



Morphology and phylogenetic relationships of a remarkable new genus and two new species of Neotropical freshwater stingrays from the Amazon basin (Chondrichthyes: Potamotrygonidae)

MARCELO R. DE CARVALHO¹ & NATHAN R. LOVEJOY²

¹Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, Trav. 14., no. 101, São Paulo, SP, CEP 05508-900, Brazil E-mail: mrcarvalho@ib.usp.br (corresponding author)

²Department of Biological Sciences, University of Toronto Scarborough, 1265 Military Trail, Toronto, ON, M1C 1A4, Canada E-mail: lovejoy@utsc.utoronto.ca

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Abstract

The morphology and phylogenetic relationships of a new genus and two new species of Neotropical freshwater stingrays, family Potamotrygonidae, are investigated and described in detail. The new genus, *Heliotrygon*, n. gen., and its two new species, *Heliotrygon gomesi*, n. sp. (type-species) and *Heliotrygon rosai*, n. sp., are compared to all genera and species of potamotrygonids, based on revisions in progress. Some of the derived features of *Heliotrygon* include its unique disc proportions (disc highly circular, convex anteriorly at snout region, its width and length very similar), extreme subdivision of suborbital canal (forming a complex honeycomb-like pattern anterolaterally on disc), stout and triangular pelvic girdle, extremely reduced caudal sting, basibranchial copula with very slender and acute anterior extension, and precerebral and frontoparietal fontanellae of about equal width, tapering very little posteriorly. Both new species can be distinguished by their unique color patterns: *Heliotrygon gomesi* is uniform gray to light tan or brownish dorsally, without distinct patterns, whereas *Heliotrygon rosai* is characterized by numerous white to creamy-white vermiculate markings over a light brown, tan or gray background color. Additional proportional characters that may further distinguish both species are also discussed. Morphological descriptions are provided for dermal denticles, ventral lateral-line canals, skeleton, and cranial, hyoid and mandibular muscles of *Heliotrygon*, which clearly corroborate it as the sister group of *Paratrygon*. Both genera share numerous derived features of the ventral lateral-line canals, neurocranium, scapulocoracoid, pectoral basals, clasper morphology, and specific patterns of the adductor mandibulae and spiracularis medialis muscles. *Potamotrygon* and *Plesiotrygon* are demonstrated to share derived characters of their ventral lateral-line canals, in addition to the presence of angular cartilages. Our morphological phylogeny is further corroborated by a molecular phylogenetic analysis of cytochrome *b* based on four sequences (637 base pairs in length), representing two distinct haplotypes for *Heliotrygon gomesi*. Parsimony analysis produced a single most parsimonious tree revealing *Heliotrygon* and *Paratrygon* as sister taxa (bootstrap proportion of 70%), which together are the sister group to a clade including *Plesiotrygon* and species of *Potamotrygon*. These unusual stingrays highlight that potamotrygonid diversity, both in terms of species composition and undetected morphological and molecular patterns, is still poorly known.

Key words: *Heliotrygon rosai*, *Heliotrygon gomesi*, taxonomy, systematics, Myliobatiformes, South America