



On the status of the snake genera *Erythrolamprus* Boie, *Liophis* Wagler and *Lygophis* Fitzinger (Serpentes, Xenodontinae)

FELIPE F. CURCIO^{1,2}, VÍTOR DE Q. PIACENTINI¹ & DANIEL S. FERNANDES³

¹Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, Caixa Postal 11.461, CEP 05422-970, São Paulo, SP, Brazil. ²E-mail: ffcurcio@yahoo.com

³Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, CEP 21941-590, Rio de Janeiro, RJ, Brasil. E-mail: danferufjrj@gmail.com

The genus *Erythrolamprus* Boie (1826) comprises six species of Central and South American false coral snakes (Peters & Orejas-Miranda 1970; Zaher 1999; Curcio *et al.* 2009). It is traditionally allocated in the tribe Xenodontini (subfamily Xenodontinae), along with the genera *Liophis*, *Lystrophis*, *Umbrivaga*, *Waglerophis* and *Xenodon* (*sensu* Dixon 1980; Cadle 1984; Myers 1986; Ferrarezzi 1994; Zaher 1999). Although Xenodontini is supported by morphological and molecular evidence, phylogenetic relationships and classification within the tribe have been the subject of recent debate. Molecular phylogenetic studies have recovered clades with *Erythrolamprus* nested within some representatives of the genus *Liophis* (Vidal *et al.* 2000; Zaher *et al.* 2009), partly corroborating previous hypotheses based on morphology (e.g. Dixon 1980).

Vidal *et al.*'s (2000) and Zaher *et al.*'s (2009) sampling of taxa of *Erythrolamprus* and *Liophis* is far from comprehensive, each including five species of traditional *Liophis* (only one of which is common to the two studies) and one species of *Erythrolamprus*. Based on their phylogenetic results, the two studies have distinct postures from a taxonomic point of view; Vidal *et al.* (2000) only discussed paraphyly of *Liophis* with respect to *Erythrolamprus*, whereas Zaher *et al.* (2009) proposed formal synonymization of *Erythrolamprus* under *Liophis* despite a recognized lack of supporting morphological evidence.

Zaher *et al.*'s (2009) taxonomic action is incorrect because *Erythrolamprus* Boie, 1826 has priority over *Liophis* Wagler, 1830. Reversal of precedence is not applicable in this case because it does not meet the conditions set by articles 23.9.1.1 and 23.9.1.2 of the International Code of Zoological Nomenclature (hereafter the *Code*; ICZN 1999). Further, attribution of *Liophis* to Boie (1826) is also incorrect because this genus was established by Wagler (1830).

Beyond the priority of *Erythrolamprus*, we believe that taxonomic changes in any direction would be premature. In our view, this particular systematic problem is too complex to be solved by simple synonymization based on the results of phylogenetic analyses including no more than five *Liophis* species (Vidal *et al.* 2000; Zaher *et al.* 2009). The genus *Liophis* is rather diverse, and the relationships between the more than 40 species it includes [excluding the taxa reallocated to *Lygophis* and *Caeteboia* by Zaher *et al.* (2009)] remain largely unknown (Dixon 1980; Fernandes *et al.* 2003).

It can be argued that in proposing taxonomic changes based on phylogenetic evidence, Article 42.3 of the *Code* should be followed, i.e., application of genus-group names should be determined by reference to type species. The type species of *Liophis*, *L. cobellus* (= *Coluber cobella* Linnaeus, 1758; see Williams & Wallach 1989) does not figure in either of the molecular studies mentioned herein (Vidal *et al.* 2000; Zaher *et al.* 2009). Moreover, the type species of *Erythrolamprus* (= *Coluber venustissimus* Wied-Neuwied, 1821) is presently considered a subspecies of the *E. aesculapii* complex, and is one of several taxa in the genus in need of redefinition. The absence of type species in Vidal *et al.*'s (2000) and Zaher *et al.*'s (2009) sampling prevents an objective conclusion being drawn from their phylogenies regarding the precise nomenclatural relationship of *Liophis* and *Erythrolamprus*.

A similar rationale can be applied to the resurrection of *Lygophis* Fitzinger by Zaher *et al.* (2009) based on their strongly supported clade 56 (*L. elegantissimus*, *L. meridionalis*) lying outside the *Erythrolamprus* + *Liophis* clade. The position of the type species of *Lygophis*, *Herpetodryas lineatus* Schlegel (presently *Liophis lineatus*, = *Coluber lineatus* Linnaeus), cannot be directly evaluated with respect to clade 56 because it was not sampled. In this case our disagreement with the resurrection of *Lygophis* rests strictly on this sampling argument; Zaher *et al.* (2009: 147) mention

a convincing morphological diagnosis for an independent genus represented by their clade 56, but their data lack compelling evidence that the name of such a genus should be *Lygophis*.

We agree that *Liophis* is probably a polyphyletic genus, and thus the inclusion of the type species of the genera involved is highly desirable for analyses aiming to provide nomenclatural resolutions. Unfortunately, there are no previous phylogenetic analyses including *L. cobellus* and/or *L. lineatus*. Dixon (1983), Donnelly and Myers (1991) and Fernandes *et al.* (2002) made taxonomic revisions of the *L. cobellus* group based on overall similarity, but to date there are no phylogenetic studies sampling taxa related to this group, taxa related to *Lygophis* (*sensu* Zaher *et al.* 2009), and other species of traditional *Liophis* (*sensu* Dixon 1980).

We suggest that the recognition of *Erythrolamprus* Boie, 1826 and *Liophis* Wagler, 1830 should be maintained until future studies provide a more solid background for taxonomic reformulations. Regarding the resurrection of *Lygophis* Fitzinger, although the molecular evidence provided by Zaher *et al.* (2009) is supportive of the morphological diagnosis, we prefer to maintain this genus in the synonymy of *Liophis* and wait for resolution of the position of the type species. We recognize that our arguments regarding the necessity for the inclusion of type species is likely to be impractical in some cases, and less strong in others (e.g., for groups of fewer genera and species, and those with a less complex taxonomic history), but these exceptions do not apply to the cases under consideration here.

Acknowledgements. We are indebted to G. Brito, P. Nunes, D. Lahr, H. Ferrarezzi, V. Verdade, J. Cassimiro da Silva Jr., R. C. Amaro and A. C. Guerrero for discussions and criticism of early versions of the manuscript. We also thank C. Canedo, M. R. Carvalho, R. Pinto, P. Passos, D. J. Gower and D. Frost for critical evaluation. The authors are supported by grants provided by Conselho de Desenvolvimento Científico e Tecnológico (CNPq; FFC – grant # 152193/2008-1, DSF – grant # 477442/2007-2) Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP; VQP – grant # 06/60300-4) and Fundação de Amparo à Pesquisa do Estado de Rio de Janeiro (FAPERJ; DSF – grants # E-26/110.654/2007 and E-26/110.948/2008).

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