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Abstract

Environmental Life History of Neotropical Fish through the Chemistry of Calcified Structures †

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Abstract: The neotropical inland waters hold about 30% of the world's fish species. South America, in particular, brings together two of the largest basins in the world: the Amazon and Plata Basin. These are long migratory corridors of thousands of kilometers for numerous species of commercial importance. Poor management practices have brought many fisheries to the brink of collapse, including species for which little is known about their biology or environmental history. In the last decade, the microchemistry of calcified structures has been a valuable tool to reveal different aspects of the biology of fishes. Calcified structures such as otoliths keep an environmental record as fish grow, thus providing information on nursery areas, population structure, and migrations. This tool is especially powerful when the environmental variability (e.g., water) is known. The use of bioindicators such as bivalves, which keep track of environmental variation over time, is particularly promising for improving otolith-chemistry-based interpretations. The usefulness of different analytical techniques of hard structures (chemical analysis in one and two dimensions) in relation to different geographical scales of evaluation is discussed. Advances in the environmental mapping of radiogenic isotopes (87Sr/86Sr) and trace elements in five countries traversed by the Plata Basin (Argentina, Brazil, Paraguay, Uruguay, and Bolivia) and their extension to the southern Atlantic and Pacific basins (Patagonia, Argentina, and Chile) are presented. The results of these techniques have made it possible to reveal the natal origin and reveal the environmental life history of various neotropical fish species, including cross-border migrations and complex population structures.

Keywords: otolith chemistry; microchemistry; life history

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