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Two new endangered species of *Anomaloglossus* (Anura: Aromobatidae) from Roraima State, northern Brazil

ANTOINE FOUQUET^{1,2,8}, SERGIO MARQUES SOUZA², PEDRO M. SALES NUNES^{2,3},
PHILIPPE J. R. KOK^{4,5}, FELIPE FRANCO CURCIO^{2,6}, CELSO MORATO DE CARVALHO⁷,
TARAN GRANT² & MIGUEL TREFAUT RODRIGUES²

¹CNRS Guyane USR3456, Immeuble Le Relais, 2 Avenue Gustave Charlery, 97300, Cayenne, French Guiana

²Universidade de São Paulo, Instituto de Biociências, Departamento de Zoologia, Caixa Postal 11.461, CEP 05508-090, São Paulo, SP, Brazil

³Universidade Federal de Pernambuco, Centro de Ciências Biológicas, Departamento de Zoologia, Av. Professor Moraes Rego, s/n. Cidade Universitária CEP 50670-901, Recife, PE, Brazil

⁴Biology Department, Amphibian Evolution Lab, Vrije Universiteit Brussel, 2 Pleinlaan, B- 1050 Brussels, Belgium

⁵Department of Recent Vertebrates, Royal Belgian Institute of Natural Sciences, 29 rue Vautier, B- 1000 Brussels, Belgium

⁶Universidade Federal de Mato Grosso, Instituto de Biociências, Departamento de Biologia e Zoologia, CEP 78060-900, Cuiaba MT, Brazil

⁷INPA Núcleo de Pesquisas de Roraima (INPA/NPRR), Rua Coronel Pinto 315 – Centro, 69301-970, Boa Vista, RR, Brazil

⁸Corresponding author. E-mail: fouquet.antoine@gmail.com

Abstract

We describe two new species of *Anomaloglossus* from Roraima State, Brazil, that are likely endemic to single mountains currently isolated among lowland forest and savanna ecosystems. The first species, *Anomaloglossus tepequem* **sp. nov.** was collected in 1986 and 1992 along a single stream at >500 m elevation on a tepui-like mountain named Tepequém, but was not detected during recent investigations. It is mainly diagnosed from other *Anomaloglossus* species by its well developed foot webbing, immaculate cream abdomen colouration and small body size (males: 18.2–20.1 mm, females: 21.7–24.5). The second species, *Anomaloglossus apiaú* **sp. nov.** was found along several streams between 500 and 1400 m elevation on Serra do Apiaú, and is mainly diagnosed from congeners by its weakly webbed feet, males with swollen third finger and ventrolateral stripe formed by white dots, and its advertisement call; a long trill (up to almost 40 s) consisting of pairs of very short pulses. The discovery of these two apparently microendemic species suggests that additional *Anomaloglossus* species remain to be described in the Guiana Shield. Both species should be considered critically endangered given their seemingly reduced range size, association with highland habitat, and the anthropogenic pressure they currently face.

Key words: Amazonia, Amphibia, conservation, endemic, Guiana shield, taxonomy

Resumo

Descrevemos aqui duas novas espécies de *Anomaloglossus* para o estado de Roraima, Brasil, provavelmente endêmicas de serras isoladas por florestas de baixada e ecossistemas savânicos. A primeira espécie, *Anomaloglossus tepequem* **sp. nov.** foi coletada na Serra do Tepequém entre 1986 e 1992 ao longo de um curso de água situado a >500 m de altitude, mas não foi registrada em trabalho de campo recente na mesma localidade. Esta nova espécie se distingue dos outros congêneres por apresentar membrana interdigital desenvolvida, abdomen de cor creme e imaculado, e tamanho pequeno (machos: 18.2–20.1 mm, fêmeas: 21.7–24.5). A segunda espécie, *Anomaloglossus apiaú* **sp. nov.** foi encontrada ao longo de diversos cursos de água entre 500 e 1400 m de altitude na Serra do Apiaú, e se distingue de seus congêneres por sua membrana interdigital pouco desenvolvida, machos com terceiro artelho volumoso faixa ventrolateral formada por pontos brancos, e por seu canto de anúncio um longo trinado (que pode chegar até 40 s) constituído de pares de pulsos muito curtos. A descoberta dessas duas espécies aparentemente microendêmicas sugere que outras espécies de *Anomaloglossus*

projected decline ("B2b"), both of these new species should be considered critically endangered and conservation measures should be taken urgently to preserve their habitat. Further, the entire genus should be the subject of conservation programs, given that most *Anomaloglossus* occur in highland areas and are closely associated with streams—two conditions known to increase extinction risk (Gillespie & Hines 1999; Woodhams & Alford 2005). Indeed, higher elevation populations (>400 m) have been shown to be more severely affected by chytridiomycosis (Pounds *et al.* 2006).

A recent case of potential extinction is that of the riparian species *Anomaloglossus parkerae*, a species described from the La Escalera area in southeastern Venezuela (Meinhardt & Parmelee 1996). The species was collected by W. E. Duellman during the early 1970s (Meinhardt & Parmelee 1996; Duellman 1997). PJRK and C. Barrio-Amorós visited the type locality together on two occasions, first in May 2009 and then in November 2010 (joined by D. B. Means), and could not detect a single individual. C. Barrio-Amorós had already visited the area five times without detecting a single specimen (C. Barrio-Amorós pers. comm.). The last sighting of the species might be that of K.-H. Jungfer in March 1993, who spotted two individuals at Salto El Danto (La Escalera region), but failed to find additional specimens in 2000 (K.-H. Jungfer pers. comm.).

