



Revisiting the type series of *Phyllomedusa guttata* A. LUTZ, 1924 (Anura: Hylidae): notes on specimens and lectotype designation

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Abstract. We revised the taxonomic history and composition of the type series of *Phyllomedusa guttata* A. LUTZ, 1924, which was not defined in the original description. According to subsequent works, the type series of *P. guttata* comprises syntypes deposited in the ADOLPHO LUTZ Collection at the Museu Nacional, Rio de Janeiro, Brazil, and in the United States National Museum of Natural History at the Smithsonian Institution. We reviewed the two putative lectotype designations and concluded that both were invalid according to the International Code of Zoological Nomenclature. Therefore, we have updated the information on the type series of *P. guttata* and formally designate and describe a lectotype for *Phyllomedusa guttata* A. LUTZ, 1924.

Key words. Amphibia, *Phyllomedusa*, *Phasmahyla*, syntypes, lectotype, ICZN, taxonomy.

Resumo. Revisamos a história taxonômica e a composição da série tipo de *Phyllomedusa guttata* A. LUTZ, 1924 não definida na descrição original. De acordo com trabalhos subsequentes, a série tipo de *P. guttata* é composta por sítipos depositados na Coleção ADOLPHO LUTZ do Museu Nacional, Rio de Janeiro, Brasil e no United States National Museum of Natural History – Smithsonian Institution. Revisamos as duas supostas designações de lectótipos e concluímos que ambas eram inválidas de acordo com o Código Internacional de Nomenclatura Zoológica. Assim, atualizamos as informações sobre a série tipo de *P. guttata* e designamos e descrevemos formalmente um lectótipo para *Phyllomedusa guttata* A. LUTZ, 1924.

Palavras-chave. Amphibia, *Phyllomedusa*, *Phasmahyla*, sítipos, lectótipo, ICZN, taxonomia.

Introduction

ADOLPHO LUTZ (1855–1940), one of the most important Brazilian scientists, left an invaluable legacy in numerous scientific fields, including herpetology. He worked at the Instituto Oswaldo Cruz (nowadays Fundação Oswaldo Cruz) between 1908 and 1940, where he assembled a significant herpetological collection comprising more than 6,000 amphibian specimens from various parts of the world, mainly from southeastern Brazil (BENCHIMOL et al. 2003, POMBAL & CARAMASCHI 2007). In the mid-1930s, ADOLPHO LUTZ donated part of his collection, about 1,100 specimens (including some type specimens), to DORIS M. COCHRAN, herpetology curator at the United States National Museum of Natural History at the Smithsonian Institution (USNM). These specimens were incorporated into the collection she made during a field trip to Brazil in 1935. (COCHRAN 1955, POMBAL & CARAMASCHI 2007).

ADOLPHO LUTZ published a series of valuable contributions to amphibian taxonomy and natural history, describing 58 species, some of them in succinct notes but without specifying type specimens or analysed specimens, which was not a requirement in taxonomic publications of his time (see POMBAL & CARAMASCHI 2007). He passed away in October 1940 at the age of 85, and this date is considered the closure of the ADOLPHO LUTZ collection, with no further specimens being incorporated thereafter. Despite this, his daughter, BERTHA LUTZ, continued to study her father's collection, describing new species (B. LUTZ 1949a, b, 1950, 1952, 1958), some of which had been previously identified by ADOLPHO LUTZ. BERTHA attributed the authorship of these new taxon to him (e.g., B. LUTZ & KLOSS 1952, B. LUTZ 1954). During this time, BERTHA LUTZ also completed the catalogue of the ADOLPHO LUTZ collection and arranged for its transfer to the Museu Nacional – Universidade Federal do Rio de Janeiro (BENCHIMOL et al.

2003, POMBAL & NASCIMENTO 2021), where it remains to this day, now under the acronym AL-MN (ADOLPHO LUTZ Collection – Museu Nacional).

Phyllomedusa guttata A. LUTZ, 1924 (currently in the genus *Phasmahyla*) was introduced to the scientific community by ADOLPHO LUTZ during a meeting of the Brazilian Society of Biology on 5 November 1923. During the session, A. LUTZ presented a brief communication indicating that this species was rare and could only be found in the mountains near Rio de Janeiro ('... *guttata* Lutz, bien plus rare et trouvée seulement dans les montagnes, près de Rio,' in the original communication). This communication was published on 1 January 1924 in the *Comptes Rendus Hebdomadaires des Séances et Mémoires de la Société de Biologie et de ses Filiales* (A. LUTZ 1924) and fully satisfied the requirements of Article 8 of the International Code of Zoological Nomenclature for recognizing *P. guttata* as a valid species (ICZN 1999). In 1939, ADOLPHO and BERTHA LUTZ provided a detailed account of the taxonomy, natural history, and morphology of adults and tadpoles of species within the subfamily Phyllomedusinae from the areas surrounding the municipality of Rio de Janeiro (A. LUTZ & B. LUTZ 1939b). They presented a thorough redescription of *P. guttata* based on an adult male specimen labelled "A. LUTZ Coll. N° 3" from the ADOLPHO LUTZ collection. They also reported that a series of male cotypes, as well as the female cotype, labelled "A. LUTZ Coll. N° 9", did not exhibit any variation (A. LUTZ & B. LUTZ 1939b).

No citation was made of the type-series of *Phyllomedusa guttata* until COCHRAN (1955). She provided a detailed description of an adult male (USNM 96338) collected in Corcovado, Rio de Janeiro, and indicate that it is a 'cotype'. She also included in the examined material, a second 'cotype' specimen (USNM 96317) from Sumaré, Distrito Federal (now the municipality of Rio de Janeiro, state of Rio de Janeiro, Brazil). In a broad review of *Phyllomedusa* (sensu lato), FUNKHOUSER (1957) cited in the chresonymic list (sensu DUBOIS 2000) of *P. guttata* that the holotype is a male in the ADOLPHO LUTZ collection with snout-vent length of 35 mm (referred to simply as 'length' in FUNKHOUSER 1957). COCHRAN (1961), in the USNM catalogue of herpetology types, listed five cotypes: USNM 96244, 96245, 96246, 96317, and 96388. DUELLMAN (1977) in his catalogue included as syntypes of *P. guttata* the specimens in COCHRAN (1961) along with two additional specimens from ADOLPHO LUTZ collection: AL-MN 297 and AL-MN 449. Despite the various taxonomic and group rearrangements within phyllomedusine frogs (e.g., LUTZ 1950, 1969, FUNKHOUSER 1957, DUELLMAN 1968), *P. guttata* remained in the genus *Phyllomedusa* until the review by CRUZ (1990), which erected and described the genus *Phasmahyla* for the leaf-frogs of the *P. guttata* group (sensu CRUZ, 1982), designating *Phyllomedusa guttata* A. LUTZ, 1924, as the type species of the genus. Interestingly, seven new species related to *P. guttata* were described after A. LUTZ's (1924) description (BOKERMANN 1966, BOKERMANN & SAZIMA 1978, CRUZ 1980, CRUZ et al. 2008a, b, CARVALHO-E-SILVA et al.

