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Revision of the hillstream lizard loaches, genus *Balitoropsis* (Cypriniformes: Balitoridae)

ZACHARY S. RANDALL & PATRICK A. RIGGS

Florida Museum of Natural History, University of Florida, Dickinson Hall, Gainesville, FL 32611, USA.

Email: zrandall@flmnh.ufl.edu

Abstract

The genus *Balitoropsis* Smith 1945 consists of two species, *B. zollingeri* (Bleeker 1853) and *B. ophiolepis* (Bleeker 1853). *Homaloptera maxinae* Fowler 1937, *Balitoropsis bartschi* Smith 1945, and *Homaloptera nigra* Alfred 1969 are junior synonyms of *B. zollingeri*. *Balitoropsis zollingeri* has been reported from Thailand, Laos, Cambodia, Malay Peninsula, Sumatra, Java, and Borneo, and *B. ophiolepis* is known from Sumatra, Java, and Borneo.

Keywords: *Homaloptera zollingeri*, *Homaloptera ophiolepis*, *Balitoropsis bartschi*, *Homaloptera maxinae*, *Homaloptera nigra*, Southeast Asia

Introduction

Randall and Page (2015) distinguished *Balitoropsis* from related genera, *Homaloptera*, *Homalopteroides*, *Pseudohomaloptera*, and *Homalopterula*, based on the nuclear recombination activating gene 1 (RAG1) and morphological characters, recognizing only two species in *Balitoropsis*: *Homaloptera zollingeri* Bleeker 1853 and *H. ophiolepis* Bleeker 1853. This classification includes fewer species in *Balitoropsis* than previously recognized (Kottelat 2012, 2013), and the objective of the present study was to use morphological and molecular data to assess the status of species synonymized with *H. zollingeri*: *Homaloptera maxinae* Fowler 1937, *Balitoropsis bartschi* Smith 1945, and *Homaloptera nigra* Alfred 1969.

Materials and Methods

Morphological. Measurements follow Hubbs and Lagler (2004) or Kottelat (1984); see Randall & Page (2012) for measurements from each source. Counts follow Randall and Page (2014). The terms “origin” and “insertion” refer, respectively, to the anterior and posterior ends of fin bases for both paired and unpaired fins. Lengths were measured to the nearest 0.1 mm using digital calipers and taken on the left side when possible. All measurements are given in millimeters (mm). Head length and measurements of the body are given as proportions of standard length (SL). Measurements of the head are presented as proportions of head length (HL), and eye length as a proportion of interorbital width (IO). Institutional abbreviations follow Sabaj Pérez (2012). When coordinates were unavailable, they were estimated using maps and GEOLocate. Maps were constructed using ArcMap10.

Molecular. To test the monophyly of populations identified morphologically as *Balitoropsis zollingeri*, a molecular analysis of the mitochondrial cytochrome c oxidase subunit 1 gene (COI) was performed based on recently collected tissues (Table 1) and sequences available on Genbank (*Balitora brucei* [accession # KJ774109.1], *Gastromyzon* sp. [accession # JN646091.1], *Metahomaloptera omeiensis* [accession # JN177080.1]). Total genomic DNA was extracted from fin clips or muscle tissue preserved in 95% ethanol using a DNeasy Tissue Kit (Qiagen). COI was amplified and sequenced using the primers FISH-BCL: 5′–TCA ACY AAT CAY AAA GAT ATY GGC AC–3′ and FISH-BCH_R: 5′–ACT TCY GGG TGR CCR AAR AAT CA–3′ (Baldwin *et al.*, 2009).