



A new species of clawed frog (genus *Xenopus*) from the Itombwe Massif, Democratic Republic of the Congo: implications for DNA barcodes and biodiversity conservation.

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Abstract

Here we describe a new octoploid species of clawed frog from the Itombwe Massif of South Kivu Province, Democratic Republic of the Congo. This new species is the sister taxon of *Xenopus wittei*, but is substantially diverged in morphology, male vocalization, and mitochondrial and autosomal DNA. Analysis of mitochondrial “DNA barcodes” in polyploid clawed frogs demonstrates that they are variable between most species, but also reveals limitations of this type of information for distinguishing closely related species of differing ploidy level. The discovery of this new species highlights the importance of the Itombwe Massif for conservation of African biodiversity south of the Sahara.

Key words: allopolyploid evolution, Albertine Rift, whole genome duplication, advertisement calls, DNA barcode, 16S, RAG1, RAG2

Introduction

Clawed frogs (*Xenopus* and *Silurana*) are widely used as model organisms for laboratory research and have a remarkable diversity and evolutionary history in sub-Saharan Africa. These frogs are unusual among vertebrates in their high number of polyploid species, frequency of independent polyploidization events, and range of ploidy levels, including diploid, tetraploid, octoploid, and dodecaploid species (Evans 2007; Evans et al. 2005; Evans et al. 2004; Kobel et al. 1996). All or almost all instances of polyploidization in clawed frogs occurred through allopolyploidization – genome duplication associated with hybridization between species (reviewed in Evans 2008). Analysis of mitochondrial and nuclear DNA suggests the existence of ancestral species that do not have known extant descendants with the same ploidy, including a diploid with 20 chromosomes, two diploids with 18 chromosomes, and three tetraploids with 36 chromosomes (Evans 2007). In other words, the genomes of possibly extinct species persist, in combination with other genomes, in extant allopolyploids. That these predicted species may actually be extant provides motivation for further fieldwork and species characterization in this group.

Here we report a new species of clawed frog from the Itombwe Massif of the South Kivu Province, Democratic Republic of the Congo (Fig. 1). As a resource for future taxonomic work and a supplement for existing