



<http://dx.doi.org/10.11646/zootaxa.3734.5.6>

<http://zoobank.org/urn:lsid:zoobank.org:pub:6F682921-CCC1-4AB1-A2CD-84C3E3D8BBD6>

Taxonomic status of *Pseudopaludicola riopiedadensis* Mercadal de Barrio and Barrio, 1994 (Anura, Leptodactylidae, Leiuperinae)

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Abstract

Pseudopaludicola riopiedadensis was described by Mercadal de Barrio and Barrio (1994) based on two adult females collected by Luiz Dino Vizotto in 1963 from Rio Piedade, São José do Rio Preto, São Paulo, Brazil. This taxon was differentiated from *P. ternetzi* based on a series of qualitative and morphometric characters. Nevertheless, the original description and the type material of *P. ternetzi* were not considered by Mercadal de Barrio and Barrio, and the morphological variation of *P. ternetzi* was not documented. This work reviews the sample collected by Vizotto in *P. riopiedadensis* type locality, evaluates the advertisement calls obtained from such population, the two vouchers assigned to *P. riopiedadensis*, and a large data set, including type specimens of *P. ternetzi* to document the morphological variation along its known distribution. Results indicate that *P. riopiedadensis* was described on the basis of highly variable characters applied to a small sample and share the unique *P. ternetzi* autapomorphy, a robust body structure with immaculate belly. The lack of differentiation in both advertisement call and morphology rejects the status of *P. riopiedadensis* as distinct species, and we therefore suggest to formally consider *P. riopiedadensis* as junior synonym of *P. ternetzi*.

Keywords: taxonomy, junior synonymies, advertisement call, external morphology

Introduction

The genus *Pseudopaludicola*, with 18 species currently recognized (Andrade & Carvalho, 2013; Frost, 2013, Pansonato et al., 2013; Roberto et al., 2013), represents a group of small bodied leptodactylid frogs in the subfamily Leiuperinae, widely distributed over northern and central South America (Frost, 2013).

The taxonomic history of this group is very dynamic, involving synonymies, re-descriptions, and species revalidations (Barrio, 1954; Milstead, 1963; Bokermann, 1966; Haddad & Cardoso, 1987; Lobo, 1994, 1996; Cardozo & Lobo, 2009; Caramaschi & Pombal, 2011; Cardozo & Baldo, 2012; Pansonato et al., 2013). The taxonomical changes proposed by Barrio (1954) to treat *P. ameghini* and *P. saltica* as synonymies of *P. falcipes*; the proposal of Milstead (1963) to include in the synonymy of *P. falcipes* the three species described by Cope (1887); and the arrangement proposed by Bokermann (1966) to consider *P. ameghini* as a synonymy of *P. ternetzi* were not fully accepted by several authors, because they did not published evidence to support their hypotheses. Several discrepancies were primarily studied by Haddad and Cardoso (1987) based in acoustic and morphometric characters, and Lobo (1996) studying the syntypes of *P. mystacalis* and *P. ameghini* housed at Academy of Natural Sciences of Philadelphia, USA (ANSP) and *P. ternetzi* type series, at the Museu Nacional, Rio de Janeiro (MNRJ). In this sense, a recent contribution performed by Pansonato et al (2013) studying the species distributed in Chapada dos Guimarães (type locality of *P. ameghini*, *P. mystacalis*, and *P. saltica*), based on morphometric and bioacoustic data, conclude that *P. ameghini* is a valid species.

Pseudopaludicola ternetzi was described by Miranda-Ribeiro (1937), primarily based on four adult specimens collected by Ternetz in 1928 at Passa Três, Goiás, Brazil. As was mentioned above, Lobo (1996) based on *P.*

us presented the sternum ossified and the xiphisternon well developed (without the process previously reported for *P. riopiedadensis*), which is consistent with Lobo's description (1995; 1996).

In spite of the difference in the minimum frequency between calls (that of *P. riopiedadensis* is higher than that of *P. ternetzi*; Table 3), there are several important overlaps between them, such as the number of pulses per note, duration of the notes, interval between notes of the same call, and the dominant frequency range. Therefore, based on the observed slightly differences of the calls and the congruencies among them we do not have enough bioacoustic data to corroborate the existence of two species. A previous study (Toledo 2010) showed that even species with some degree of advertisement call overlap (such as between *P. serrana* Toledo 2010 and *P. murundu* Toledo, Siqueira, Duarte, Veiga-Menocello, Recco-Pimentel & Haddad, 2010) can be distinguished by at least three different parameters (see Toledo, 2010; Toledo *et al.* 2010). None of these parameters are the fundamental frequency, which can be more variable than central spectrum parameters (such as the dominant frequency) or temporal parameters (LFT, person. obs.).

Pseudopaludicola riopiedadensis was described on the basis of highly variable characters applied to a small sample size, only two specimens. These vouchers, as the other specimens collected at same locality and examined herein, share the same autoapomorphies proposed by Lobo (1995) to characterize *P. ternetzi* (robust body structure, and immaculate belly). Although the robust body structure also is present in *P. giarettai* (Carvalho, 2012), and *P. ameghini* (Cope, 1887), these species can be discriminated from *P. ternetzi* and *P. riopiedadensis* by their advertisement calls, and by a combination of morphological characters, as follows: from *P. giarettai* by the vocal sac yellowish (Carvalho, 2012), while in *P. ternetzi* and *P. riopiedadensis* the vocal sac is white or immaculate (Lobo, 1995, present study), and from *P. ameghini* by the dorsum intensively warty according to Pansonato *et al.* (2013), being slightly warty in *P. ternetzi* and *P. riopiedadensis*.

The statistical analysis does not allow discriminate two species, and all the characters listed above plus the similar advertisements calls are not useful to diagnose *P. riopiedadensis* from *P. ternetzi*. Therefore, no arguments remain to consider *P. riopiedadensis* as species separate from *P. ternetzi*, and we therefore suggest to formally consider *P. riopiedadensis* as junior synonym of *P. ternetzi*.

Acknowledgments

We are grateful to J. Faivovich (MACN) and Pombal Jr. (MNRJ) for allowing to examine the types of *P. riopiedadensis* and *P. ternetzi* respectively; I. Nunez, S. Nenda and M. Pereyra for *P. ternetzi* and *P. riopiedadensis* photos; F. Brusqueti, H. Zaher, C. F. B. Haddad, and D. C. Rossa-Feres for providing specimens of *P. ternetzi* under their care; T. Carvalho, M. A. Almeida, M. Pereyra, B. Blotto, D. Baldo and S. Valdecantos for their assistance in the lab work. A. A. Giaretta provided the call recording from Minas Gerais and L. D. Vizotto provided unpublished information and the call recordings from São José do Rio Preto; to A. Veiga Menocello for the information about DNA sequences of *P. ternetzi* populations. We are grateful to Mabel Gimenez for her help with the English. LFT thanks to Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) (grants: JP: 2008/50325-5; FAPESP-Microsoft Virtual Institute, NavScales project: 2011/52070-7; and regular research award: 2011/51694-7) for financial support and a fellowship. DC thanks to CONICET.

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