

Is the matamata only one species? Morphological variation and color polymorphism in the South American turtle *Chelus fimbriatus* (Schneider, 1783) (Pleurodira: Chelidae)

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Background. Studies on the geographic variation of the matamata, *Chelus fimbriatus*, have previously demonstrated differences between carapace shape, plastral pigmentation and the ventral coloration of the neck between populations from the Amazon and Orinoco river basins, but did not discuss whether these populations should be considered different species. The aim of this study is to evaluate the taxonomic status of *C. fimbriatus* and describe to its intraspecific and ontogenetic variability and sexual dimorphism based on morphology and osteology.

Methods. We analyzed 277 morphological characters and 138 osteological characters of the skull and shell of 82 matamatas from the four known populations (Amazon, Orinoco, Guyana and Tocantins) and performed the Population Aggregation Analysis (PAA) species delimitation test in searching for character states that are exclusive to and fixed between populations. The *t Student* test was also performed in order to observe sexual dimorphism.

Results. Considerable overlap in character states between different populations prevents the recognition of these populations as independent species. *Chelus fimbriatus* has a high level of polymorphism, particularly among morphological and color pattern characters. Unlike what have been stated on previous studies, we recognise four different carapace shapes, of which the anteriorly larger oval shape is the most common one. Two coloration patterns can be found both for the plastron and the carapace that are strongly correlated with one another, but no such correlation was observed with geographic distribution. We furthermore recognise three states of neck coloration pattern. Ontogenetic variability was observed in the coloration of the carapace, plastron, and the underside of the neck, in that juveniles have a stronger pigmentation than adults. Sexual dimorphism was established for six morphometric variables of the shell and 20 variables of the skull. As expected, females are significant larger than males for all these variables, such as carapace, plastron and skull length. New osteological

characters, such as the presence of a serrated medial process in the palatine and a pair of anterolateral tubercles in the basioccipital were observed.

Discussion. This is the first study to confirm the presence of sexual dimorphism in *C. fimbriatus* using morphological and morphometric variables and to document infraspecific variation in detail. The possible presence of two subspecies has been discussed since the 19th century based on alleged geographic variation in coloration patterns. However, this hypothesis could not be confirmed in the context of this study and the matamata should therefore still be considered a single species with a wide distribution range.

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