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First confirmed records of Lesser Mouse-tailed Bat, *Rhinopoma cystops* Thomas, 1903, for Sinai, Egypt (Mammalia: Chiroptera)

Jill Carpenter^a, Zsolt Hegyeli^b, Sebastian Bugariu^c & István Moldován^d

^a LSA Associates, Irvine, California, USA

^b "Milvus Group", Bird and Nature Protection Association, Tîrgu-Mureş, Romania

^c Romanian Ornithological Society/BirdLife Romania, Bucharest, Romania

^d Birding in Egypt Project, Tîrgu-Mureş, Romania

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First confirmed records of Lesser Mouse-tailed Bat, *Rhinopoma cystops* Thomas, 1903, for Sinai, Egypt (Mammalia: Chiroptera)

Jill Carpenter^{1*}, Zsolt Hegyeli², Sebastian Bugariu³, and István Moldován⁴

¹LSA Associates, Irvine, California, USA. ²“Milvus Group”, Bird and Nature Protection Association, Tîrgu-Mureş, Romania. ³Romanian Ornithological Society/BirdLife Romania, Bucharest, Romania. ⁴Birding in Egypt Project, Tîrgu-Mureş, Romania

The Lesser Mouse-tailed Bat, *Rhinopoma cystops* Thomas, 1903, is distributed throughout North Africa and the Middle East, and is known to inhabit desert and semi-desert areas and to roost in caves and old buildings (Qumsiyeh & Jones, 1986). It is now considered separate from the Asian *Rhinopoma hardwickii* Gray, 1831 following recent genetic analyses (Hulva, Hortáček, & Benda, 2007). Although some range maps include the Sinai peninsula of Egypt in the distribution of *Rh. cystops* (Basuony, Gilbert, & Zalat, 2010), other range maps (e.g. Aulagnier, Haffner, Mitchell-Jones, Moutou, & Zima, 2009) show Sinai as a gap in the distribution of this species, which has been documented elsewhere in Egypt along the Nile River delta and east of Sinai near Palestine (Qumsiyeh, 1985; Aulagnier et al., 2009). A single echolocation sequence recorded at Wadi Feiran in 2005 was tentatively assigned to *Rhinopoma cystops* (Dietz 2005a); however, based upon stated concerns about quality of this sequence and the fact that it was a single recording, *Rh. cystops* was subsequently reported in Sinai with some degree of caution (Benda et al., 2008). Basuony et al. (2010) erroneously reported two separate occurrences in Sinai, due to an accidental duplicate entry of this 2005 record. The records presented here comprise the first confirmed occurrences of this species from Sinai, including the first captures of this species in Sinai as well as the first confirmed echolocation recordings (n=79) at 13 survey sites in 3 distinct regions of South Sinai.

Twenty-eight sites throughout South Sinai were surveyed for bats during “Operation Wallacea” biodiversity surveys conducted between 6 July and 17 August 2010. The echolocation calls of free-flying bats were recorded using ultrasound detectors placed in locations that would attract or funnel bat activity, such as near water tanks or along a canyon. The survey team was typically positioned near one of the acoustic detectors to permit the correlation of echolocation calls with visual observations. One or two Pettersson D-240X ultrasound detectors (Pettersson Elektronik, Inc.) were used in time-expansion mode to collect acoustic data during each survey, and iRiver ifp-890 digital

