

Systematic relationships of Oriental tiny frogs of the family Microhylidae (Amphibia, Anura) as revealed by mtDNA genealogy

Abstract

We estimated the genealogical relationships and assessed systematic relationships among 45 out of 89 named species and four unnamed taxa from 11 of 14 genera of the Oriental microhylids from 1767. bp sequences of the mitochondrial DNA genes 12S rRNA and 16S rRNA using maximum parsimony, maximum likelihood, and Bayesian inference methods. Monophyly was rejected for the subfamily Microhylinae, and our data reveal four well-supported clades whose relationships to each other are unresolved: (A) *Microhyla*, *Calluella*, and *Glyphoglossus*, (B) *Chaperina*, (C) *Kaloula*, *Phrynella*, and *Metaphrynella*, and (D) *Micryletta*. They were genetically as divergent from each other as from another Oriental subfamily *Kalophryninae*, and could be recognized as distinct subfamilies. Within Clade A, our data reveal three well-supported subclades whose relationships to each other are unresolved: (AI) *Microhyla*-I, (AII) *Calluella* and *Glyphoglossus*, and (AIII) *Microhyla*-II. Of the two enigmatic Malaysian genera, whose subfamilial placement has been undetermined, *Phrynella* was found to be the sister species of *Metaphrynella* in Clade C, whereas *Gastrophrynoides* was grouped in the Papua-Australian subfamily *Asterophryinae*. Currently recognized subgenera and species groups within *Microhyla* based on morphology were not supported phylogenetically, and require thorough reassessments.