2009, PEREIRA et al. 2018). However, curiously, these species descriptions do not compare the new taxon with any of the syntypes cited by A. LUTZ & B. LUTZ (1939b), COCHRAN (1955, 1961) or DUELLMAN (1977).

As detailed above, the primary issues with the type series of *Phyllomedusa guttata* focus on the lack of knowledge about its composition, the discrepancies in the numbering assigned to specimens by subsequent authors (A. LUTZ & B. LUTZ 1939b, COCHRAN 1955, 1961, DUELLMAN 1977), and the two putative lectotype designations (A. LUTZ & B. LUTZ 1939b, FUNKHOUSER 1957). To address these issues, we conducted a thorough review of the historical information regarding the type series of *P. guttata*, including a detailed examination of the specimens housed in the herpetological collections of the Museu Nacional, Universidade Federal do Rio de Janeiro (AL-MN and MNRJ) and the United States National Museum of Natural History, Smithsonian Institution (USNM). In conclusion, we clarify the composition of the type series of *Phyllomedusa guttata* A. LUTZ, 1924, and designate a lectotype for the species to prevent further nomenclatural issues.

Material and methods

Literature review and voucher specimens

To trace the information regarding the type series of *Phyllomedusa guttata*, we followed four steps: (1) reviewing the taxonomic literature of *P. guttata* to identify references to the type specimens, such as voucher numbers, type locality, and collection date; (2) examining the catalogues and notes of AL-MN, MNRJ, and USNM collections; (3) searching for and verifying the identity of *P. guttata* specimens in the AL-MN, MNRJ, and USNM catalogues; and (4) revising the Phyllomedusinae specimens in the AL-MN, MNRJ, and USNM collections, to identify any misidentified specimens of *P. guttata*.

The formal species description was published on 1 January 1924 (A. LUTZ 1924), therefore we established 31 December 1923, as the deadline for identifying potential type specimens of *Phyllomedusa guttata*. Where necessary, any original information from the taxonomic literature is enclosed in quotation marks. Data and figures relating to the erroneous type series cited by A. LUTZ & B. LUTZ (1939b) are presented in the main text and in the Supplementary Material section (see Results below).

Measurements and external morphology

We measured 20 characters of the lectotype as summarized and revised by WATTERS et al. (2016): snout-vent length (SVL), head length (HL), head width (HW), internarial distance (IND), interorbital distance (IOD), eye diameter (ED), eye-nostril distance (END), eye-snout distance (ESD), tympanum diameter (TD), arm length (AL), forearm length (FAL), hand length (HAL), disc width of Finger II (2FW), disc width of Finger IV (4FW), thigh length

(THL), tibia length (TBL), tarsus length (TAL), foot length (FL), disc width of Toe I (1TW), and disc width of Toe IV (4TW). The measurements were taken using a Mitutoyo digital calliper (precision 0.01 mm) under a Zeiss Stemi SV-11 stereomicroscope. We numbered the adult fingers from II to V, following FABREZI & ALBERCH (1996). The sex of specimens in the type series was determined by the presence of nuptial pads with papillary epidermal projections in males (males of *Phyllomedusa guttata* do not have vocal slits and expanded external vocal sacs) and visualisation of oocytes through dorsolateral dissection or translucent skin in females. We use the term dorsolateral macroglands to describe the glands found in Phyllomedusinae, as recommended by ANTONIAZZI et al. (2013), rather than the historically used term parotoid macroglands.

Results

Potential type specimens

We identified 22 specimens in the AL-MN and USNM collections that could potentially be syntypes of *Phyllomedusa guttata* (Table 1). We personally located and examined all specimens cited as type or cotype by COCHRAN (1955, 1961) and DUELLMAN (1977), as well as those referenced in A. LUTZ & B. LUTZ (1939b). In the original description of *P. guttata*, A. LUTZ (1924) did not provide any information regarding the labelled specimens (i.e., vouchers) for this new taxon. However, he briefly described the tadpoles and adults as follows: “Nous avons trouvé 2 espèces de *Phyllomedusa*, genre strictement nocturne, à pupille elliptique. C’est d’abord l’espèce *hypochondrialis*, assez commune autour de Rio, et, ensuite, une nouvelle espèce: *guttata* Lutz, bien plus rare et trouvée seulement dans les montagnes, près de Rio. Nous avons trouvé d’abord un nouveau têtard, qui a la bouche allongée en entonnoir, avec lequel il se suspend à la surface de l’eau, ce qui s’observe aussi chez la larve de l’*hypochondrialis*. Les deux espèces ont la taille de la Rainette d’Europe, mais elles sont plus grêles. La *guttata* montre sur les flancs une vingtaine de taches rondes d’un bleu violacé sur fond orangé; l’autre est décorée des mêmes couleurs, mais disposées tout différemment. Les 2 espèces se distinguent aussi par leur voix. La *guttata* peut être attrapée la nuit, quand on l’entend chanter au voisinage de l’eau où l’on a trouvé ses têtards.” [In free translation: We found two species of *Phyllomedusa*, a strictly nocturnal genus with elliptical pupils. The first species is *hypochondrialis*, quite common around Rio, and then a new species: *guttata* LUTZ, much rarer and found only in the mountains, near Rio. We first found a new tadpole, which has an elongated funnel-shaped mouth, with which it clings to the surface of the water, a feature also observed in the larva of *hypochondrialis*. Both species are the size of the European tree frog but are slenderer. The species *guttata* has about twenty round violet-blue spots on an orange background on its flanks; the other is decorated with the same colours but arranged differently. The two species are also distinguished by their calls. The species *guttata* can be caught at

night when its call is heard near the water where its tadpoles were found].

It is evident that ADOLPHO LUTZ included at least one adult and one tadpole in the species description, as demonstrated by the description of the colour pattern of adults and morphology of tadpoles outlined above. Furthermore, it is clear that he did not designate a primary type for *P. guttata* (i.e., holotype). In this case, the International Code of Zoological Nomenclature (hereafter, The Code) in its Article 73.2 (ICZN 1999) states that the type series is composed of syntypes. This syntype conjecture is supported by subsequent publications that cited a series of cotypes for *P. guttata* (A. LUTZ & B. LUTZ 1939b, COCHRAN 1955, 1961, DUELLMAN 1977), as well by Articles 72.4.1, 72.4.1.1, and 73.2.1, of The Code, which support the recognition of an unknown series of syntypes based on bibliographic inference or any kind of evidence (ICZN 1999). Thus, we can conclude that the type-series of *P. guttata* is composed of syntypes, specifically adults and tadpoles collected ‘only in the mountains, near Rio de Janeiro’ until the date of 31 December 1923.

