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Editorial

Molecular Evolution and Conservation of Tropical Biodiversity: A Special Issue

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Molecular evolutionary studies provide fundamental evidence to be applied in biodiversity conservation and management [1,2]. They are particularly relevant for understanding population dynamics and species diversity of threatened Tropical ecosystems [3]. Indeed, molecular evolutionary research is an essential scientific strategy that can be integrated into other conservation biology approaches to accelerate the understanding of threatened biodiversity worldwide, including basic knowledge for identifying taxonomic units still unknown and not considered in conservation planning, particularly in Neotropical biomes [4,5].

This Special Issue includes molecular evolution studies on Tropical fauna from the Old and New World such as South American foxes [6], giant anteater [7], fishes [8] and bumblebees [9], and West African fishes [10]. All studies were mainly performed in research institutions of developing world countries by local postgraduate students working on species taxa of their native countries. The published papers explored intra and interspecific questions to understand short- and long-term patterns of lineage diversification of mammals, fishes, and bees, which can be applied in conservation planning that considers evolutionary processes affecting populations and species from many Tropical ecosystems.

For example, a multispecies phylogenetic analysis was used to reconstruct the evolutionary history of diversification of South American foxes of the genus *Lycalopex* [6]. Even though most of the six fox species appear to be monophyletic with a particular distribution in different Neotropical ecosystems, a sign of likely introgression was identified in two individuals of the hoary fox *L. vetulus*, an endemic and endangered species of the Brazilian Cerrado domain. In summary, the genus presents six species that recently diverged in the middle Pleistocene in a fast radiation event, which may explain their close affinities and interspecific hybridization. Thus, conservation management of South American foxes should take into account a fine line of interspecific differentiation to avoid further anthropogenic effects.

Another study focused on a populational survey of the endemic and charismatic giant anteater (*Myrmecophaga tridactyla*) [7]. In this paper, phylogeographic and demographic analyses based on molecular data were integrated into an ecological niche modeling approach to identify priority areas for the conservation of the species in the Brazilian territory. The integrated analysis indicated the Cerrado as a key domain with a great heterogeneity of landscapes necessary for the conservation of the giant anteater.

The study of the Neotropical freshwater fish *Hypomasticus copelandii* included populations from four South American Atlantic coastal rivers [8]. It revealed at least two deeply divergent populations separated by almost 3 million years (since the end of the Pliocene). Separate conservation management was suggested for these two major populations occurring in different drainages, including some rivers highly affected by mining activities.

The only study on invertebrates evaluated the diversification and historical biogeography of bumblebees worldwide, with a focus on Neotropical species [9]. The phylogenetic study indicates that the genus *Bombus* diversified initially in the Holarctic region, and

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expanded into Tropical areas of Asia and the Americas in the last 30 million years. The South American species are represented by six different *Bombus* lineages distributed in two subgenera, which occupied the subcontinent for the last 15 million years. Furthermore, the recent separation of two ecologically distinctive bumblebees of the Atlantic Forest, *B. brasiliensis* and *B. bahiensis*, reveals the relative importance of bumblebees for the pollination dynamics of different forest environments [11].

The only study of Old-World biodiversity was performed with West African cyprinid fishes from an under-investigated river basin [10]. This is the first molecular assessment of fishes from the Rokel River basin of Sierra Leone that aimed to evaluate the genetic diversification of cyprinid fish populations from a taxonomic perspective. This molecular research indicates that at least six different species remain unnamed in this river basin, which should be priority research in this highly threatened freshwater ecosystem, and before any conservation management is done with local fishes.

This Special Issue addresses some interesting conservation issues of Tropical diversity. What is the origin of taxa, and how and when have they distributed at different ecoregions? How many populations can represent independent taxa? Which populations should be considered a priority for conservation? Altogether, the studies represent a fine collection of molecular evolution research that can be applied to Conservation strategies in the Tropics.

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