thanh et al., 2019). Although *M. minimus* is not listed as a rare species, its presence in Vietnam was confirmed only from three localities in the previous records: the provinces of Kien Giang, Ca Mau and Ba Ria-Vung Tau (Kruskop, 2013; Hoang Trung Thanh et al., 2019). It is listed as "Least Concern" in the current IUCN Red List (Francis et al., 2008). Therefore, the present record from mangrove of the Dam Nai area is the first confirmed occurrence of *Macroglossus minimus* in Ninh Thuan province.

Figure 2. Macroglossus minimus captured at mangrove of Dam Nai area.
a. Frontolateral view; b. Thoracic nipple indicating the post-lactating stage of a captured female.

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