



A remarkable new species of *Callulina* (Amphibia: Anura: Brevicipitidae) with massive, boldly coloured limb glands

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Abstract

A large new species of *Callulina* is described from a series of 22 specimens from the montane and upper montane forest of the Nguru Mountains, Tanzania. The most striking features of *Callulina meteora* **sp. nov.** are the massive and boldly coloured glands on the arms and legs and a metallic sheen to the skin. The new species is distinguished further on the basis of acoustic and molecular data. The position, size and conspicuousness of the enlarged glands in the new species are strikingly similar to those of *Nectophrynoides viviparus*, a toad found also in the Eastern Arc Mountains of Tanzania. The new species is known from a single forest reserve and is of high conservation concern.

Key words: aposematism, Eastern Arc, glands, *Nectophrynoides*, Nguru, Tanzania

Introduction

Patterns of species distributions in the Eastern Arc Mountains of Tanzania and Kenya are characterised by high levels of endemism (Myers *et al.*, 2000; Burgess *et al.*, 2007). However, much of the documented endemism is patchy, with greatest diversity being found in the East Usambara, Uluguru and Udzungwa Mountains (Fig. 6). This patchiness can, in part, be attributed to uneven sampling (Burgess *et al.*, 2007; Ahrends *et al.*, 2011). Increasing understanding of other mountain blocks in the Eastern Arc suggest that high levels of endemism are more widely distributed throughout the region, but many species remain to be described (Menegon & Davenport, 2008; Menegon *et al.*, 2008, 2011; Loader *et al.*, 2011a). The Nguru Mountains is one part of the Eastern Arc from where a number of new amphibians, with highly restricted distribution, have been described recently (Poynton *et al.*, 2009; Loader *et al.*, 2010a,b, 2011b) and more reported to await description (Menegon *et al.*, 2008; Loader *et al.*, 2009b). Potentially this area might be considered as one of the richest areas for biodiversity in the Eastern Arc Mountains and therefore globally.

The eight nominal species in the genus *Callulina* Nieden 1911, are almost entirely restricted to submontane and montane forest of the Eastern Arc Mountains (Loader *et al.*, 2010b). A hotspot of species richness for this genus is the Nguru Mountains, with two species recently described (Loader *et al.*, 2010b), one from the Nguru South Forest Reserve (*C. hanseni*) and another from Kanga Forest Reserve (*C. kanga*). We describe here the third new species endemic to the Nguru Mountains. A fourth probably new species ("*Callulina* sp. 3") was mentioned by Menegon *et al.* (2008) but is not described here because it has a more complex distribution, is less easily diagnosed, and is the subject of ongoing research.

Material and methods

Specimens were collected from two separate surveys conducted in the Nguru South Forest Reserve in 2004 and 2008. Specimens and tissues collected in 2004 are deposited in the collection of Museo Tridentino di Scienze Nat-