Type locality

A. LUTZ (1924) mentioned that *Phyllomedusa guttata* is a rare species found only in “the mountains near Rio”. Today, Rio de Janeiro is a highly urbanised conurbation, encompassing the municipalities of Duque de Caxias, Mesquita, Nilópolis, Nova Iguaçu, Rio de Janeiro, and São João de Meriti. This conurbation lies in a coastal plain extending around Guanabara Bay, between isolated coastal massifs (Mendanha-Geridó, Pedra Branca, and Tijuca) and towards the Serra dos Órgãos (the local name for the Serra do Mar), a 2,000 m high escarpment (FERNANDES et al. 2010, DANTAS & MELLO 2022). Since A. LUTZ (1924) stated that the specimens were registered “only in the mountains near Rio”, it is possible that the presumed syntypes could have originated from any of the massifs mentioned above. We exclude the possibility of the massifs Mendanha-Geridó and Pedra Branca, and Serra dos Órgãos being the type locality because: (1) there are no descriptions or specimens collected by A. LUTZ from the Mendanha-Geridó or Pedra Branca massifs; (2) A. LUTZ explicitly referred to Serra dos Órgãos as the type locality when describing new taxa from this locality (see A. LUTZ 1925, 1932, A. LUTZ & B. LUTZ 1939a, b); and (3) all syntypes indicated by COCHRAN (1955, 1961) and DUELLMAN (1977) were collected from localities in the Tijuca Massif. Therefore, we conclude that the syntypes were obtained from the Tijuca Massif.

Previous invalid lectotype designations

We found evidence of two possible lectotype designations for *Phyllomedusa guttata*, one in A. LUTZ & B. LUTZ (1939b) and one in FUNKHOUSER (1957). Each publication warrants a particular comment.

Table 1. Presumed type specimens (syntypes) of *Phyllomedusa guttata* A. LUTZ, 1924, including its citations in the literature, of the ADOLPHO LUTZ Collection (AL-MN), housed in the Museu Nacional, Rio de Janeiro, Brazil and in the United States National Museum of Natural History (USNM), Washington, D.C. ^a Translated from Portuguese. ^b Voucher specimen erroneously cited by COCHRAN (1961) and DUELLMAN (1977) as USNM 96244. ^c Voucher specimen erroneously cited by COCHRAN (1961) and DUELLMAN (1977) as USNM 96245. ^d Voucher specimen erroneously cited by COCHRAN (1961) and DUELLMAN (1977) as USNM 96388.

Voucher (previous number)	Locality	Collection date	Collector	Sex and/or stage	AL-MN Collection	USNM Collection	A. LUTZ & B. COCHRAN (1939)	FUNKHOUSER (1957)	COCHRAN (1961)	DUELLMAN (1977)
AL-MN 297 (A. LUTZ coll. N°22)	Brazil, Rio de Janeiro, Tijuca	December 1922	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Tadpole	Type [#]	-	-	-	-	Cotype
AL-MN 298 (A. LUTZ coll. N°18)	Brazil, Rio de Janeiro, Tijuca	December 1922	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Tadpole	Paratype [#]	-	-	-	-	-
AL-MN 447 (A. LUTZ coll. N°04)	Brazil, Rio de Janeiro, Tijuca, Sumaré	April 10, 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype [#]	-	-	-	-	-
AL-MN 448 (A. LUTZ coll. N°04)	Brazil, Rio de Janeiro, Tijuca, Sumaré	April 10, 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype [#]	-	-	-	-	-
AL-MN 449	Brazil, Rio de Janeiro, Tijuca, Sumaré	April 10, 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype [#]	-	-	-	-	Cotype
AL-MN 1973 (A. LUTZ coll. N°03)	Brazil, Rio de Janeiro, Tijuca	April 25, 1929	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	Type [#]	-	-	-	-	-
AL-MN 1973a (A. LUTZ coll. N°03)	Brazil, Rio de Janeiro, Tijuca	April 25, 1929	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	One froglet and one tadpole	Type [#]	-	-	-	-	-
AL-MN 2371 (A. LUTZ coll. N°04)	Brazil, Rio de Janeiro, Angra dos Reis	March, 1932	TRAVASSOS; PEN.; WERN.	Adult male	Cotype [#]	-	-	-	-	-
AL-MN 3036 (A. LUTZ coll. N°06)	Brazil, Rio de Janeiro, Tijuca	January 21, 1938	BERTHA LUTZ; JOAQUIM VENÂNCIO	Dry adult male	Cotype	-	-	-	-	-
AL-MN 3624 (A. LUTZ coll. N°08)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Type [#]	-	-	-	-	-
AL-MN 3625 (A. LUTZ coll. N°07)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Type [#]	-	-	-	-	-
AL-MN 3685 (A. LUTZ coll. N°09)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult female	Cotype	-	-	-	-	-
AL-MN 3686 (A. LUTZ coll. N°14)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype	-	-	-	-	-
AL-MN 3687 (A. LUTZ coll. N°13)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype	-	-	-	-	-
AL-MN 3688 (A. LUTZ coll. N°11)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype	-	-	-	-	-
AL-MN 3689 (A. LUTZ coll. N°12)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype	-	-	-	-	-
AL-MN 3690 (A. LUTZ coll. N°10)	Brazil, Rio de Janeiro, Tijuca	March 1939	BERTHA LUTZ; JOAQUIM VENÂNCIO	Adult male	Cotype	-	-	-	-	-
USNM 96224	Brazil, Rio de Janeiro, Tijuca	November 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	-	Cotype	-	Specimen examined	Cotype ^a	Cotype ^a
USNM 96225	Brazil, Rio de Janeiro, Tijuca	November 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Tadpoles (02)	-	Cotype	-	Specimen examined	Cotype ^b	Cotype ^b
USNM 96226	Brazil, Rio de Janeiro, Tijuca	February 2, 1920	ADOLPHO LUTZ	Adult male	-	Cotype	-	Specimen examined	Cotype ^c	Cotype ^c
USNM 96317	Brazil, Rio de Janeiro, Tijuca	January 28, 1920	ADOLPHO LUTZ	Young male	-	Cotype	-	Specimen examined	Cotype	Cotype
USNM 96338	Brazil, Rio de Janeiro, Tijuca	November 1923	ADOLPHO LUTZ	Adult male	-	Cotype	-	-	Cotype ^d	Cotype ^d

Lectotype designation by A. LUTZ & B. LUTZ (1939b): A. LUTZ & B. LUTZ (1939b:225–227) provided a detailed description of an adult male labelled “A. LUTZ Coll. N° 3” and subsequently (p. 228) presented some measurements of a male identified as “Type ♂” with no number associated with it. Although they do not objectively state that the described specimen is a type of *Phyllomedusa guttata*, we can infer that the detailed species description on pages 225–227, followed by the measurements on page 228, refers to a single specimen: “A. LUTZ Coll. N° 3” a “Type ♂”. They also mentioned that the specimen “A. LUTZ Coll. N° 9” is the female cotype (p. 227) and provided its measurements as “Female (N° 9)” on page 228. The male type and female cotype were also depicted in photograph 2 of Plate II (Supplementary Figs 1A–B). On the same plate, A. LUTZ & B. LUTZ (1939b:259) also illustrated five male cotypes in photograph 04, as indicated by original figure caption written in both English and Portuguese (Supplementary Figs 1A–B): “Photo 2. *Ph. guttata* Lutz: ♂ type and ♀ co-type, (N° 9) showing relative size. O tipo ♂ e co-tipo ♀ mostrando o tamanho relativo de um e outro; Photo 4. *Ph. guttata* Lutz: Series of ♂ cotypes showing unusual variations. Series de co-tipos ♂ com variações não usuas”.

