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New species of reed frog from the Congo basin with discussion of paraphyly in Cinnamon-belly reed frogs

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Abstract

We describe a new species of Afrotropical reed frog, genus *Hyperolius* (Hyperoliidae), from Salonga National Park in the central Congo basin, Democratic Republic of Congo. Males and females have similar colour and pattern and are easily distinguished from other taxa by a relatively short and broad, bright yellow (in life), dorsolateral line ending in the sacral region and the presence of a light spot on the heel. In a 16S mitochondrial rRNA phylogeny, it clusters with samples allocable to the Cinnamon-belly reed frog, *H. cinnamomeoventris*. The new species, along with other morphologically well distinguished taxa, splits *H. cinnamomeoventris* into different non-sister clades. We discuss paraphyly of this reed frog in a taxonomic framework.

Key words: Anura, DNA barcoding, Hyperoliidae, *Hyperolius cinnamomeoventris*, *H. veithi* **sp. nov.**, paraphyly, taxonomy

Introduction

Reed frogs, genus *Hyperolius* (Hyperoliidae), comprise a diverse group of arboreal anurans from sub-Saharan Africa. More than 120 species are recognized (Frost 2009). *Hyperolius* taxonomy remains difficult for the following reasons. Species are generally poor in external diagnostic characters, and often typified by high intraspecific colour and pattern variation (e.g. Schiøtz 1999). Second, numerous 'old' names are available based on one to a few specimens which in many cases are poorly preserved or are even lost, leaving us with poor original descriptions only, as for example those of Ahl (1924). As pointed out by Schiøtz (1999), an almost exclusive feature of reed frogs is that in many species all females and part of the males undergo colour and pattern change with maturation (phase female, PhF), while the remaining males retain their juvenile colour and pattern (phase juvenile, PhJ). Sexual dichromatism and monochromatism are robust species-specific traits in the genus (Veith *et al.* 2009).

During field work at Salonga National Park, Democratic Republic of Congo (DRC), in the central Congo drainage (Fig. 1), we discovered a species of reed frog (Fig. 2A) which, by colour and pattern, is well distinguished from any of the described taxa, leading us to consider it an undescribed species. We used sequences of the 16S mitochondrial rRNA to 'barcode' the new reed frog (Vences *et al.* 2005) and to run a molecular phylogeny to identify its congeneric relatives. We found that the new taxon is related to the Cinnamon-belly reed frog, *H. cinnamomeoventris* Bocage, 1866; the latter species displays sexual dichromatism (Fig. 2B–D) with a PhJ somewhat similar in pattern to the new species, which is sexually monochromatic (Fig. 2A). At Salonga National Park, the two species can be found syntopically.

Hyperolius cinnamomeoventris is suggested to exhibit a vast geographic range (Fig. 1) over a large

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