*Corresponding author. Email: carpenterj@gmail.com

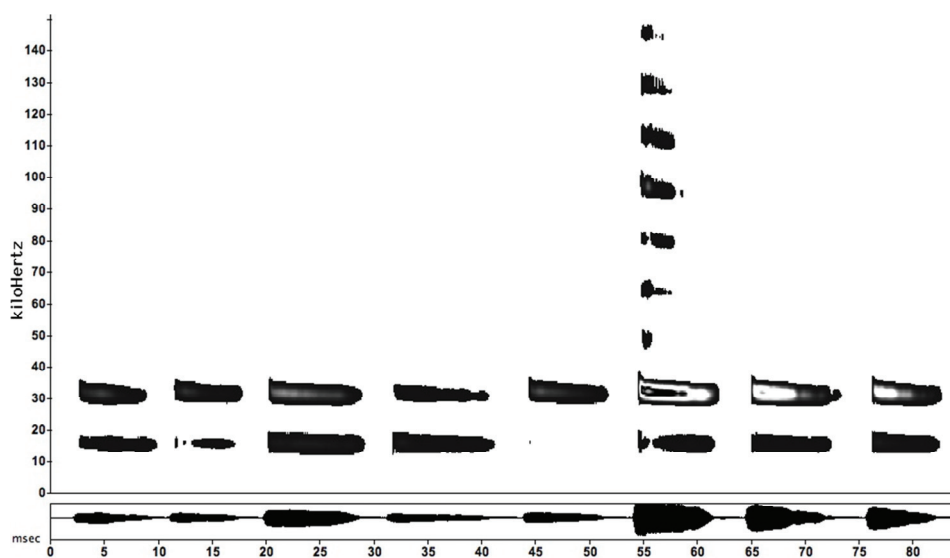


Figure 1. Representative call sequence of *Rhinopoma cystops*, recorded in Wadi Sa'al.

media players were used to record the data files. These data, consisting of full-spectrum sonograms of echolocation calls, were subsequently analysed using Sonobat 2.9 acoustic analysis software. A sampling frequency of 44,100 samples/second, with 16 bits/sample, and expansion factor of 10 were used. Species identifications were determined by comparing call sequences with recordings from known hand-released bats; echolocation parameters were also compared to those described in Benda et al. (2008) for bat species of Sinai. Following consultation with Christian Dietz at University of Tübingen and based upon comparison with his library of sound recordings from other parts of Egypt and from Israel, 79 previously unidentified call sequences collected in 2010 were determined to be *Rhinopoma cystops*.

The 79 call sequences belonging to *Rh. cystops* were recorded at 13 survey sites (46% of all sites surveyed in 2010); the majority of call sequences ($n=47$) were collected at multiple sites in Wadi Sa'al ($28^{\circ}45'N$, $34^{\circ}14'E$) in the eastern part of South Sinai, while the remaining sequences were recorded in scattered sites in Wadi Feiran ($28^{\circ}42'N$ $33^{\circ}38'E$) and in two areas in the vicinity of St. Katherine ($28^{\circ}33'N$ $33^{\circ}57'E$ and $28^{\circ}36'N$ $33^{\circ}55'E$). These first confirmed records of this species at three distinct regions in southern Sinai in 2010 indicate a potentially widespread distribution of this species, as was suggested by Benda et al. (2008).

Although no individuals were captured in 2010, the call sequences are of sufficient quality to confirm the presence of this species at those locations with a high level of confidence. A representative sonogram for *Rhinopoma cystops* recorded in Sinai in 2010 is presented in Figure 1. All call sequences identified as *Rh. cystops* consist of clear multi-harmonic calls with the most energy in the second harmonic around 32–34 kHz, and are consistent with the parameters described by Simmons, Kick, and Lawrence (1984) and Benda et al. (2008).

On the afternoon of 13 February 2012, a solitary *Rhinopoma cystops* individual was observed and photographed roosting in a small cave in Wadi Maghara ($28^{\circ}53'N$,

33°22'E). This wadi, located approximately 35 km northwest of Wadi Feiran, is typical of the region and consists of rocky hillsides containing small caves and an open, sandy floor with scattered acacias. Another group of bats was observed in a separate part of the cave but could not be positively identified as *Rh. cystops*. Later that evening, three *Rh. cystops* individuals were incidentally captured in a mist net (12 x 2.6 meter net) set for Hume's Owl *Strix butleri* near the entrance to the cave. Photographs were taken of the captured *Rh. cystops* individuals. All three individuals were released at the capture site shortly after removing them from the net.

The captured individuals were identified as *Rh. cystops* using the photographs of two of the individuals. When compared to the thumb of the person holding it, the forearm length of the captured bat is between 56 and 62 mm, which conforms to the range described by Dietz (2005b) and Aulagnier et al. (2009). In addition, using this and other photographs it is possible to confirm that the tail length is greater than the length of the forearm, which is another physical characteristic of this species that can be used to distinguish it from others of the genus (Qumsiyeh, 1985; Dietz, 2005b; Aulagnier et al., 2009). An additional external characteristic used to identify the captured individuals as *Rh. cystops* was the presence of a pronounced dermal ridge on the muzzle.

While the quality of the acoustic recordings is sufficient to confirm the presence of *Rh. cystops* in Sinai, the observations and captures of this species in 2012 provide further evidence confirming the occurrence of this species in the Sinai.

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