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Phylogeny of the genus *Rhynchocalamus* (Reptilia; Colubridae) with a first record from the Sultanate of Oman

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Abstract

The genus *Rhynchocalamus* comprises three species distributed in Southwest Asia. Little is known about them, most probably because of their secretive fossorial lifestyle. The poor knowledge of the genus is even underscored by the fact that its phylogenetic affinities remained unclear until very recently. The least known of the species, *Rhynchocalamus arabicus*, is known only from the holotype collected in Aden, Yemen, and it has not been observed since its description in 1933. Here we provide a second record for this species, which represents the first record of this genus for Oman. This extends its range in southern Arabia by more than 1000 km. The observed specimen was determined as *R. arabicus* on the basis of its similarity in size, color, and scalation with the holotype. Furthermore, we sequenced three mitochondrial (*12S*, *16S*, *cytb*) and one nuclear (*cmos*) genes for *R. arabicus* and for two individuals of *R. melanocephalus* and one *R. satunini* and inferred the phylogenetic relationships of all currently recognized species of the genus for the first time. The results of our phylogenetic analyses indicate that *Rhynchocalamus* is a member of the Western Palearctic clade of Colubrinae and is sister to *Lytorhynchus*, with which it forms a very well supported clade and shares some morphological characters. As our results show, *R. satunini* is the basal lineage of the genus and *R. melanocephalus* is sister to *R. arabicus*.

Key words: Anatolia, Arabia, Colubrinae, Kukri snake, Levant, mitochondrial DNA, nuclear DNA, *Rhynchocalamus arabicus*, *R. melanocephalus*, *R. satunini*

Introduction

The genus *Rhynchocalamus* Günther is part of the family Colubridae Opper and includes only three species of small opisthoglyphous snakes endemic to Southwest Asia—*R. arabicus* Schmidt, *R. melanocephalus* Jan and *R. satunini* Nikolsky. All are characterized by having smooth dorsal scales in 15 rows, small head not distinct from the neck, rather small eyes with round pupils, rostral shield enlarged and wedged between the internasals, a frontal which is approximately half of the length of the parietals, reduced maxillary dentition with 6–8 maxillary teeth, the posterior ones being long (Jan 1862; Schmidt 1933). Our knowledge on the distribution of all three species is still scarce, being probably the result of their secretive fossorial lifestyle and mostly nocturnal activity (Disi *et al.* 2001; Amr and Disi 2011). The range of *R. melanocephalus*, the best known of all three species, spans from Sinai, Egypt through the Levant to southern Anatolia (Gasperetti 1988; Avci *et al.* 2008; Sindaco *et al.* 2013), *R. satunini* is