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Taxonomy of the southernmost populations of *Philander* (Didelphimorphia, Didelphidae), with implications for the systematics of the genus

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Abstract

The taxonomic identities of populations of *Philander* Brisson of Argentina are still unclear. *Philander frenatus* (Olfers) is the only species assigned to the country, a conclusion based on incomplete analysis of available material and without a clear taxonomic criterion. The aim of this study was to determine the taxonomic identity of the populations of *Philander* of Argentina. To accomplish this, DNA from eight specimens from Argentina and one specimen from Paraguay was sequenced and compared with sequences published by other authors, using a phylogenetic approach. To complement the molecular information, seven skull measurements were taken from specimens of *P. frenatus* and *P. opossum canus* (Osgood) from Bolivia and Brazil, and compared with the specimens from Argentina and Paraguay using bi- and multivariate analyses. Molecular and morphological results showed that there are two species of *Philander* in Argentina, *P. frenatus* in Misiones province and *P. opossum canus* in Chaco and Formosa provinces. Both species can be morphologically distinguished only by the width of the postorbital constriction. Finally, the phylogenetic analyses and the pairwise genetic distances between the included sequences showed that the taxonomic status of *Philander mcilhennyi*, *P. opossum* and its subspecies should be revisited.

Keywords: *Philander frenatus*, *Philander opossum canus*, cytochrome *b*, morphometric analyses, genetic distances.

Introduction

The genus *Philander* Brisson comprises a group of medium-sized didelphid marsupials commonly known as four-eyed pouched opossums. *Philander* species inhabit tropical and subtropical forests from Tamaulipas and Oaxaca in Mexico to Misiones, Formosa and Chaco provinces in Argentina (Hershkovitz 1997; Patton and da Silva 2007). The genus was traditionally considered as monotypic with the sole species, *P. opossum* (Linnaeus), and seven subspecies (*P. opossum andersoni* (Osgood), *P. o. azaricus* (Krumbiegel), *P. o. canus* (Osgood), *P. o. grisescens* (Krumbiegel), *P. o. melanurus* (Thomas), *P. o. opossum* (Linnaeus), and *P. o. quica* (Temminck); Cabrera, 1958), until *P. mcilhennyi* Gardner and Patton was described based on morphological characters from the skull, teeth, and pelage (Gardner and Patton, 1972). The subsequent taxonomic arrangement proposed by Emmons and Feer (1990), Gardner (1993) and Hershkovitz (1997) elevated *P. opossum andersoni* to species status and placed *P. mcilhennyi* as its junior synonym.

Subsequent phylogenetic and phylogeographic studies derived in depth modifications of the systematics and taxonomy of the group (e.g. Patton and da Silva 1997; Patton *et al.* 2000; Patton and Costa 2003). These studies conferred specific status to *P. frenatus* (Olfers) (synonym of *P. o. quica*), and considered *P. andersoni* and *P. mcilhennyi* as valid species. However, these authors suggested that some of the subspecies of *P. opossum* might eventually be elevated to species status. New *Philander* species have been recently described based on the morphology of specimens believed to be *P. opossum* (*P. deltae* Lew, Pérez-Hernández and Ventura, and *P. mondolfii* Lew, Pérez-Hernández and Ventura, Lew *et al.* 2006; *P. olrogi* Flores, Díaz and Bárquez, Flores *et al.* 2008), and the current definition of the genus recognizes seven species, with four subspecies for *P. opossum* (Patton and da Silva 2007).

The taxonomic status of the genus in the southern extreme of its continental distribution (i.e. Atlantic,

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