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On a putative type specimen of *Pleurodema bibroni* Tschudi, 1838 from Chile (Anura: Leptodactylidae)

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Abstract. The original description of the Neotropical frog *Pleurodema bibroni* was based on material collected at "Monte-Video" [Montevideo, Uruguay], but no type specimen was originally designated. In several publications, a specimen deposited at the National Museum of Natural History of Leiden (The Netherlands, RMNH 2277) and collected at Valparaíso, Chile, has been referred as type specimen of *P. bibroni*. Herein, it is argued that RMNH 2277 is not a type specimen of *P. bibroni*; nor can it be assigned to *P. bibroni*, but probably to *Pleurodema thaul*, a species with which *P. bibroni* was long confused.

Keywords. Leiuperinae, *Pleurodema thaul*, type series, Uruguay.

The *Rijksmuseum van Natuurlijke Historie* (RMNH, currently National Museum of Natural History "Naturalis") was founded in 1820 in Leiden, The Netherlands (Holthuis, 1995). The Swiss naturalist J.J. von Tschudi was working at the RMNH during 1837, along with the curator Hermann Schlegel. During his stay at the museum, Tschudi described several amphibian taxa, which were published in his *Classification der Batrachier* (1838) and housed at Leiden collection (Gassó Miracle et al., 2007). Tschudi (1838) described the genus *Pleurodema*, and included a unique species, *Pleuroderma bibroni* (incorrect original spelling). This description was based on an unspecified number of specimens collected at "America Merid. (Monte-Video)" [Montevideo, Uruguay] and transported by D'Orbigny to Paris (Tschudi, 1838: 84). Tschudi did not designate type specimens, but he included "*Bombinator ocellatus* Mus. Ludg." in the synonymy of *P. bibroni*.

Pleurodema bibroni has been long confused with *Pleurodema thaul* (Schneider, 1799), a polymorphic species described for Chile, for which type specimens were not fixed (Ferraro and Lavilla, 2013). Interestingly, these taxonomic confusions occur since their descriptions to nowadays, on the basis of both misidentified specimens (e.g. Donoso-Barros, 1960; Ferraro and Lavilla, 2013) and ADN sequences (Faivovich et al., 2012). The correct use of both binomia was resolved by Donoso-Barros (1969). The current distribution of both taxa extends to other South American countries. *Pleurodema thaul* has a broad distribution in Chile and a restricted distribution in Southwestern Argentina (Ortiz and Díaz-Páez, 2006; Ferraro and Casagranda, 2009), while *P. bibroni* inhabits Uruguay, Rio Grande do Sul and Paraná states at Brazil, and northeastern Paraguay (Braun, 1973; Barrio, 1977; Natale and Maneyro, 2008; Kolenc et al., 2009, 2011, 2012; Lema and Martins, 2011; Trein et al., 2014).

Several authors cited a few specimens as those possibly used by Tschudi in his description of *Pleurodema bibroni*. Donoso-Barros (1969) stated that the material used for the description of *P. bibroni* could not be traced at the Museum of Neuchâtel (Switzerland) without additional information. Hoogmoed (1985) established that syntypes included several specimens deposited at the

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Muséum national d'Histoire naturelle of Paris (MNHN, not traced at that moment) and one specimen housed at the *Rijksmuseum van Natuurlijke Historie* (RMNH 2277) from Valparaíso, Chile, described as "… a specimen of *Pleurodema thaul*, which was referred by Tschudi (1838) as Syn. *Bombinator ocellatus* Mus. Ludg …". Posteriorly, Ortiz and Lescure (1989) designated the specimen MNHN 4501 as lectotype of *P. bibroni*, pointing out that this was the only specimen of *Pleurodema* deposited at that time at MNHN collected by D'Orbigny at the Río de la Plata region. Finally, Gassó-Miracle et al. (2007) considered the specimen RMNH 2277 (assigned to *P. thaul*) a possible paralectotype of *P. bibroni*.

Herein, the identity of the specimen RMNH 2277 is re-evaluated on the basis of phenotypic characters. Also, the assignation of the specimen RMNH 2277 as type specimen of *P. bibroni*, as published in several publications, is analyzed according to the rules of the "International Code of Zoological Nomenclature" (Anonymous 1999; cited below as ICZN).

Photographs of specimens MNHN 4501 and RMNH 2277 were carefully examined, as well as specimens of *P. bibroni* and *P. thaul* housed at herpetological collections (see Appendix). When possible, exo-morphological and some anatomical characters were compared. Osteological preparations were made following Wassersug (1976), to distinguish bone (Alizarin Red S) and cartilage (Alcian Blue). Institutional abbreviations follow Leviton et al. (1985) with the exception of Centro Nacional de Investigaciones Iológicas (CENAI, now housed at MACN collection).

