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A new Miocene penguin from Patagonia and its phylogenetic relationships

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We describe a new medium-sized penguin, *Madrynornis mirandus* gen. et sp. nov., from the early late Miocene Puerto Madryn Formation, Chubut Province, Argentina. Although it is evident that extant and fossil penguins form a remarkably homogeneous family of birds, Spheniscidae, their within-group phylogenetic relationships are less obvious. In order to identify the phylogenetic position of the new taxon, we conducted a phylogenetic analysis using 44 osteological characters sampled from 14 representative species of all living genera and five fossil species of Spheniscidae. The family is clearly monophyletic and *Madrynornis mirandus* is closely related to living taxa. Our phylogenetic interpretation is congruent with biostratigraphic data, with *Paraptenodytes* from the early Miocene (about 20 Ma) located at the base of the Spheniscidae. Classically, two basic tarsometatarsal types were recognized (one for pre-Miocene and the other for the post-Miocene penguins) based on the pattern of the proximal foramina and the hypotarsus. *Madrynornis mirandus* exhibits an arrangement of the proximal foramina and a degree of metatarsals fusion similar to that in the living forms, although its elongation index (total length/proximal width) is reminiscent of the extinct *Paraptenodytes* (a penguin historically recognized as a pre-Miocene form, coming from the early Miocene of Argentina). *Madrynornis* reveals that the two basic tarsometatarsal types co-existed among Miocene penguins.

Key words: Aves, Spheniscidae, penguins, Miocene, Puerto Madryn Formation, Chubut Province, Argentina.

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