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On the paraphyly of *Homaloptera* (Teleostei: Balitoridae) and description of a new genus of hillstream loaches from the Western Ghats of India

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Abstract

Homaloptera van Hasselt 1823 as treated historically exhibits substantial morphological diversity and is paraphyletic based on both morphological and molecular data. The morphological diversity and phylogenetic relationships of *Homaloptera*, *Homalopteroides* Fowler 1905, *Homalopterula* Fowler 1940, and *Balitoropsis* Smith 1945, are elucidated. *Pseudohomaloptera* Silas 1953 is removed from the synonymy of *Homaloptera*. Homalopteroidini is created for the monophyly of *Homalopteroides* and *Homalopterula*; it is the sister group to balitorini Swainson 1839. *Ghatsa* n. gen. is created for species previously assigned to *Homaloptera* from the Western Ghats of India, and a redescription of *Ghatsa montana* (Herre 1945) is provided.

Key words: *Ghatsa*, *Balitoropsis*, *Homalopterula*, *Pseudohomaloptera*, *Homalopteroides*, *Helgia*, *Chopraia*, Loaches, Southeast Asia

Introduction

The limited information on phylogenetic relationships of hillstream loaches has led to inconsistent and often transient recognition of genera. Relationships among species historically assigned to *Homaloptera* van Hasselt 1823 have been particularly problematic, as noted by Fang (1930), Hora (1932), Kottelat (1998), Tan & Ng (2005), Tan (2009), and Randall & Page (2012). Several names historically synonymized with *Homaloptera* (*Helgia* Vinciguerra 1890, *Homalopteroides* Fowler 1905, *Chopraia* Prashad & Mukerji 1929, *Homalopterula* Fowler 1940, *Balitoropsis* Smith 1945, and *Pseudohomaloptera* Silas 1953) have been recognized as genera or junior synonyms in recent years (Randall 2012; Kottelat 2012; Kottelat 2013). Some of these recent classifications are without supporting data or diagnoses, which only adds to the confusion of balitorid classification. The objectives of this study were to test the most recent classifications (Randall 2012; Kottelat 2012; Kottelat 2013) by analyzing genetic and morphological data (including type species when available) to identify clades and to diagnose well-supported clades as genera using morphological criteria.

Material and methods

Morphological. Measurements follow Hubbs & Lagler (2004) or Kottelat (1984) (see Randall & Page 2012 for measurements from each source), and counts follow Randall & Page (2014). The definition of a rostral cap follows Roberts (1982). A central furrow refers to an indentation on the ventral surface of the head at the branchiostegal membrane just anterior to the isthmus. The terms origin and insertion refer, respectively, to the anterior and posterior ends of fin bases for paired and unpaired fins. Total lateral-line scale count includes scales on the caudal fin. Counts are given as ranges where taxa are distinguished by the mode of that range (M). 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).

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Key to genera diagnosed in this study

1a. Origin of dorsal fin anterior to or above origin of pelvic fin; lateral- and medial-rostral barbels in close proximity to one another; large rostral cap; fleshy pad between lateral portions of lower lip; 8½ (M) branched dorsal-fin rays 2

1b. Origin of dorsal fin posterior to origin of pelvic fin; rostral barbels widely separated; small rostral cap; fleshy pad between lateral portions of lower lip absent; 7½ (M) branched dorsal-fin rays 4

2a. Reddish tints on fins in life; predorsal scales ≥ 20; medium-sized keeled scales (Fig. 4D); 7 (M) branched pelvic-fin rays . . . . . *Homaloptera*

2b. Absence of reddish tints on fins in life; predorsal scales < 20; large keeled scales (Fig. 4A & B); 8 (M) branched pelvic-fin rays 3

3a. Anus closer to pelvic-fin base than to anal fin . . . . . *Balitoropsis*

3b. Anus closer to anal fin than to pelvic-fin base . . . . . *Pseudohomaloptera*

4a. Scales large (Fig. 4C); predorsal scales ≤ 25; total lateral-line scales ≤ 52; caudal fin forked; adipose keel absent . . . . . *Homalopteroides*

4b. Scales small (Fig. 4E & F); predorsal scales > 26; total lateral-line scales > 53; caudal fin truncated or slightly emarginated; adipose keel present 5

5a. Thick barbels and lips; fleshy lobes between lateral portions of lower lip; endemic to Sumatra . . . . . *Homalopterula*

5b. Thin barbels and lips; no fleshy lobes between lateral portions of lower lip; endemic to Western Ghats of India . . . . . *Ghatsa*

Comparative material. ***Balitora brucei*:** India: RMNH 11924 (neotype). ***Balitora* sp:** Thailand: NIFI 02927 (3). ***Bhavania australis*:** India: MNHN 50-79 (1); CAS 62052 (2). ***Cryptotora thamicola*:** Thailand: NIFI 3046 (1). ***Hemimyzon yaotanensis*:** China: KU 21445 (1). ***Neohomaloptera johorensis*:** Peninsular Malaysia: CAS-SU 39840 (holotype), 39841 (paratype). ***Sewellia elongate*:** Laos: UF 185476 (3), 185488 (3). ***Travancoria jonesi*:** India: MNHN 1950-0080 (1).

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