

Mannophryne vulcano, Male carrying tadpoles. El Ávila (Parque Nacional Guairarepano), Distrito Federal. Photo: Jose Vieira.

We want to dedicate this work to some outstanding individuals who encouraged us, directly or indirectly, and are no longer with us. They were colleagues and close friends, and their friendship will remain for years to come.



César Molina Rodríguez (1960–2015)



Erik Arrieta Márquez (1978–2008)



Jose Ayarzagüena Sanz (1952–2011)



Saúl Gutiérrez Eljuri (1960–2012)



Juan Rivero (1923–2014)



Luis Scott (1948–2011)



Marco Natera Mumaw (1972–2010)



Catalogue of the amphibians of Venezuela: Illustrated and annotated species list, distribution, and conservation

^{1,2}César L. Barrio-Amorós, ^{3,4}Fernando J. M. Rojas-Runjaic, and ⁵J. Celsa Señaris

¹Fundación AndígenA, Apartado Postal 210, Mérida, VENEZUELA ²Current address: Doc Frog Expeditions, Uvita de Osa, COSTA RICA

³Fundación La Salle de Ciencias Naturales, Museo de Historia Natural La Salle, Apartado Postal 1930, Caracas 1010-A, VENEZUELA ⁴Current address: Pontificia Universidade Católica do Rio Grande do Sul (PUCRS), Laboratório de Sistemática de Vertebrados, Av. Ipiranga 6681, Porto Alegre, RS 90619–900, BRAZIL ⁵Instituto Venezolano de Investigaciones Científicas, Altos de Pipe, apartado 20632, Caracas 1020, VENEZUELA

Abstract.—Presented is an annotated checklist of the amphibians of Venezuela, current as of December 2018. The last comprehensive list (Barrio-Amorós 2009c) included a total of 333 species, while the current catalogue lists 387 species (370 anurans, 10 caecilians, and seven salamanders), including 28 species not yet described or properly identified. Fifty species and four genera are added to the previous list, 25 species are deleted, and 47 experienced nomenclatural changes. *Eleutherodactylus terraebolivaris* Rivero, 1961 is synonymized with *Hylodes incertus* Lutz, 1927 as *Pristimantis incertus*. *Oreophrynella dendronastes* Lathrop and MacCulloch, 2007, is considered a junior synonym of *O. macconnelli* (Boulenger 1895). *Centrolene* Jiménez de la Espada, 1872, is a feminine genus, so all species in the genus are amended. *Centrolenella pulidoi* Rivero, 1968 is considered a junior synonym of *Hyla benitezi* Rivero, 1961, as *Boana benitezi*. *Centrolenella estevesi* Rivero, 1968 is considered a junior synonym of *Hyla jahni* Rivero, 1961, as *Hyloscirtus jahni*. Illustrated herein are 300 species (77.5% of the total). Lastly, the distributions for all species are revised, species that possibly occur within Venezuela are suggested, and comments are provided on nomenclature and conservation issues.

Keywords. Biogeography, checklist, Anura, Urodela, Gymnophiona, management

Resumen.—Se presenta una lista anotada de los anfibios de Venezuela, actualizada hasta diciembre de 2018. La última lista comprensiva (Barrio-Amorós 2019c) incluyó un total de 333 especies, mientras que la lista actual contiene 387 especies (370 anuros, 10 cecilias y siete salamandras), incluyendo 28 especies aun no descritas o identificadas propiamente. 50 especies y cuatro géneros se añaden a la lista previa, 25 especies se eliminan y 47 de ellas han experimentado cambios nomenclaturales. *Eleutherodactylus terraebolivaris* Rivero, 1961 se sinonimiza con *Hylodes incertus* Lutz, 1927, como *Pristimantis incertus*. *Oreophrynella dendronastes* Lathrop and MacCulloch, 2007, se considera sinónimo de *O. macconnelli* (Boulenger, 1895). *Centrolene* Jiménez de la Espada, 1872, es un género femenino, así que se emendan todos los nombres acorde. *Centrolenella pulidoi* Rivero, 1968 es considerado sinónimo de *Hyla benitezi* Rivero, 1961, como *Boana benitezi*. *Centrolenella estevesi* Rivero, 1968, se considera sinónimo de *Hyla jahni* Rivero, 1961, como *Hyloscirtus jahni*. Se presentan fotografías de 300 especies (77.5% del total). Por último, la distribución de todas las especies es revisada, se sugieren especies que podrían estar presentes en Venezuela y se presentan comentarios sobre nomenclatura y conservación.

Palabras clave. Anura, biogeografía, Gymnophiona, lista, manejo, Urodela

Citation: Barrio-Amorós CL, Rojas-Runjaic FJM, Señaris JC. 2019. Catalogue of the amphibians of Venezuela: Illustrated and annotated species list, distribution, and conservation. *Amphibian & Reptile Conservation* 13(1) [Special Section]: 1–198 (e180).

Copyright: © 2019 Barrio-Amorós et al. This is an open access article distributed under the terms of the Creative Commons Attribution License [Attribution 4.0 International (CC BY 4.0): <https://creativecommons.org/licenses/by/4.0/>], which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. The official and authorized publication credit sources, which will be duly enforced, are as follows: official journal title *Amphibian & Reptile Conservation*; official journal website: amphibian-reptile-conservation.org.