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APPENDIX. Additional material examined.

- Anomaloglossus ayarzaguenai*: **Venezuela**, Estado Bolívar, Cerro Jaua, MHNLS 12949 (holotype), MHNLS 12950–51 (paratypes).
- Anomaloglossus baeobatrachus*: **French Guiana**, Municipality of Sinnamary, Piste St Elie, AF0590-91; **French Guiana**, Municipality of Sinnamary, AF0657-58; **French Guiana**, Municipality of Sinnamary, Paracou, AF0688, AF0718.
- Anomaloglossus beebei*: **Guyana**, Potaro-Siparuni District, Kaieteur National Park, IRSNB 13721–26, 13728–54, ULABG 6817 (ex IRSNB 13727), IRSNB 13779–81 (tadpoles).
- Anomaloglossus breweri*: **Venezuela**, Estado Bolívar, Aprada Tepui, Cueva del Fantasma, MHNLS 17044 (holotype), MHNLS 17045–46 (paratypes).
- Anomaloglossus degranvillei*: **French Guiana**, Municipality of Maripasoula, Atachi-Bacca (type locality) PG601-04, PG606-12, PG618-19, PG627-33
- Anomaloglossus guanayensis*: **Venezuela**, Estado Bolívar, Serranía de Guanay, MHNLS 10708 (holotype), MHNLS 10712–10714 (paratypes), 10716–10717 (paratypes), 10724–10725 (paratypes).
- Anomaloglossus kaiei*: **Guyana**, Potaro-Siparuni District, Kaieteur National Park, IRSNB 1938 (holotype), IRSNB 1939–64 (paratypes), IRSNB 14419 (2 specimens), IRSNB 14422–26, IRSNB 14433–35, IRSNB 14437–40, IRSNB 14443, IRSNB 14446–51, IRSNB 14454–57, IRSNB 13755–78 (tadpoles), IRSNB 14432 (tadpoles), IRSNB 14436 (tadpole), IRSNB 14444–45 (tadpoles), IRSNB 14452–53 (tadpoles), ROM 42999, Mount Wokomung, ROM 43321, ROM 43327, ROM 43330, ROM 43333; Cuyuni-Mazaruni District, Wayalayeng, IRSNB 14922–24, Maringma Tepui, IRSNB 14925–31.
- Anomaloglossus moffetti*: **Venezuela**, Estado Bolívar, Sarisariñama-tepui, EBRG 4645 (holotype), EBRG 4646–51 (paratypes).
- Anomaloglossus murisipanensis*: **Venezuela**, Estado Bolívar, Murisipan-Tepui, MHNLS 11385 (holotype).
- Anomaloglossus parimae*: **Venezuela**, Estado Amazonas, Cerro Delgado Chalbaud, ULABG 4221 (holotype), ULABG 4212–20 (paratypes), ULABG 4222–26 (paratypes).
- Anomaloglossus parkerae*: **Venezuela**, Estado Bolívar, Sierra de Lema, Salto El Danto, MHNLS 2901, MHNLS 11088–89 (topotypic specimens).
- Anomaloglossus praderioi*: **Guyana**, Cuyuni-Mazaruni District, Maringma Tepui, IRSNB 14403–13, IRSNB 14414–16 (tadpoles); **Venezuela**, Estado Bolívar, Mount Roraima ULABG 4196 (holotype), MHNLS 11272 (paratype), Sierra de Lema, EBRG 5569.
- Anomaloglossus roraima*: **Venezuela**, Estado Bolívar, Mount Roraima, ULABG 4197 (holotype).
- Anomaloglossus rufulus*: **Venezuela**, Estado Bolívar, Amuri-Tepui, Chimantá Massif, MHNLS 10361 (holotype).
- Anomaloglossus stepheni*: **Suriname**, Brokopondo district, Road to Apura, AF0093-96; **Brazil**, Amazonas, EE Anavilhanas, MSH10334, 10336; **Brazil**, Amazonas, **Brazil**, Amazonas, Igarape Araras, MTR10269-70.
- Anomaloglossus tamacuarensis*: **Venezuela**, Estado Amazonas, Sierra Tapirapecó, north base of Pico Tamacuari, MBUCV 6430–33 (paratypes).
- Anomaloglossus tepuyensis*: **Venezuela**, Estado Bolívar, Auyantepui, ULABG 2557 (holotype), Cucurital River, MHNLS 14404–05, Purumay River, MHNLS 14924–25, MHNLS 14940–41, MHNLS 15687, Quebrada Atapere, MHNLS 15924, MHNLS 17359–60, MHNLS 17383, Quebrada Tucutupan, MHNLS 17401, Quebrada Rutapa, MHNLS 17361.
- Anomaloglossus triunfo*: **Venezuela**, Estado Bolívar, Cerro Santa Rosa, Serranía del Supamo, EBRG 4756 (holotype), EBRG 4757–59 (paratypes).