The cotype “A. Lutz Coll. N° 9” is also illustrated in figure 5 of Plate VIII, according to the figure caption on page 263 written in both English and Portuguese (Supplementary Figs 2A–B): “Fig. 5 *Ph. guttata* Lutz: Mouth cavity showing pear-shaped tongue and absence of vomerine teeth Cotype N° 9 (♀). Cavidade buccal, mostrando a lingua pyriforme e a ausencia de vomerinos Cotypo N° 9 (♀)”.

Based on the evidence presented above, we can infer that the type series of *Phyllomedusa guttata* mentioned by A. LUTZ & B. LUTZ (1939b) is composed of at least seven syntypes: “A. LUTZ Coll. N° 3 (male)”, “A. LUTZ Coll. N° 9 (female)”, and five males (“a series of ♂ cotypes showing unusual variations”, Plate II/Photograph 2).

Although the exact number of specimens analysed in the original description of *P. guttata* is unknown, we can assume that these specimens are syntypes. In agreement with this conclusion, we also found evidence that A. LUTZ & B. LUTZ (1939b) recognised the male “A. LUTZ Coll. N° 3 (male)” as the lectotype of *P. guttata* when they used the term “Type ♂” for this specimen (see comments above), and the remaining specimens as paralectotypes (the female cotype A. LUTZ Coll. N° 9 and the five cotypes males on Plate II/Photograph 2). This conclusion is further supported by Article 74.5 of The Code (ICZN 1999).

We conducted a search for the cited specimens above in the AL-MN collection and catalogue and discovered some problems. In this catalogue, the specimens AL-MN 03 and AL-MN 09 are, respectively, a specimen of *Boana faber* (WIED, 1821) and *Physalaemus cuvieri* FITZINGER, 1826. When BERTHA LUTZ transferred the ADOLPHO LUTZ collection from the Instituto Oswaldo Cruz to the Museu Nacional, she revised the specimens in her father’s collection and prepared a new catalogue (U. CARAMASCHI & J. P. POMBAL, unpubl. data). At this point, she assigned a new

numeration and acronyms (AL-MN: Adolpho Lutz Collection – Museu Nacional) to all specimens, as cited by her:

“Faltam os exóticos que terminarei ainda este mês. Depois terão de ser refeitos os rótulos e feitas novas fichas. Temos ainda lagartixas, cobras e alguns crânios ou peles de vertebrados (BENCHIMOL et al. 2003:231) [In free translation: I still need to sort out the exotics that I will finish this month. So, the labels will have to be redone, and new sheets made. We also have lizards, snakes and some vertebrate skulls or skins].”

Since the specimens of the ADOLPHO LUTZ collection received new tag numbers, we searched for type series information on the entries of *Phyllomedusa guttata* in the AL-MN catalogue and revised the secondary information on the jar labels of the specimens. We found 16 citations of specimens that are potential ‘types’ or ‘cotypes’ of *P. guttata* in the AL-MN catalogue and jar labels (Table 1); we also found the previous tag numbers cited by A. LUTZ & B. LUTZ (1939b) in some specimens or information on the jar labels (see voucher [previous number] in Table 1). We did not properly consider the specimens AL-MN 1973+a (these specimens were divided into two lots: AL-MN 1973, one adult male, and AL-MN 1973a, one froglet and one tadpole), 2371, 3036, 3624, 3625, 3685–3690 as putative syntypes since they were collected after the species description (see collection date in Table 1). However, we must comment on the type series indication recovered in the specimens AL-MN 1973+a, 3624, 3625, 3685–3690 to clarify the type series information of A. LUTZ & B. LUTZ (1939b).

In the ADOLPHO LUTZ catalogue the specimen AL-MN 1973+a is originally identified as ‘TIPO’; however, this information was struck through, while the jar label has the information that it is the specimen “A. LUTZ Coll. N° 3” (Figs 1A–C), the presumable lectotype of *Phyllomedusa guttata* designated by A. LUTZ & B. LUTZ (1939b) as stated above.

The specimens AL-MN 3624–3625 (Figs 2A–B) bear two notes indicating that they are cotypes 7 and 8 according to the jar label, and the types according to the catalogue (‘TIPOS’ in the ADOLPHO LUTZ catalogue, manually struck through). In the catalogue, a handwritten observation was added noting that the specimens ‘N 3685–3690’ are the types. The specimens AL-MN 3685–3690 are identified as cotypes in the ADOLPHO LUTZ catalogue (‘COTIPOS’ in the original). These specimens, AL-MN 3685–3690, have two tags: one with the AL-MN catalogue number and another with the old numeration, along with six jar labels individually identifying them as “Cotypes of *Phyllomedusa guttata*”. The voucher AL-MN 3685 is a female and has a tag number 9 agreeing with the tag number of the female cotype cited by A. LUTZ & B. LUTZ (1939b), while the remaining specimens (AL-MN 3686–3690) are males and have numbered tags from 10 to 14 (Figs 3A–F). These specimens match the general morphological posture depicted in the Plate II/Photographs 2 and 4 of A. LUTZ & B. LUTZ (1939b) (Figs 2A–B; 3A–F; Supplementary Figs 1A–B).

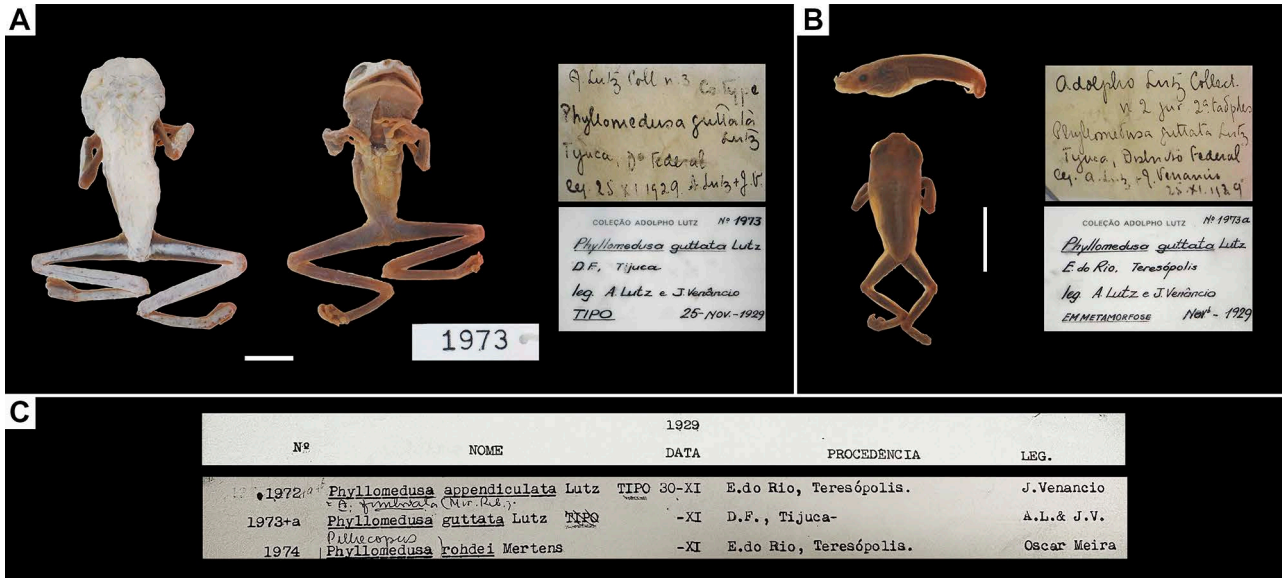


Figure 1. Specimens erroneously assigned to the type series of *Phyllomedusa guttata* with respective jar labels: adult male AL-MN 1973 (A. LUTZ Coll. N° 3) in ventral and dorsal view (A); tadpole and froglet AL-MN 1973a (B); and detail of the information present in the ADOLPHO LUTZ catalogue (C). Scale bar = 10 mm. Photographs by D. BAÊTA.