According with the old and hand-written catalogue of the National Museum of Natural History of Leiden, the specimen RMNH 2277 was catalogued as *Bombinator ocellatus* (in litt. E. Dondorp, 9 September 2014), i.e. the taxon considered as synonymous of *P. bibroni* in the original description (Tschudi, 1838). Also, electronic database shows that this specimen was collected by C. Gaudichaud at Valparaiso, Chile (in litt. R. de Ruiter, 24 January 2011). Specimen RMNH 2277 is today faded and poorly preserved. It is not possible to accurately determine the color pattern, but one or two spots are observed over lumbar gland, as well as dark longitudinal stripes are observed over thighs (Fig. 1 A). These two character states are shared by *P. bibroni* and *P. thaul* (Figs. 1 B-C). In addition, a distinguishing character between *P. bibroni* and *P. thaul* – a dark band over the upper lip present in *P. thaul* but absent in *P. bibroni* – cannot be evaluated in specimen RMNH 2277. Regarding osteological characters, vomerine teeths are present in specimen RMNH 2277 and in *P. thaul* (Figs. 1 D-E), but absent in *P. bibroni* (Fig. 1 F).

Morphological observations added to locality data suggest that specimen RMNH 2277 cannot be assigned to *P. bibroni* because the specimen possesses vomerine teeths and was not collected in the distribution area for

Fig. 1. A) Specimen RMNH 2277 (Chile: Valparaiso), dorsal view. B) *Pleurodema thaul* (MLP 4002, Argentina: Neuquén: Los Lagos: Laguna Pire). C) *Pleurodema bibroni* (photo: F. Kolenc; Uruguay: Rocha: Barra de Balizas). D) Specimen RMNH 2277, detail of buccal cavity with voremine teeths. E) *Pleurodema thaul* (MACN 32114, Argentina, Neuquén, Junín de los Andes), detail of buccal cavity with voremine teeths. F) *Pleurodema bibroni* (CENAI 6205, Uruguay: Rocha: Barra de Balizas), detail of buccal cavity without voremine teeths.

P. bibroni. The poor preservation of the specimen RMNH 2277 avoid an unambiguous assignation to any Chilean anuran species, but, considering the presence and shape of the lumbar gland and the locality data, the specimen RMNH 2277 could possibly belong to *P. thaul*.

The specimen RMNH 2277, catalogued as *Bombinator ocellatus*, was considered as syntype of *P. bibroni* by Hoogmoed (1985). After Ortiz and Lescure (1989) designated MNHN 4501 as lectotype of *P. bibroni*, the specimen RMNH 2277 was considered as paralectotype (Gassó-Miracle et al., 2007), apparently based on the concept that if a lectotype is designated between the syntypes, the rest of the syntypes becames paralectotypes (ICZN 1999, art. 74.1.3). This statement is valid if all the specimens under consideration were effectively syntypes. Hoogmoed (1985), as well as Gassó-Miracle et al. (2007), identified the specimen RMNH 2277 as *P. thaul* collected at Valparaiso, Chile. However, independently of its taxonomic identification and locality data (which do not match with data of the original description), I consider that the specimen RMNH 2277 is not a type specimen of *P. bibroni*, because it was explicitly included by Tschudi (1838) as a synonym of the species under description. Specimen RMNH 2277 can be considered, in turn, the type specimen of *Bombinator ocellatus*, fixed by posterior evidence (i.e. the handwritten information of the old catalogue of the RMNH; ICZN, art. 72.4.1.1). However, it is important to note that the binomen *Bombinator ocellatus* is not an available nomen for at least two reasons: (i) its first mention was not accompanied by a description (*nomen nudum*), and (ii) it was first published as a junior synonym (ICZN, art. 11.6) and never used as an available name.

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Appendix. Specimens examined

An asterisk (*) denotes cleared and stained specimens.

Pleurodema bibroni. – The same Appendix that Kolenc et al. (2011, Zootaxa: 1969: 1-35). New specimens: **URUGUAY**: "Monte–video" MNHN 4501 (syntype, examined by photographs); Barra de Valizas CENAI 6204*, CENAI 6205*.

Pleurodema cf. *thaul*. – **CHILE**: Valparaiso RMNH 2277 (examined by photographs). *Pleurodema thaul*. – **CHILE**: Concepción CENAI 4428-4430; El Correntoso (Chamiza): near Puerto Montt CENAI 1952*; Icalma MLP 1170; Los Andes FML 3309; Mallín de Lago Todos los Santos MLP 3530; Pirehueico FML 3761 (specimens); Quebrada El Teniente FML 3310; Valdivia: Selvas de Toltein MACN 4640-4646. **ARGENTINA**: Chubut Province: Esquel: Parque Nacional Los Alerces CENAI 8826*; Neuquén Province: Aluminé MACN 11648*, MACN 11649*; Isla Victoria MLP A. 1449-1450, CENAI 4107*, MACN 9092*; Junín de los Andes MACN 28701*, MACN 28702*, MACN 28703*, MACN 29214*, MACN 32114*, MACN 32118*; Lago Aluminé: La Angostura MLP 1168; Lago Curruhé CENAI 2170-2171; Los Lagos: Laguna Pire MLP 4002; Río Negro Province: El Bolsón CENAI 3617*, CENAI 3619*; Nahuel Huapi MLP 1276–1277; near Puerto Blest CENAI 1527 (specimen 5)*, CENAI 1527 (specimen 8)*; San Carlos de Bariloche CENAI 7156, MACN 31552.