



Relicts of a forested past: Southernmost distribution of the hairy frog genus *Trichobatrachus* Boulenger, 1900 (Anura: Arthroleptidae) in the Serra do Pingano region of Angola with comments on its taxonomic status

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The monotypic genus *Trichobatrachus*, with its sole representative, the hairy frog, *Trichobatrachus robustus* Boulenger, 1900, could be considered one of the most well-known frogs of Africa. Despite its broad recognition and the fact that it is considered wide-spread and locally common (Amiet & Burger 2004), surprisingly little is known about the actual distribution and the specific occurrence patterns of the species. It was originally described by Boulenger (1900) from the Benito River, previously erroneously stated to be located in Gabon. However, Lötters *et al.* (2001) clarified that the type locality was actually situated in Equatorial Guinea, then part of French Congo, and subsequently provided the first confirmed country record for Gabon. Hairy frogs were previously included in the herpetofaunal lists of Cameroon (Parker 1936; Perret & Mertens 1957), the Democratic Republic of Congo (Laurent 1956), and Nigeria (Schiotz 1963). More recently published accounts list them for Cameroon (Euskirchen *et al.* 1999; Herrmann *et al.* 2005; Gonwouo & Rödel 2008), Equatorial Guinea (De la Riva 1994; Lasso *et al.* 2002), Gabon (Lötters *et al.* 2001; Rödel & Pauwels 2003; Burger *et al.* 2004; Pauwels & Rödel 2007; Bell *et al.* 2011), and the Democratic Republic of Congo (DRC, Fretey *et al.* 2011), and speculate about their potential occurrence in Congo and the Cabinda enclave of Angola (Amiet & Burger 2004). The DRC record so far represented the most southerly distribution, while the most northerly account comes from the Adamaoua Province of northern Cameroon (Tadpole voucher MHNG-AMP/ERPI-1035.006 from Bénoué source, Northern cliff Ngaoundéré, Adamaoua, Cameroon/Adamaoua Province, *cf.* Perret 1966). Specimens stored in the collection at the Royal Museum of Central Africa, Tervuren (RMCA) under collection numbers RMCA B 90060.0004-11 confirm the occurrence of the species in Congo. To our knowledge, these specimens represent yet unpublished first country records.

Here we report the first confirmed country record of the genus from the Serra do Pingano, Uíge province, Angola. The observed presence of *Trichobatrachus* in this locality is particularly surprising because the area is located roughly 400 km south of the previously recorded southernmost distribution. The distributional range of the species therefore seems to be much larger than previously assumed (Fig. 1). However, molecular data cast serious doubt on a “wide-spread-species-scenario” and rather indicate that there is a significant amount of cryptic genetic diversity across populations from different localities (Barej *et al.* in prep., this study). Results of preliminary genetic analysis of MTD 48622 targeting the two mitochondrial loci 12S and 16S (sequence data available under GenBank accession numbers HG940464 and HG940465, respectively) indicate high genetic divergence (between 3-6 % in 12S and 2-3 % in 16S) between the Angolan specimen and sequence data from Cameroonian specimens available on GenBank. Yet, more in depth analyses using multiple markers both mitochondrial and nuclear are required to confirm the potentially distinct taxonomic status of the Angolan specimens and clarify whether the notion of a wide spread monotypic taxon can be retained or needs to be abandoned (Barej *et al.* in prep.).

The single adult specimen from Angola does not show any obvious morphological differences compared to specimens from other known localities (Fig. 1). The same is true for the few larvae collected (Fig. 1 & Tab. 1). But larger series need to be compared systematically to clarify whether individuals from different populations and/or genetic lineages can be separated based on morphological data or whether they are morphologically inseparable.

All collected specimens were euthanized using commercially available toothache pain relief gel containing 20% Benzocaine and subsequently preserved in 70% ethanol. Specimens are stored in the herpetological collection of the Museum für Tierkunde, Senckenberg Natural History Collections Dresden (MTD) under collection numbers provided below. Tissue samples used in molecular analyses are additionally stored in the tissue bank of the MTD.

A single adult female (72.0 mm SVL) in breeding condition (fully developed eggs in ovary) was found around 12:30 a.m. on 15th of October 2013 in the Serra do Pingano (S7° 41' 4.8", E14° 55' 56.7", 890 m a.s.l.), approximately 40 m away from a creek locally known as Mbalage creek. The specimen (MTD 48622, Fig. 1) was retrieved from dry leaf litter in a comparatively well conserved and intact forest patch that is used by local hunters. Upon capturing the individual, it immediately emitted a high pitched screeching release call that lasted for about 5 s. At the same time it performed rapid hind-leg movements, thereby making use of its claw-like terminal phalanges and inflicting bleeding wounds in the hands of the captor. The release call could not be evoked subsequently. Additional larval specimens were obtained along the Mbalage creek. The tadpole of *T. robustus* was first described by Mertens (1938a) and illustrated by Mertens (1938b). A recent account and description, including an illustration that is based on a specimen from Cameroon can be found in Channing *et al.* (2012). The larvae from Angola (MTD 48623:1-3 and MTD 48624) generally correspond to this description but show some deviation in the tooth row formula (TRF) and arrangement of marginal papillae (compare Tab. 1). The latter are irregular in the Angolan specimens and distinct and defined rows cannot be identified unambiguously (Fig. 1).

The exceptional discovery of a distinct lineage of hairy frogs in the last remaining forest remnants of northern Angola is particularly noteworthy because insights into the biogeography of the region are very limited. Reconstructing the phylogenetic history of this taxon may help to uncover the poorly understood biogeographical history of the region as a whole. This will provide the basis for a more comprehensive assessment of Angola's biodiversity in general and is a prerequisite for the development of sound and sustainable conservation strategies of its most precious and unique ecosystems.

Acknowledgements

This study was conducted under the auspices of the TU Dresden in collaboration with the SNSD, within the scope of the "Qualitätsnetz Biodiversität" program of the German Academic Exchange Service (DAAD). Field work was made possible through the help of the University of Kimpa Vita in Uíge. We particularly thank Kikongo, Macuntima, Nzusi, Jose Lau and Mwemba for various supports with logistics and administration, K.D. Dijkstra for his support in the field, and M. Nuß who initiated the first survey. Permission to conduct biodiversity research in Angola and to export specimens was granted by the directorate (Dr. S. Kuedikuenda) of the Instituto Nacional da Biodiversidade e Áreas de Conservação, Ministério do Ambiente, República de Angola, under permission number 122/INBAC.MINAMB/2013. A. Müller of the DNA-Lab at SNSD provided molecular sequence data and I.J. de la Riva provided valuable literature. These supports are gratefully acknowledged.

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