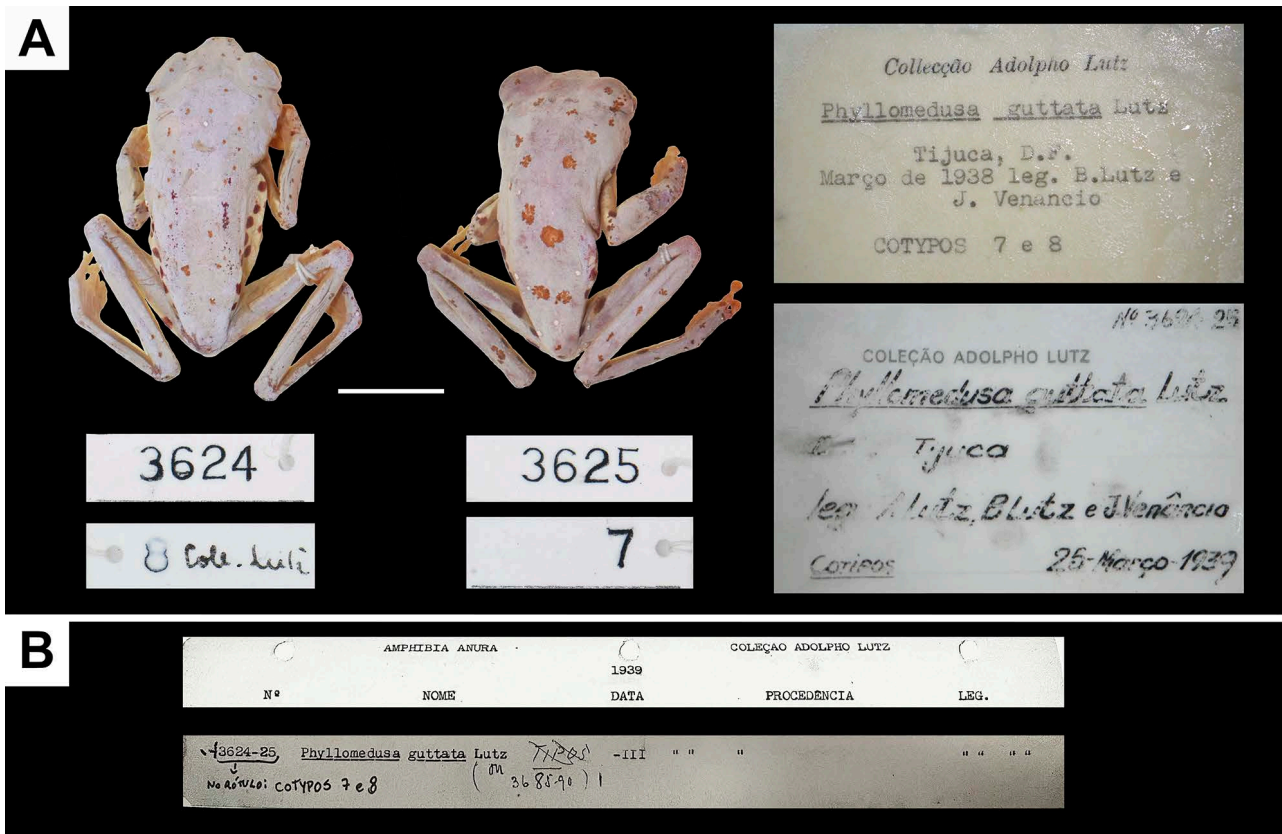


Figure 2. Specimens erroneously assigned to the type series of *Phyllomedusa guttata*: adult males AL-MN 3624 (A. LUTZ Coll. N° 8) and AL-MN 3625 (A. LUTZ Coll. N° 7) in dorsal view with the jar labels (A); and detail of the information present in the ADOLPHO LUTZ catalogue (B). Scale bar = 10 mm. Photographs by D. BAÊTA.

Type series of *Phyllomedusa guttata*

We found the lectotype and paralectotypes designated by A. LUTZ & B. LUTZ (1939b); however, they were collected after the species description, according to the ADOLPHO LUTZ catalogue and their paper tags (Figs 2A–B; 3A–F). The species description was published in 1924, but the lectotype (AL-MN 1973) was collected on 25 November 1929, five years after the species description, while the paralectotypes (AL-MN 3685–3690) were collected in May 1939, 15 years after the species description. Since these specimens

are not syntypes of *Phyllomedusa guttata*, the lectotype designation of A. LUTZ & B. LUTZ (1939b) is invalid according to Article 74.2 of The Code.

Lectotype designation by FUNKHOUSER (1957): FUNKHOUSER (1957) stated that the ‘holotype’ of *Phyllomedusa guttata* is a male with an SVL of 35 mm from the ADOLPHO LUTZ Collection: “... holotype in Adolpho Lutz Collection, Instituto Oswaldo Cruz, male, length 35 mm”. It should be noted that ANNE FUNKHOUSER did not personally examine

