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## The “*Rhampholeon uluguruensis* complex” (Squamata: Chamaeleonidae) and the taxonomic status of the pygmy chameleons in Tanzania

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### Abstract

The specific status of several pygmy chameleons endemic to mountain massifs in the Eastern Arc Mountains, Tanzania has long been controversial due to their lack of distinctive morphological characters. In this work we extend our previous sampling of *Rieppeleon* and *Rhampholeon* species, especially from the *Rhampholeon moyeri*/*Rhampholeon uluguruensis* complex, and add data from a new mitochondrial marker to address this problem. Our results show that there is geographical structure between populations of pygmy chameleons from different mountains. This structure is especially well defined for *Rhampholeon (Rhinodigitum)*. Phylogenetic analyses confirm that both *Rh. uluguruensis* Tilbury and Emmrich, 1995 and *Rh. moyeri* Menegon, Salvidio and Tilbury, 2002 are distinct lineages, the former from the Uluguru Mountains and the latter from the Udzungwa Mountains. However, the paratype material used to erect *Rh. moyeri* belongs to a separate lineage from the holotype. Similarly, a number of additional lineages within the *Rh. moyeri*/*Rh. uluguruensis* complex recovered in the analysis may deserve specific status. At present, there is a lack of morphological characters that can be used to distinguish these lineages, suggesting that there are multiple cryptic taxa in this complex.

**Key words:** *Rhampholeon*, allopatric speciation, radiation, Eastern Arc Mountains, Tanzania, 12S rRNA, 16S rRNA, ND1

### Introduction

Significant progress on the higher systematics of African pygmy chameleons has been made in recent years (Matthee *et al.* 2004; Mariaux & Tilbury 2006), however the recognition of species remains notoriously difficult (Tilbury 2010). Specifically, pygmy chameleons (*Rhampholeon* [sub genera *Rhampholeon* and *Rhinodigitum*] and *Rieppeleon*) have very similar external morphologies, and consequently lack sufficient external features that can be used to distinguish between species (Mariaux & Tilbury 2006; Matthee *et al.* 2004; Menegon *et al.* 2002; Rieppel & Crumly 1997). A good example of this problem is the present confusion concerning the status of *Rhampholeon uluguruensis* Tilbury and Emmrich, 1995 and *Rhampholeon moyeri* Menegon, Savidio and Tilbury, 2002 from the Eastern Arc Mountain (EAM) forests in Tanzania.

*Rhampholeon uluguruensis* was described on the grounds of specimens collected at Morningside on the Uluguru Mountains (Tilbury & Emmrich 1996). It was the first EAM *Rhampholeon* species identified bearing a soft, tuberculated rostral process similar to that of *Rhampholeon nchisiensis* (Loveridge 1953), which is found further south in the Southern Highlands of Tanzania and northern Malawi, and *Rhampholeon boulengeri* Steindachner, 1911 found in the montane forests of the Albertine Rift. Subsequent studies of *Rhampholeon* specimens from the Kihanga and Kitolomero valleys of the Udzungwa escarpment showed that they bore strong morphological resemblance to *Rh. uluguruensis* (Menegon *et al.* 2002) but were distinguished from it by the number of their interorbital scales and the number and arrangement of hemipenial papillae. These differences became the basis for erecting a separate species (*Rh. moyeri*, Menegon *et al.* 2002). This move appeared to be supported by nuclear and mitochondrial DNA analyses of *Rh. moyeri* specimens collected from the Kitolomero

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