FIFTY SHADES OF CRAYFISH: INTEGRATIVE TAXONOMY REVEALS CRYPTIC DIVERSITY IN A BURROWING SPECIES OF THE GENUS *PARASTACUS* (DECAPODA: ASTACIDEA: PARASTACIDAE)

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Integrative taxonomy proposes a pluralistic approach to species description with the combined use of traditional morphology with other tools such as molecular markers and ecological data. This approach has been useful in the study of biodiversity patterns and for the recognition of cryptic species and multiple lineages in several decapod group, including freshwater crayfish. The genus *Parastacus* contains 14 species and constitutes a unique group with respect to the biodiversity of South American freshwater crustaceans. Most species of burrowing crayfish are morphologically similar and the diagnostic characteristics traditionally used to delimit species are few and subtle. The aim of this work is to investigate the presence of cryptic diversity in a burrowing species, *Parastacus defossus*. Specimens were obtained from field expeditions and from scientific collections from Universidade Federal do Rio Grande do Sul (Brazil), Universidad de la Republica (Uruguay) and Smithsonian Institute (USA). In the field, burrows were excavated manually in order to describe their morphology. Specimens were examined and illustrated with aid of a stereomicroscope fitted with a *camara lucida*. For the molecular analyzes, two mitochondrial markers (COI and 16S) were used. The total DNA was extracted from museum and fresh samples, amplified, sequenced, and aligned. Phylogenetic analyzes (Maximum Likelihood and Bayesian Inference), genetic distances, and methods for species delimitation (Barcoding Gap and ABGD) were conducted. In addition, the conservation status assessment was performed based on the sub-criterion B1 of the IUCN Red List. DNA sequences were obtained from 116 individuals. After concatenation, we obtained ~1.027 aligned base pairs. The integrative framework showed that *P. defossus* is polyphyletic and constituted by nine groups with high support. Results also showed that *P. defossus* doesn't occur in Brazil, but only in Uruguay. In Brazil, the eight remaining lineages are here described as new species. Although all lineages of *P. defossus* have burrowing habits, we found differences in burrow structure. Due to their very limited extent of occurrence, the lineages were classified in threatened categories. Our results bring important information that can be used in future conservation strategies.

Keywords: freshwater crayfish, parastacids, limnetic ecosystems, molecular systematics, mtDNA.

Funding: CNPq, CAPES.