



In praise of subgenera: taxonomic status of cobras of the genus *Naja* Laurenti (Serpentes: Elapidae)

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Abstract

The genus *Naja* Laurenti, 1768, is partitioned into four subgenera. The typical form is restricted to 11 Asian species. The name *Uraeus* Wagler, 1830, is revived for a group of four non-spitting cobras inhabiting savannas and open formations of Africa and Arabia, while *Boulengerina* Dollo, 1886, is applied to four non-spitting African species of forest cobras, including terrestrial, aquatic and semi-fossorial forms. A new subgenus is erected for seven species of African spitting cobras. We recommend the subgenus rank as a way of maximising the phylogenetic information content of classifications while retaining nomenclatural stability.

Key words: *Naja*, *Uraeus*, *Boulengerina*, *Afronaja* subgen. nov., taxonomy, Africa, Asia

Introduction

The scientific nomenclature of life serves the key function of providing labels for the cataloguing of the Earth's biodiversity and thus for information retrieval. In order to make a system of classification predictive, it is generally agreed that a classification should reflect the current state of knowledge about the evolutionary relationships within a group, which, in the case of a nested, hierarchical system of nomenclature, means recognizing only monophyletic groups as named taxa. However, this creates the dilemma that, whereas the function of information retrieval ideally requires stability of names, our developing understanding of the Tree of Life requires changes in nomenclature, to reflect new insights into patterns of relationships provided by ongoing research. This issue is particularly acute at low taxonomic levels, where novel insights into the phylogeny of relatively closely related groups of organisms may reveal long-established genera to be non-monophyletic: a change in genus allocation of a species changes the scientific name of the species itself, thus impeding information retrieval. As a result, changes in genus allocation are often slow to percolate into the non-systematic literature (e.g., Wüster & McCarthy, 1996) or may encounter resistance (e.g. Orlov *et al.*, 2004), particularly if multiple studies propose different arrangements in relatively quick succession (e.g., Pizzato *et al.*, 2008). This matters particularly in the case of high profile species, such as those of medical importance, where nomenclatural confusion can seriously hamper later research.

This situation exemplifies the dilemma between using nomenclature as an information retrieval and cataloguing system, and also to represent organismal phylogeny. Smith & Chiszar (2006) highlighted the usefulness of the rank of subgenus in these circumstances: where a large monophyletic genus contains well-defined lineages that could usefully be endowed with scientific names, the subgenus rank provides the opportunity to do so without altering the binomial name of the animal, which would interfere with information retrieval, thus increasing the overall information content of the classification. The rank of subgenus has been relatively little-used in recent herpetological taxonomy, particularly among snakes (but see Tokar, 1989, for