

Echolocation Call Characteristics of Hipposiderid Bats in Sri Lanka

Tharaka Kusuminda^{1(*)}, Amani Mannakkara¹, Chamara J. Amarasinghe²,
Mathisha K. Karunaratna³, Bruce D. Patterson⁴, Wipula B. Yapa⁵

06 Nov.

NSM21

¹Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Kamburupitiya, Sri Lanka, ²Postgraduate Institute of Archeology, University of Kelaniya, Sri Lanka, ³Sandaraja Wana Arana, Dothalu-Oya, Dolosbage, Sri Lanka, ⁴Integrative Research Center, Field Museum of Natural History, Chicago, Illinois, USA, ⁵Department of Zoology and Environment Sciences, Faculty of Science, University of Colombo, Sri Lanka

(*)Email: t.kusuminda@gmail.com

Sri Lanka is known to support 31 species of bats representing 8 families. The family Hipposideridae includes five species in Sri Lanka, currently identified as *Hipposideros speoris*, *Hipposideros ater*, *Hipposideros fulvus*, *Hipposideros galeritus*, and *Hipposideros lankadiva*. Detailed descriptions of echolocation calls of most bat species in Sri Lanka are not known. Our study generated the first detailed accounts and comparisons of time-expanded echolocation calls of four hipposiderid bats in Sri Lanka. Echolocation calls from hand held bats were recorded using Pettersson M500 microphone and Bat Sound Touch software. Recorded sound files were analysed to measure the frequency of maximum energy (FME) and call duration (CD) using BatSound Pro software. Unambiguous echolocation calls with high signal-to-noise ratio, emitted by *H. speoris* (132 calls from 16 bats), *H. ater* (88 calls from 13 bats), *H. galeritus* (37 calls from four bats) and *H. fulvus* (11 calls from one bat) were selected for further analyses. Descriptive statistics were calculated and separate boxplots were generated for each variable using Minitab 17 software. FME values (mean \pm SD) were 127.70 ± 3.2 kHz in *H. speoris*, 154.64 ± 3.0 kHz in *H. ater*, 159.02 ± 0.7 kHz in *H. fulvus*, and 97.66 ± 0.7 kHz in *H. galeritus*. The combination of FME and CD values do not overlap between species, indicating these parameters permit the accurate identification of these hipposiderid species in the field. Interestingly, except for *H. ater* (no published data to compare), call frequencies of the other three species vary to some degree across their biogeographic ranges. Therefore, detailed molecular and morphometric studies combined with acoustic information on Sri Lankan species are warranted to assess the taxonomic status of Sri Lanka bat species with respect to their relatives in mainland Asia.

Keywords: Echolocation, Pettersson M500 microphone, Bat Sound Touch software, maximum energy, acoustic, biogeographic, Asia