HISTORICAL BIOGEOGRAPHY OF CORYDORADINAE (SILURIFORMES: CALLICHTHYIDAE) FROM PHYLOGENOMIC INFERENCE

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ABSTRACT

Neotropical freshwater fishes represent the most species-rich group of vertebrates on the planet, and this diversity is closely related to the geomorphological history of the heterogeneous basins they inhabit. The subfamily Corydoradinae, a diverse clade widely distributed across nearly all drainages east of the Andes in South America, exhibits a fascinating distribution pattern that reflects its complex evolutionary history, making it an ideal for a biogeographic investigation. The evolution of paleo-scenarios has had direct influence on dispersion and speciation rates of many groups of freshwater fishes, and the mechanisms that shaped this distribution are poorly understood. Using phylogenomic (ultraconserved elements of the genome; UCEs), parametric biogeographic methods, and a comprehensive taxonomic sampling including all the seven recognized genera, we investigate here the biogeographical and chronological patterns of diversification in the subfamily Corydoradinae. The time calibration along with ancestral area estimation indicated that the ancestor of Corydoradinae originated during the Lower Cretaceous *ca.* 135.5 Ma, with the *Corydoras* clade as the earliest lineage-split, and emergence of most of the genus during the Paleogene. Our results also indicate that the time frame during the Oligocene and Middle Miocene was the key for the diversification processes of Corydoradinae, during which most of the cladogenetic events occurred. These events took place in a landscape characterized by the Pebas mega-wetland (>23–11 Ma), revealing how the processes of formation of river basins affected the distribution of Corydoradinae species, and reflecting the effects of vicariance between rivers. Nevertheless, we present a biogeographical context for the diversification of Corydoradinae and suggest how landscape reconfigurations may help explain the broad distribution pattern and high number of species within this subfamily, as well as how these processes have shaped the evolutionary history of Corydoradinae through time and space.

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