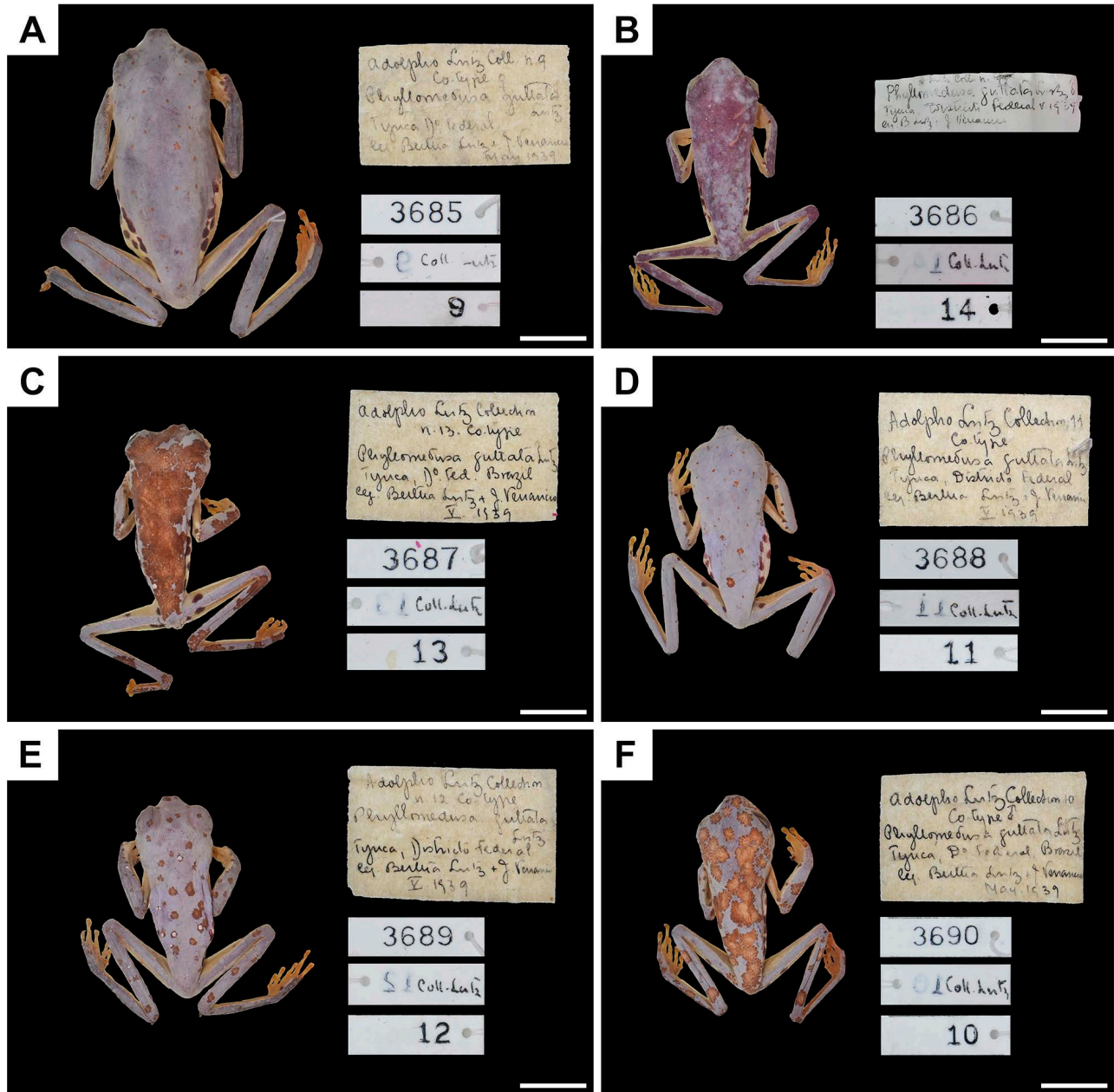


Figure 3. Dorsal view, jar label and voucher tags of presumed type-series of *Phyllomedusa guttata* according to A. LUTZ & B. LUTZ (1939b): AL-MN 3685, female A. LUTZ Coll. N° 9 (A); AL-MN 3686, male A. LUTZ Coll. N° 14 (B); AL-MN 3687, male A. LUTZ Coll. N° 13 (C); AL-MN 3688, male A. LUTZ coll. N° 11 (D); AL-MN 3689, male A. LUTZ Coll. N° 12 (E); AL-MN 3690, male A. LUTZ coll. N° 10 (F). Scale bar = 10 mm. Photographs by D. BAËTA.

any specimen of *P. guttata* from the ADOLPHO LUTZ collection, since she thanked ANTENOR LEITÃO DE CARVALHO (Museu Nacional – Universidade Federal do Rio de Janeiro), for his help with the Brazilian forms. This conclusion is further supported by her list of specimens examined, which included only specimens from the University of Michigan – Museum of Zoology (UMMZ); Sanford University (SU), now housed at California Academy of Sciences (CAS-SU); and United States National Museum (USNM). According to Article 74.5 of The Code (ICZN 1999) “In a lectotype designation made before 2000, either the term lectotype, or an exact translation or equivalent expression (e.g., ‘the type’), must have been used or the author must have unambiguously selected a particular syntype to act as the unique name-bearing type of the taxon. When the original work reveals that the taxon had been based on more than one specimen, a subsequent use of the term holotype does not constitute a valid lectotype designation unless the author, when wrongly using that term, explicitly indicated that he or she was selecting from the type series that particular specimen to serve as the name-bearing type”. Since FUNKHOUSER (1957) did not explicitly express her intention to designate a lectotype, and due to the absence of any suitable evidence that the “holotype with 35 mm of length” is a syntype of *Phyllomedusa guttata* (i.e., voucher number, collection date and locality), this is not a valid lectotype designation.

Regarding the examined specimens of FUNKHOUSER (1957) from USNM – one of the collections where the putative syntypes of *Phyllomedusa guttata* are deposited – we did not find any voucher or information at USNM collection database of the specimens USNM 81148, 96227 and 96642–96643. We confirm the identity of USNM 81147 and 118996 as *P. guttata*; however, they lack information about its collection date, thus unfortunately they cannot be considered syntypes. The specimens USNM 96548–56 do not belong to the type locality of *P. guttata*, as they are from Serra da Bocaina (state of São Paulo, southeastern Brazil), and these specimens are *Phasmahyla cochranae* (BOKERMANN, 1966). At least, three of the specimens examined by FUNKHOUSER (1957), the specimens USNM 96224–26, were cited as cotypes of *P. guttata* by COCHRAN (1955, 1961) and DUELLMAN (1977).

Cotypes in COCHRAN (1955, 1961) and DUELLMAN (1977)

COCHRAN (1955) reported two cotypes (i.e. syntypes) of *Phyllomedusa guttata* in the USNM collection: USNM 96317 and 96338. Regarding the specimens examined, she also indicated the presence of six adults (USNM 81147–48, 96224–25, and 118996–97) and two lots of tadpoles (USNM 96226–27). Of these specimens, we promptly exclude USNM 118996–97 as possible syntypes since they were collected in November 1939 (COCHRAN 1955), 15 years after the species description. The remaining specimens were collected before the species description (Table 1).

In the USNM herpetology type catalogue, COCHRAN (1961) listed five cotypes, including four new specimens not mentioned in his previous publication (COCHRAN 1955): USNM 96244–46 and 96388; and excluding the specimen USNM 96338. However, when searching the USNM collection database, we found that these specimens are not identified as *Phyllomedusa guttata*. Specifically, USNM 96244 is identified as a *Fritziana goeldii* (BOULENGER, 1895), while specimens USNM 96245 and 96246 are identified as *Scinax strigilatus* (SPIX, 1824) (currently *Oloolygon strigilata*), and USNM 96388 is identified as *Scinax perpusillus* (A. LUTZ & B. LUTZ, 1939a) (currently *Oloolygon perpusilla*). These specimens were personally examined, and the identifications were confirmed in the USNM catalogue, with one exception: *Oloolygon strigilata* is a species restricted to the Atlantic Rainforest of southern state of Bahia in Brazil, not occurring in the state of Rio de Janeiro (PIMENTA et al. 2007, FROST 2024). We analysed this specimen and confirmed its identity as *Oloolygon humilis* (A. LUTZ & B. LUTZ in LUTZ, 1954).

