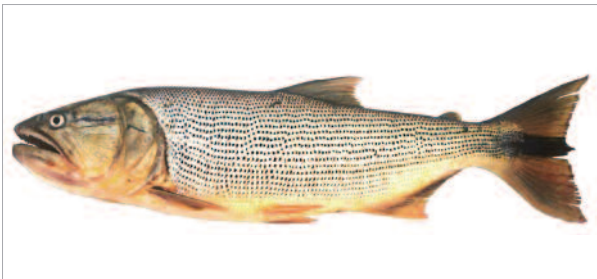


PHYLOGENETIC RELATIONSHIPS IN THE CHARACIDAE (OSTARIOPHYSI: CHARACIFORMES)

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Examples of small (above, *Moenkhausia sanctaefilomenae*), medium (*Brycon hilari*) and large (below, *Salminus brasiliensis*) size Characidae species (original photographs)

The neotropical freshwater fish fauna is the richest and most diversified in the World, consisting of 71 families, several hundred genera, and approximately 6,000 species. The family Characidae, with 12 subfamilies, 167 genera and about 980 recognized species, contain approximately 21% of the fishes species now recognized in the neotropical freshwater ichthyofauna. Characids are commonly known in Brazil as dourado fishes, tetras, dogtooth characins, elongate hatchetfishes, characins, pacus, tambaquis, redbellied pacus and piranhas among other names and range in size from small (up to 15 cm length), medium sized to large species (20 to 100 cm length). The confused and unresolved phylogenetic relationships among the characid ratio presents a major impediment to the advancement in the understanding and the conservation of the neotropical freshwater fish fauna. Our goal is to undertake an analysis of the phylogenetic interrelationships of the Characidae by the use of cladistic methodologies, applied to anatomical (mostly skeletal) and genetic/molecular characters applied to an group of at least 145 generic terminals.

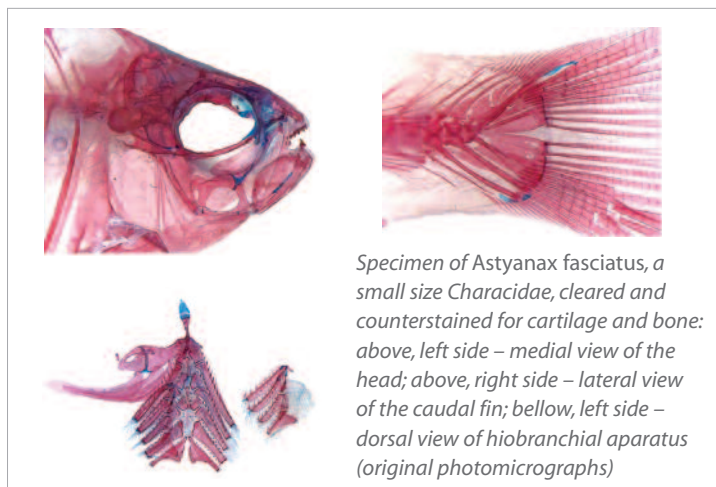
These analyses, when completed, would result in: 1) a phylogenetic hypothesis based on a broader ratio sample than was previously attempted, with a particular focus on the about 90 *incertae sedis* genera; 2) a test of the hypothesized monophylus of all of the 12 recognized characid subfamilies; 3) the examination of the phylogenetic position and limits of the Acestrorhynchidae, Cynodontidae, and in particular the Gasteropelecidae, a group that has been typically considered to be *incertae sedis* in the Characiformes; 4) the formulation of a more robust hypothesis about the limits of the Characidae based on the large number of terminal ratio in the analysis; and 5) provide a framework for the study of phylogenetic relationships within the genera presently included as *incertae sedis* in the Characidae.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

At the present date, we have obtained, for the anatomical part of the analysis, representative specimens of 102, in addition to representative specimens of five additional terminals not originally included in our in-group. All the approximately 200 representative specimens had their taxonomic identifications carefully checked and were submitted to a method for clearing and counterstaining for cartilage and bone, utilizing alcian blue for cartilage and alizarin red S for bone, together with proteolytic enzyme digestion for tissue clarification. The specimens were dissected and the resulting homologous skeletal complexes and/or structures were photomicrographed.

For the genetic/molecular part of the analysis, we have obtained partial sequences of the 16S RNA gene of at least 50 generic terminals of our in-group.

As partial results, we have produced a phylogenetic analysis of the genera *Brycon* and *Hemichilus*, a complete species-level phylogeny of the gasteropelecid freshwater hatchet fishes, plus some important preliminary hypothesis about the true composition and phylogenetic position of the characid subfamilies Agoniatinae and Clupeocharacinae. Also, as byproducts and complements of the project main investigative objectives, we are preparing a myological atlas of *Brycon orbignyanus*, a generalized characid, plus species-level phylogenetic analyses of the characid genera *Agoniatas*, *Bario*, *Deuterodon*, *Ctenobrycon*, *Microschemobrycon*, *Moenkhausia* and *Tetragonopterus*.



MAIN PUBLICATIONS

Benine RC, Castro RMC, Santos ACA. 2007. A new *Moenkhausia* Eigenmann, 1903 (Ostariophysi: Characiformes), from Chapada Diamantina, Rio Paraguaçu basin, northeastern Brazil, Bahia, Brazil. *Neotropical Ichthyology*. **5**: 259-262.

Vari RP, Castro RMC. 2007. New Species of *Astyanax* (Ostariophysi: Characiformes: Characidae) from the Upper Rio Paraná System, Brazil. *Copeia*. **1**: 150-162.

Cavallaro MC, Castro RMC. New *Microschemobrycon* (Characiformes: Characidae) from the middle Rio Madeira drainage, northwestern Brazil. *Neotropical Ichthyology*. (submitted)

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