

Vocal repertoire of *Microhyla nilphamariensis* from Delhi and comparison with closely related *M. ornata* populations from the western coast of India and Sri Lanka

Megha Srigyan^{1,2,3,*}, Abdus Samad^{1,4}, Abhishek Singh^{1,4}, Jyotsna Karan^{1,4}, Abhishek Chandra¹, Pooja Gokhale Sinha⁵, Vineeth Kumar⁶, Sandeep Das^{7,8}, Ashish Thomas⁹ and Robin Suyesh^{1,*}

¹ Department of Environmental Sciences, Sri Venkateswara College, University of Delhi, New Delhi, Delhi, India

² Department of Biochemistry, Sri Venkateswara College, University of Delhi, New Delhi, Delhi, India

³ Department of Ecology and Evolutionary Biology, University of California, Santa Cruz, Santa Cruz, CA, United States of America

⁴ Biological Sciences, Sri Venkateswara College, University of Delhi, New Delhi, Delhi, India

⁵ Department of Botany, Sri Venkateswara College, University of Delhi, New Delhi, Delhi, India

⁶ Department of Biology, Center for Advanced Learning, Mangalore, Karnataka, India

⁷ Forest Ecology and Biodiversity Conservation Division, Kerala Forest Research Institute, Peechi, Kerala, India

⁸ Department of Zoology, St Joseph's College (Autonomous), Irinjalakuda, Thrissur, Kerala, India

⁹ Department of Environmental Studies, SGND Khalsa College, University of Delhi, Delhi, India

* These authors contributed equally to this work.

ABSTRACT

Advertisement calls in frogs have evolved to be species-specific signals of recognition and are therefore considered an essential component of integrative taxonomic approaches to identify species and delineate their distribution range. The species rich genus *Microhyla* is a particularly challenging group for species identification, discovery and conservation management due to the small size, conserved morphology and wide distribution of its members, necessitating the need for a thorough description of their vocalization. In this study, we provide quantitative description of the vocal behaviour of *Microhyla nilphamariensis*, a widely distributed south Asian species, from Delhi, India, based on call recordings of 18 individuals and assessment of 21 call properties. Based on the properties measured across 360 calls, we find that a typical advertisement call of *M. nilphamariensis* lasts for 393.5 ± 57.5 ms, has 17 pulses on average and produce pulses at rate of 39 pulses/s. The overall call dominant frequency was found to be 2.8 KHz and the call spectrum consisted of two dominant frequency peaks centered at 1.6 KHz and 3.6 KHz, ranging between 1.5–4.1 KHz. Apart from its typical advertisement call, our study also reveals the presence of three 'rare' call types, previously unreported in this species. We describe variability in call properties and discuss their relation to body size and temperature. We found that overall dominant frequency 1 (spectral property) was found to be correlated with body size, while first pulse period (temporal property) was found to be correlated with temperature. Further, we compare the vocal repertoire of *M. nilphamariensis* with that of the congener *Microhyla ornata* from the western coast

Submitted 23 September 2021

Accepted 17 January 2024

Published 29 March 2024

Corresponding author

Robin Suyesh, robins@svc.ac.in

Academic editor

Ann Hedrick

Additional Information and
Declarations can be found on
page 26

DOI 10.7717/peerj.16903

© Copyright
2024 Srigyan et al.

Distributed under
Creative Commons CC-BY 4.0

OPEN ACCESS