

Molecular systematics of the armored neotropical catfish subfamily Neoplecostominae (Siluriformes: Loricariidae)

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Abstract

Morphological and molecular studies in the family Loricariidae have revealed that the relationships among its members are not yet well resolved, and the present study was conducted with the main objective of improving our knowledge about this highly diversified group of catfishes. Maximum parsimony and Bayesian analysis were conducted on a matrix of 53 terminal taxa and 4676 characters with partial sequences of the genes COI, CytB, 16S rRNA, 12S rRNA and F-reticulon 4. As outgroups, samples of the species *Hemipsilichthys gobio* and *H. papillatus* (subfamily Delturinae), *Rineloricaria jaraguensis* (subfamily Loricariinae), *Hypostomus nigromaculatus* (subfamily Hypostominae), *Hypoptopoma inexpectatum* (subfamily Hypoptopomatinae), and *Corumbataia cuestae* (subfamily Otothyridinae) were used. The results showed that the subfamily Neoplecostominae is monophyletic, including *Pseudotocinclus*, and three clades were recognized. The first one is composed of *Pareiorhina rudolphi*, *P. cf. rudolphi* and *Pseudotocinclus*. The second is composed of *Isbrueckerichthys*, *Pareiorhaphis*, *Kronichthys* and *Neoplecostomus ribeirensis*. The third is composed of the remaining species of the genera *Neoplecostomus*, except *N. ribeirensis*, *Pareiorhina carrancas*, *P. cf. carrancas*, *Pareiorhina* sp. 1 (possible new species) and an undescribed taxon referred to in this paper as new genus and species 2. In our analyses, *Pareiorhina* and *Neoplecostomus* are paraphyletic taxa.

Key words: freshwater, Loricariidae, mitochondrial DNA, nuclear gene, phylogenetic analysis

Introduction

Loricariidae, an armored catfish family with 973 species currently recognized (Eschmeyer 2011), is the largest Neotropical endemic freshwater fish family. Loricariid revisionary studies began with Eigenmann and Eigenmann (1890), who divided the family into three subfamilies (Loricariinae, Hypoptopominae, and Plecostominae). Thereafter, Regan (1904), in a broad analysis of Loricariidae, divided the family in five subfamilies (Plecostominae, Hypoptopomatinae, Loricariinae, Arginae, and Neoplecostominae). In that study, Regan named the subfamily Neoplecostominae to include *Neoplecostomus granosus* and suggested that this group was closely related to *Astroblepus* (of the subfamily Arginae), representing an intermediate form between the armored and the naked catfish species. Gosline (1947) was the first to propose an expanded Neoplecostominae including *Corymbophanes*, *Delturus*, *Hemipsilichthys*, *Kronichthys*, *Neoplecostomus*, *Pareiorhaphis*, *Pareiorhina*, *Pogonopoma*, *Pogonopomoides*, *Canthopomus* (=*Pseudorhinelepis*), *Rhinelepis*, and *Upsilodus*. Isbrücker (1980) also separated Loricariidae into five subfamilies (Loricariinae, Hypoptopomatinae, Neoplecostominae, Hypostominae and Ancistrinae) and again considered *Neoplecostomus* as the single genus in Neoplecostominae.

Howes (1983) was the first author to perform a cladistic analysis of osteological and myological data of the Loricariidae and found that the family had six monophyletic groups (Loricariinae, Hypoptopomatinae, Hypostominae, Neoplecostominae, Lithogeninae, and Chaetostominae). Schaefer (1987), after a cladistic analysis, also recognized six subfamilies in Loricariidae (Lithogeneinae, Neoplecostominae, Hypoptopomatinae, Loricariinae,