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Phylogenetic Relationships of Species of *Hypselobarbus* (Cypriniformes: Cyprinidae): An Enigmatic Clade Endemic to Aquatic Systems of India

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Abstract

Very little is known about the diversity and systematics of the genus cypriniform genus *Hypselobarbus*. Currently, the genus includes at least eleven species, all endemic to freshwater systems of Peninsular India. While these species are commonly known in India and are frequently used as a food source, little is known about the morphological diversity within and between species and nothing is known regarding intraspecific genetic diversity or species relationships. Herein, we examine the genetic diversity in the genus for 11 mitochondrial genes for eleven populations representing nine of the known 11 species. *Hypselobarbus* is resolved as monophyletic, with the inclusion of *P. carnaticus*, and species relationships are very strongly supported. Because of the unambiguous relationships strongly supported *B. carnaticus* is allocated to *Hypselobarbus*. This research and ongoing morphological and molecular work with the genus supports the existence of additional new species in peninsular India in need of further molecular and morphological study. Genetic diversity in the genus is high; for the two species wherein more than one sample, and the two of each are suspected to represent undescribed taxa, these populations exhibited greater genetic divergence than that observed between any two of the other currently recognized species, corroborating our hypothesis based on morphological evidence. Clearly the genus warrants more thorough geographic sampling and examination of morphological and molecular data/analyses to reveal the natural lineages existing in this endemic and enigmatic genus.

Key words: mtDNA sequences, species, genetic divergence, Western Ghats

Introduction

The genus *Hypselobarbus* Bleeker, 1860 (Figs. 1–3) is endemic to rivers of peninsular India, with most species occurring in rivers, streams, and reservoirs of the Western Ghats or lower reaches of rivers in the range. Currently, the genus includes 11 species, with *H. curmuca* (Hamilton, 1807) (Fig. 2), *H. dobsoni* (Day, 1876), *H. dubius* (Day, 1867) (Fig. 1), *H. micropogon* (Valenciennes, 1842) (Fig. 1), *H. jerdoni* (Day, 1870) (Fig. 2), *H. kolus* (Sykes, 1839) (Fig. 3), *H. kurali* Menon & Rema Devi, 1995 (Fig. 2), *H. lithopidos* (Day, 1874), *H. periyarensis* (Raj, 1941) (Fig. 3), *H. pulchellus* (Day, 1870), and *H. thomassi* (Day, 1874). *Barbodes carnaticus* (Fig. 1) and *Puntius sarana* (Fig. 3), while currently placed in other genera, based on morphological similarities and hypothesized unpublished morphological synapomorphies, have been suspected to be related to *Hypselobarbus* by the authors. The genus is currently under morphological revision by the authors and include at least two undescribed species (Figs. 1, 3).

Where known, these species are typically potandromous, migrating from lower reaches of rivers into more upland, small tributaries to spawn during the monsoon season or shortly thereafter, and have an omnivorous diet. Given the size of these species, ranging from about 25–100 cm total length, they often serve as an important protein source and are known to be used in aquacultural practices in India. Of the species, *H. jerdoni* and *H. micropogon*, *H. dubius*, *H. periyarensis*, *H. kurali*, *H. kolus*, and *H. curmuca* are endangered in India. *Hypselobarbus lithopidos* is thought extinct, and *H. pulchellus* and *H. thomassi* are data deficient (Molur et al. 2011)