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Phylogenetic assessment of ultrastructural and histological characters of teeth in the Anostomoidea, Hemiodontidae and Parodontidae (Teleostei: Ostariophysi: Characiformes)

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Abstract

The ultrastructure and histology of teeth of members of the order Characiformes, in conjunction with the examination of cleared and stained sections and teeth, revealed characters pertinent to understanding the relationships among the Anostomoidea (Curimatidae, Prochilodontidae, Anostomidae, and Chilodontidae), Hemiodontidae, and Parodontidae. The superimposition of these characters onto cladograms of Characiform phylogeny based on morphological and molecular characters confirmed the monophyly of the Anostomoidea, but resulted in conflicting interpretations concerning the relationships of the Hemiodontidae and Parodontidae.

Key words: Neotropical fishes, SEM, apatite crystals

Resumo

O exame da ultra-estrutura e histologia dentária de representantes da ordem Characiformes, associadas ao exame de peças bucais e dentes de exemplares digeridos e corados, revelou caracteres informativos quanto às relações de Anostomoidea (Curimatidae, Prochilodontidae, Anostomidae e Chilodontidae), Hemiodontidae e Parodontoidae. A sobreposição destes caracteres em hipóteses filogenéticas conhecidas de Characiformes, obtidas através de análises de caracteres morfológicos e moleculares, confirmou a monofilia de Anostomoidea, porém, mostrou interpretações conflitantes nas relações de Hemiodontidae e Parodontidae.

Palavras-chave: peixes neotropicais, MEV, cristais de apatita

Introduction

The order Characiformes is a monophyletic group with approximately 3,500 species (Lundberg, 1993; Vari & Malabarba, 1997), and comprises 18 families according to the classification proposed by Buckup (1998: 139).

The latest studies of interrelationships involving these families (Buckup, 1998: Fig. 6; Calcagnotto *et al*., 2005: Fig. 1) corroborate the close relationship among the families Curimatidae, Prochilodontidae, Anostomidae and Chilodontidae, which form the superfamily Anostomoidea (Buckup, 1998). Conflicting hypotheses have been proposed for the Hemiodontidae and Parodontidae, the two other families examined in these same papers (see Vari, 1983, for a discussion on the various ways they have been grouped).

The objective of the present paper is to test the current alternative hypotheses about the relationships of the above-mentioned families when new characters from the ultrastructure and histology of teeth are included.

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