Interestingly, COCHRAN (1961) referred to similar tag labels for the types of *P. guttata* compared to those in COCHRAN (1955): USNM 96224, 96226, and 96338. We searched for these specimens in the USNM catalogue and specimen collection and confirmed their identities as *P. guttata*. We conclude that a typographic error occurred in COCHRAN (1961) regarding the original specimens tag labels in COCHRAN (1955), as their tag labels differ from each other only in one number (highlighted in bold): USNM 96224, 96225, 96226, and 96338 in (COCHRAN 1955); and USNM 96244, 96245, 96246, and 96388 in COCHRAN (1961). This error was followed by DUELLMAN (1977).

DUELLMAN (1977) also cited two additional specimens from the ADOLPHO LUTZ collection as cotypes: AL-MN 297 and 449 (as AL-MNRJ in this publication). We located these specimens in the AL-MN collection and confirmed their identities. The specimen AL-MN 297 is a tadpole and AL-MN 449 is an adult male, both collected before the description of *Phyllomedusa guttata* (Table 1).

Identified name-bearing types

To determine the composition of the type series of *Phyllomedusa guttata*, we searched for adults and tadpoles collected until 31 December 1923 on the Tijuca Massif, State of Rio de Janeiro, southeastern Brazil.

The Tijuca Massif is a vast forested area located between the parallels 22°55' – 23°00' S and the meridians 43°11' – 43°19' W. It is characterised by a rugged relief (a faulted block of the Serra do Mar), oriented NE/SW with altitudes varying between 80 m and 1,021 m above sea level (ICMBIO 2008). The Tijuca Massif is home to the Parque Nacional da Floresta da Tijuca (PNFT), a federal conservation unit established by the Brazilian Government on 06 July 1961, covering an area of 3,953 ha and organised in 11 sectors: Andaraí, Corcovado, Covanca, Gávea Pequena, Paineiras, Parque Lage, Serra da Carioca, Serra dos Pretos-

Type series of *Phyllomedusa guttata*

Table 2. Designated lectotype (in bold) and paralectotypes of *Phyllomedusa guttata* A. LUTZ, 1924 of the ADOLPHO LUTZ Collection (AL-MN) housed in the Museu Nacional, Rio de Janeiro, Brazil and in the United States National Museum of Natural History (USNM), Washington D.C., USA.

Voucher No.	Type status	Locality	Collection date	Collector	Sex and/or stage	SVL
AL-MN 449	Lectotype	Brazil, Rio de Janeiro, Tijuca	April 10, 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	34.8 mm
AL-MN 297 (A. LUTZ coll. N°22)	Paralectotype	Brazil, Rio de Janeiro, Tijuca	December 1922	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Tadpole	–
AL-MN 298 (A. LUTZ coll. N°18)	Paralectotype	Brazil, Rio de Janeiro, Tijuca	December 1922	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Tadpole	–
AL-MN 447 (A. LUTZ coll. N°04)	Paralectotype	Brazil, Rio de Janeiro, Tijuca, Sumaré	April 10, 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	34.6 mm
AL-MN 448 (A. LUTZ coll. N°04)	Paralectotype	Brazil, Rio de Janeiro, Tijuca, Sumaré	April 10, 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male	33.3 mm
USNM 96224	Paralectotype	Brazil, Rio de Janeiro, Tijuca	November 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Adult male (dry)	34.7 mm
USNM 96225	Paralectotype	Brazil, Rio de Janeiro, Tijuca	November 1923	ADOLPHO LUTZ; JOAQUIM VENÂNCIO	Tadpoles (02)	–
USNM 96226	Paralectotype	Brazil, Rio de Janeiro, Tijuca	February 2, 1920	ADOLPHO LUTZ	Adult male (dry specimen)	34.3 mm
USNM 96317	Paralectotype	Brazil, Rio de Janeiro, Tijuca	January 28, 1920	ADOLPHO LUTZ	Young male	–
USNM 96338	Paralectotype	Brazil, Rio de Janeiro, Tijuca	November 1923	ADOLPHO LUTZ	Adult male	34.1 mm

Forros/Covanca, Tijuca, Trapicheiro, and Três Rios (ICMBIO 2008). The PNFT also hosts some famous tourist attractions in the city of Rio de Janeiro, such as Cristo Redentor, Mesa do Imperador, Vista Chinesa, and the Parque Nacional da Floresta da Tijuca itself.

In addition to the syntypes listed in COCHRAN (1955, 1961) and DUELLMAN (1977), we found three additional specimens in the ADOLPHO LUTZ collection that meet the criteria to be considered syntypes of *P. guttata*: a tadpole (AL-MN 298), and two adult males (AL-MN 447 and 448) (Tables 1–2), all collected before the species description in 1924. Therefore, we conclude that only ten specimens fulfil the requirements to be syntypes of *P. guttata* (Table 2). Due to the issues detailed above regarding the type series of *P. guttata*, and the presence of different semaphoronts in its composition, in accordance with Article 74 of The Code (ICZN 1999), we designate the syntype AL-MN 449 as the lectotype of *Phyllomedusa guttata* A. LUTZ, 1924, to clarify the application of this name and prevent nomenclatural issues.

Lectotype designation and description
Phyllomedusa guttata A. LUTZ, 1924

Lectotype: AL-MN 449 (Figs 4A–F), an adult male collected in Sumaré, Parque Nacional da Floresta da Tijuca, municipality of Rio de Janeiro, state of Rio de Janeiro, Brazil (D.F., Sumaré, Tijuca in the original label) by ADOLPHO LUTZ and JOAQUIM VENÂNCIO on 10 April 1923.

Remarks on the type locality: During the period between 1891 and 1960, the Brazilian Federal Capital was in the Federal District (D.F. = Distrito Federal in Portuguese) which corresponded to the current limits of the municipality of Rio de Janeiro; the Brazilian Federal Capital was transferred to Brasília in 1960, a new city specifically constructed for this purpose. Therefore, in accordance with the current Brazilian geopolitical boundaries and definitions, we update the original locality of the lectotype (D.F., Sumaré, Tijuca) to: Brazil, state of Rio de Janeiro, municipality of Rio de Janeiro, Parque Nacional da Floresta da Tijuca, Sumaré.

Paralectotypes: AL-MN 297–298 (two lots of tadpoles) collected by A. LUTZ and J. VENÂNCIO on December 1922; AL-MN 447–448, (adult males) collected by A. LUTZ and J. VENÂNCIO on 10 April 1923; USNM 96224 (adult male) and USNM 96225 (two tadpoles) collected by A. LUTZ and J. VENÂNCIO on November 1923; USNM 96226 (adult male) collected by A. LUTZ and J. VENÂNCIO on 02 February 1920; USNM 96317 (a young male) collected by A. LUTZ on 28 January 1920; and USNM 96338 (adult male) collected by A. LUTZ and J. VENÂNCIO on November 1923. The complete locality data are provided in Table 1.

