



New data on the distribution and morphology of the West African squeaker frog *Arthroleptis langeri* Rödel, Doumbia, Johnson & Hillers, 2009 (Amphibia: Anura: Arthroleptidae)

JOACHIM NOPPER^{1,6}, LEGRAND NONO GONWOUO², ANNIKA HILLERS³, LAURA SANDBERGER⁴,
ANNEMARIE OHLER⁵ & MARK-OLIVER RÖDEL⁴

¹Ecology & Conservation, Biocenter Grindel, Universität Hamburg, Martin-Luther-King-Platz 3, 20146 Hamburg, Germany.
E-mail: Joachim.Nopper@uni-hamburg.de

²University of Yaoundé I, Faculty of Science, Laboratory of Zoology, P.O. Box 812, Yaoundé, Cameroon.
E-mail: lgonwouo@yahoo.com

³Royal Society for the Protection of Birds, Across the River – A Transboundary Peace Park for Sierra Leone and Liberia, 38 Maxwell Khobe Street, Kenema, Sierra Leone. E-mail: annika.hillers@rspb.org.uk

⁴Museum für Naturkunde, Leibniz Institute for Research on Evolution and Biodiversity at the Humboldt University Berlin, Herpetology, Invalidenstr. 43, 10115 Berlin, Germany. E-mail: laura.sandberger@mfn-berlin.de, mo.roedel@mfn-berlin.de

⁵Muséum national d'Histoire naturelle, Département de Systématique et Evolution, UMR 7205 OSEB, Reptiles et Amphibiens, CP 30, 25 rue Cuvier, 75005 Paris, France. E-mail: ohler@mnhn.fr

⁶Corresponding author. E-mail: Joachim.Nopper@uni-hamburg.de

Arthroleptis langeri Rödel, Doumbia, Johnson & Hillers 2009 is a genetically and morphologically distinct West African squeaker frog species. It was described based on one individual from a forest at 567 m a.s.l. in the East Nimba National Forest, Liberia. However, it was believed to be potentially more widespread in the Western Guinean rainforest ecoregion (Rödel *et al.* 2009). We herein report on additional specimens of this species. Three frogs were discovered in the collection of the Muséum National d'Histoire Naturelle, Paris (MNHN 1998.1779, 1998.1820, 2000.6982; Table 1). These frogs were very similar to the holotype and originated from near the type locality on Mt. Nimba (Seka Valley forest and New Camp forest, respectively; altitudinal data is only provided for MNHN 1998.1820 found at 700 m a.s.l.); the specimens were collected in 1966 and 1969 by Maxime Lamotte. In addition we have recorded a population on top of Mt. Jideh in the Putu Range, south-eastern Liberia (N 5°38'23" W 0°81'8"), approximately 200 km from the type locality (Fig. 1).

Genetics. We sequenced app. 393 base pairs of the mitochondrial 16S ribosomal RNA from three Mt. Jideh specimens (ZMB 76954–76956; GenBank: JN408722, JN408723, JN408724) and compared them to the respective sequence of the holotype (ZMB 74038; GenBank: GU119909; for molecular methods applied see Rödel *et al.* 2011). The three specimens were genetically identical. The sequence difference to the holotype was 0.3%, thus confirming species affiliation.

Morphology. In order to provide additional morphological details of the species, we studied characters of the new specimens and the holotype. Measurements were taken with a dial calliper (accuracy ± 0.1 mm) and the help of a dissecting microscope. We recorded snout-urostyle length, head width measured directly behind the eyes, femur length, tibia-fibulare length, foot length including longest toe, horizontal eye-diameter, distance from anterior corner of the eye to nostril, horizontal tympanum diameter, distance from anterior corner of the eye to the snout-tip, inter-orbital distance, relative toe and finger length. We also investigated the structure of the dorsal and ventral skin, and determined the number of spines on fingers and the presence of inguinal spines in adult males. Sex was determined by dissection. Measurements are summarized in Tab. 1.

The species seems not to exceed 20 mm in length. The adult females have an SUL of 18.7 mm to 19.3 mm, the largest male 17.6 mm. In addition to the characters provided by Rödel *et al.* (2009) we found that adult males have, apart from a slightly elongated third finger, inguinal spines as well as 13 spines on the third and 6 to 7 spines on the second finger (ZMB 76956; SUL: 15.7 mm). The finger spines are arranged in one row (Fig. 2H). Spines were missing in the holotype (ZMB 74038; SUL: 16.2 mm) and ZMB 76955 (SUL: 16.1 mm), suggesting that spines are present in sexually active males only (Blackburn 2009; for a similar example in *Arthroleptis aureoli* see Rödel *et al.* 2011). Another difference of our new vouchers from the type concerns skin texture which in contrast to the holotype was not completely smooth (Fig. 2G). Instead, the back skin was slightly granular (Fig. 2F). It is not known if this character may vary with