SUMMARY

Cryptic anuran biodiversity in Bangladesh with description of a new species of genus *Hoplobatrachus* (Anura, Dicroglossidae)

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The study on herp-life in Bangladesh is still promising and how many frog species exists in this country is an open question. In spite of paucity of up-to-date anuran check list in this disdain developing country, a few detailed studies on herpetofauna was conducted based on morphology and scattered information from field research having some misidentification of species due to intermingle behavior of amphibia, resultant poor scientific merit. Outside of, until now no comprehensive molecular study has been performed yet to determine the anuran cryptic species status in Bangladesh. This is the first attempt to review the anuran biodiversity in Bangladesh based on molecular data. In amphibians, the mitochondrial 16S rRNA gene (*16S*) is considered a reliable marker for determining taxonomic status of frog species. Hence, to survey diversity of anuran species in Bangladesh, we compared mitochondrial 16S rRNA gene sequences (approximately 1.4 kbp) from 107 Bangladesh frog specimens. The results of genetic divergence and phylogenetic analyses incorporating data from related species revealed the occurrence of at least eight cryptic species. *Hoplobatrachus tigerinus* from two districts diverged considerably, indicating the involvement of a cryptic species. Two *Fejervarya* sp. (large and medium types) and *Hylarana* cf. *taipehensis* formed lineages distinct from related species and are probably new species. *Microhyla* cf. *ornata* differed from *M. ornata* with respect to type locality area and involved two distinct species. In addition, we found that *Hylarana* sp. and *Microhyla* sp. did not fit congeners examined to date in either morphology or 16S rRNA sequence. The occurrence of *M. fissipes* was tentatively
suggested, which needs further taxonomic study to confirm either “real” *M. fissipes* exist in Bangladesh or not. Consequently, at least, 19 species (including cryptic taxa) were found from Bangladesh in this study.

Among these, a new cryptic species of the genus *Hoplobatrachus* from Cox’s Bazar District of Bangladesh is described and compared with its relevant congeneres both in morphology and mitochondrial gene sequences. The genus *Hoplobatrachus* comprises large robust frogs with numerous ridges or warts on the back and extensive webbing between toes. Individuals are semi-aquatic and live mostly near water edge of ponds, marshes, rivers, and flooded rice paddies. The following four species are currently recognized (Frost, 2011): *H. crassus* in south to east India, Sri Lanka, Nepal, and Bangladesh; *H. occipitalis* in western and central Africa; *H. rugulosus* in Myanmar, southern China, Taiwan, Thailand, and peninsular Malaysia; and *H. tigerinus* in east Afghanistan, Pakistan, India, Sri Lanka, Nepal, Bangladesh, and Myanmar. All of these species were described during the early to middle 19th century, and no new species were reported far more than a century thereafter. The new species differs from its close relative *H. tigerinus* in having a distinct broad black band from the eye, through the nostrils, to the anterior edge of the upper jaw, another black band along the lateral margin of the upper jaw, and a narrow inter-orbital distance relative to eyelid width and inter-nostril distance. Advertisement calls of the new species are similar to those of *H. tigerinus* but differ in dominant frequency and number of pulses. Based on mitochondrial DNA sequence data, this species was proved to genetically diverge from *H. tigerinus* at 3.2% for the 16S rRNA gene and 14.2% for the Cytb gene, which are higher values than suggested for species threshold in anura. The distribution range of the new species is restricted to the southeastern corner of Bangladesh and is segregated from that of *H. tigerinus*. 
Although, Bangladesh is simple topographic feature but eastern and south-eastern part of Bangladesh is relatively rich in species richness. Still many distinct species which were screened from our first study await for further description from these regions. As for eg., *M. cf. ornata* from Sylhet and Chittagong region is quite different from the nominal *M. ornata*. Detailed description of this species is now under progress by the present author. These findings revealed a rich anuran biodiversity in Bangladesh, which is unexpected considering the rather simple topographic features of the country and emphasize the necessity for further taxonomic and reproductive isolation studies of anurans in this country.