Description of the lectotype (Figs 4A–F): A medium-sized phyllomedusine species (SVL = 34.8 mm); body robust (for the genus *Phasmahyla*); head longer (HL = 12.6 mm) than wide (HW = 11.8 mm); head length 36.2% of SVL;

snout truncated in both dorsal and lateral views; nostril anterolateral and not protruded (its opening can be visualized anteriorly), nearest to tip of snout; internarial distance 21.2% of HW; canthus rostralis concave and marked; loreal region oblique; eye large and protuberant (eye diameter 38.1% of HL), its posterior margin in contact with anterior margin of tympanum; palpebral membrane with barely reticulated pattern nearest to its ventral margin; dorsolateral tympanum rounded and visible only on the left side of head; tympanic annulus visible only on its left ventral side; tympanum diameter equal to 19% of head length; supratympanic fold present, distinct only in the posterior margin of tympanum and obliquely oriented to the insertion of arm; tongue cordiform, anteriorly attached, laterally and posteriorly free; dentigerous process of vomer absent; choanae oval and widely separated; vocal slits and vocal sac absent. Forelimbs robust; forearm with a smooth dermal ridge on lateral margins, more evident on elbow margin; fingers slender, order of length $II < III < V < IV$; subarticular tubercles well developed, single, rounded or conical; supernumerary tubercles absent; thenar tubercle oval, covering the entire ventral length of metacarpus and to half of its width; palmar tubercle absent; adhesive discs rounded; dark coloured keratinized papillary epidermal projections (nuptial pad) covers entire dorsal and lateral

surface of metacarpus on finger II; fingers not webbed. Hindlimbs robust; tibia length 47.4% of SVL; lateral and medial margins of tibia with a smooth dermal ridge; lateral margins of tarsus with a smooth dermal ridge, from calcar to basal metatarsus of toe V; conical and robust calcar present at latero-postaxial margin, covering one fourth of heel width; toes slender, order of length: $I < II < III < V < IV$; subarticular tubercles single, rounded or conical, well developed; supernumerary tubercles absent; inner metatarsal tubercle oval, covering two thirds of metatarsus length and one third of metatarsus width; outer metatarsal tubercle rounded at the base of the toes II and IV; adhesive discs rounded; toes not webbed. Skin on dorsum of body and limbs smooth due the age of the specimen; however, we can visualize some asperities; gular region rough and venter areolate; ventral surface of femur areolate, increasing in density below cloaca; skin on venter of hindlimbs, tibia, and tarsus smooth; osteoderms and dorsolateral macroglands absent; dorsolateral glands present; pterorhodin pigment present in skin; cloacal opening at upper level of thighs with no ornamentation.

Measurements: SVL 34.8; HL 12.6; HW 11.8; IND 2.5; IOD 4.3; END 2.6; ESD 4.3; ED 4.8; TD 2.4; AL 10.9; FAL 8.4; HDL 8.9; 2FW 1.1; 4FW 1.0; THL 17.2; TBL 16.5; TAL 10.8; FTL 11.1; 1TW 1.0; 4TW 0.8.

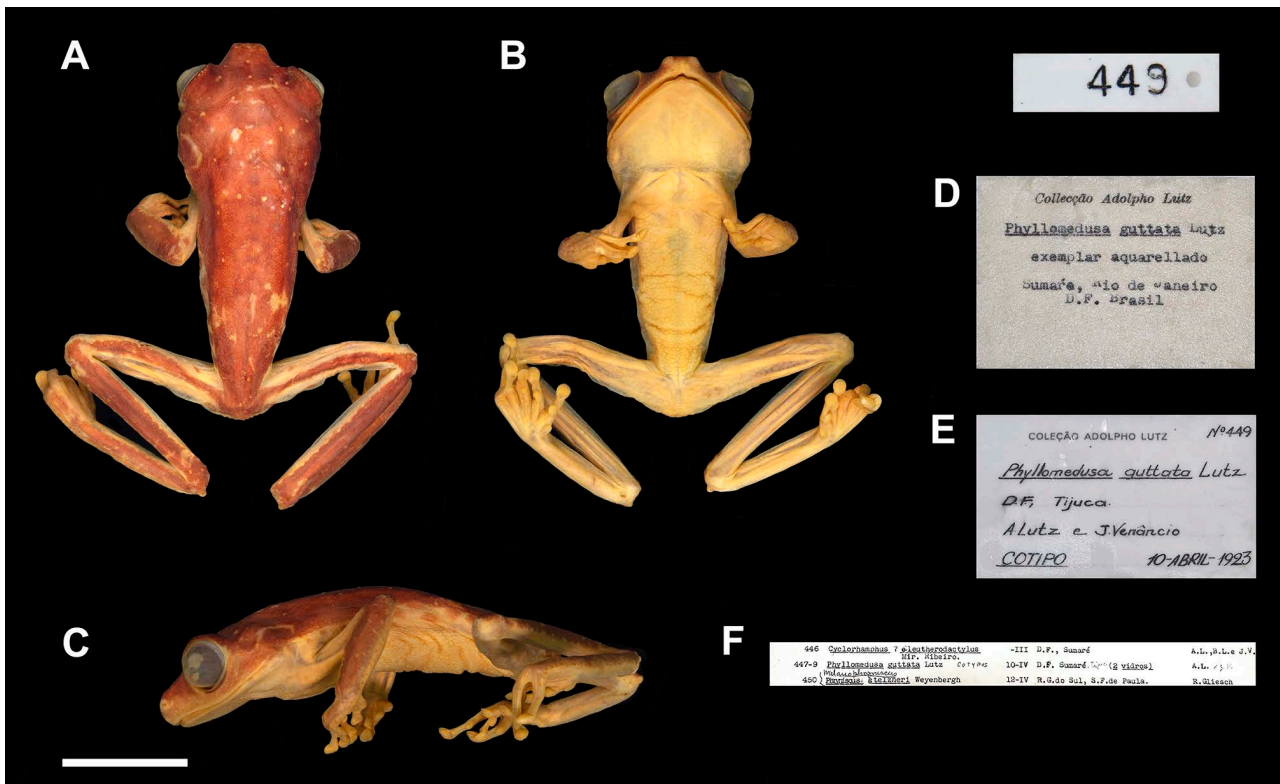


Figure 4. Dorsal (A), ventral (B), and lateral (C) views of the designated lectotype (AL-MN 449) of *Phyllomedusa guttata* A. LUTZ, 1924 from Sumaré, Parque Nacional da Floresta da Tijuca, municipality of Rio de Janeiro, State of Rio de Janeiro, Brazil. Jar labels of the ADOLPHO LUTZ collection (D–E); and detail of the information present in the ADOLPHO LUTZ catalogue (F). Scale bar = 10 mm. Photographs by R. M. S. RODRIGUES (A–C) and D. BAÊTA (D–F).

In preservative, dorsal and lateral surfaces of head, dorsal surfaces of body and cloacal region faded violet; lateral surfaces of body cream (skin transparent) with some faded violet dots of variable size and irregular distribution; forearm and dorsolateral surfaces of hand and proximal region of fifth finger faded violet; papillary epidermal projections faded brown; thigh with a dorsal faded violet stripe from the cloacal region to the tibia; tibia, calcar, tarsus and dorsolateral surfaces of foot pale violet. Presence of small dots and irregular cream marks in the pale pink colour. All other surfaces faded, cream, partly transparent, visualizing the musculature.

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Supplementary data

The following data are available online:

Supplementary Figure S1. Reproduction of the figure captions and Plate II of A. LUTZ & B. LUTZ (1939b).

Supplementary Figure S2. Reproduction of the figure captions and Plate VIII of A. LUTZ & B. LUTZ (1939b).