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A revision of *Apteromantis* (Mantodea: Mantidae, Amelinae): A comprehensive approach to manage old taxonomic and conservation problems

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Abstract

The genus *Apteromantis* Werner, 1931 comprises two species of wingless mantids, the Iberian *A. aptera* (Fuente, 1894) and the North African *A. bolivari* (Werner, 1929). Although *A. aptera* and *A. bolivari* have been traditionally considered as separate and valid species, their external appearance is quite similar and no comprehensive taxonomic study has analyzed their morphological and genetic characteristics. This taxonomic uncertainty has important implications for conservation because *A. aptera* is considered an Iberian endemic and the only praying mantis protected by international laws. In this study, we apply a comprehensive approach, including quantitative morphological and molecular analyses, to shed new light on the taxonomic and conservation status of the genus *Apteromantis* and the putative species. We have found that the Iberian and North African specimens analyzed herein significantly differ in female head shape, male genitalia morphology and several other traits related to body size. Molecular data suggest the presence of two main lineages, with sequence divergence rates of approximately 4 %, which are within the range reported for other well defined insect species. Overall, this study supports that *A. aptera* and *A. bolivari* are valid species despite their ecological and morphological similarity and highlights the importance of comprehensive approaches to resolve old taxonomic and conservation problems.

Key words: Mantodea, *Apteromantis*, conservation, evolutionary significant units (ESUs), DNA barcoding, phylogeography

Introduction

The genus *Apteromantis* Werner, 1931 is composed of two species of wingless mantids: *Apteromantis aptera* (Fuente, 1894) distributed in central and south Spain and Portugal, and *Apteromantis bolivari* (Werner, 1929) distributed mostly in the Mediterranean part of Morocco and Algeria. Although the external morphology of these two species is extremely similar (Fig. 1), they have been traditionally considered as separate and valid species (Ehrmann 2002; Battiston *et al.* 2010; Otte *et al.* 2011). The geographical distribution and presumed isolation of these species is the main character used to separate the Iberian *A. aptera* from the North African *A. bolivari*. However, after the original description of these species, no detailed taxonomic study has analyzed the morphological and genetic traits justifying their distinctiveness. This taxonomic uncertainty has important applied implications because *A. aptera* is an Iberian endemic and it is the only mantis protected in Spain (OM. 13682, BOE n. 136, 1988) and by the European community (Annexes II and IV of Habitat Directive 92/43/CE). *Apteromantis aptera* has been also included in the Appendix II of the Bern Convention and in the IUCN red-list of threatened species with the status "Least Concern" (Battiston, in press). The protection status of *A. aptera* is mainly based on its small distribution range and the scarce abundance of its populations (Peinado & Mateos 1998; Pascual 2005; Pascual *et al.* 2008; Pascual 2012). The uncertainty of the status of this may modify the protection and conservation status of *A. aptera*.

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