Received: 27 August 2016; **Accepted:** 26 April 2018; **Published:** 14 July 2019

Introduction

In consideration of the findings presented herein, Venezuela (387 species) will be the seventh-most diverse country in the world with respect to

amphibian diversity, after Brazil (1,026 species; <http://br.herperto.org/anfibios/>), Colombia (813; <https://www.batrachia.com>), Peru (657; http://research.amnh.org/vz/herpetology/amphibia/index.php//content/search?taxon=&subtree=&subtree_id=&english_na

Correspondence. ^{1,2}cesarlba@yahoo.com, ^{3,4}rojas_runjaic@yahoo.com, ⁵celsisenaris@gmail.com

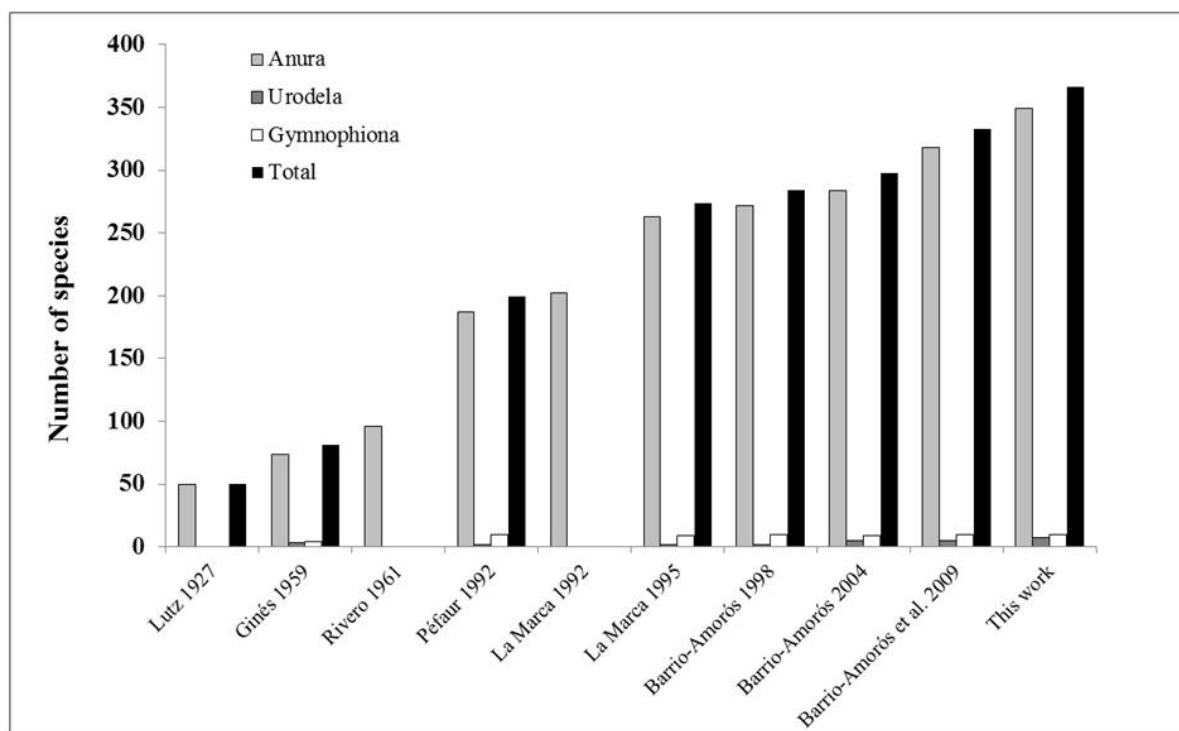


Fig. 1. Number of amphibian species known in Venezuela since 1927.

me=&author=&year=&country=167), Ecuador (594; <https://bioweb.bio/faunaweb/amphibiaweb/>), Indonesia (457; http://research.amnh.org/vz/herpetology/amphibia/index.php/content/search?taxon=&subtree=&subtree_id=&english_name=&author=&year=&country=166), and Mexico (392; Parra-Olea et al. 2014; <https://amphibiaweb.org/amphibian/newspecies.html>).

Several checklists for Venezuela, with varying levels of detail, have appeared since the 1950s (Fig. 1), and clearly the number of known species has grown with time and increased inventory activity, from 74 frog species in 1959 to 370 in 2019. The most data-intensive and continuously updated listing of the world's amphibian species is currently Amphibian Species of the World 6.0 (<http://research.amnh.org/vz/herpetology/amphibia/index.php>), an Online Reference whose book predecessor was published by Darrel Frost in the mid-1980s (Frost 1985). Another important online source is the AmphibiaWeb site (<http://www.amphibiaweb.org>). Although both online databases are quite useful as references, they lack precision in their ability to specifically identify local species, and should not be taken as the final taxonomic authority (Dubois 2017). It is also unwise to rely on a third major online database, the IUCN Red List of Threatened Species (IUCN 2015), since entries often lag behind current research, and with few exceptions, corrections and updates are irregular.

Ten years after the last published official checklist (Barrio-Amorós 2009c), the panorama has changed again in many ways. Several new species have been described, others reported as new for the country, and

many were deleted from the list due to synonymy or misidentification. The suprageneric systematics are still in flux and subject to numerous, and sometimes shocking, changes as well as errors (see Heinicke et al. 2009; Pyron and Wiens 2011; De Sá et al. 2012, 2014; Padial et al. 2014; Duellman et al. 2016). For a relatively stable listing in the face of significant taxonomic changes, the reader is advised to consult Frost (2019). This publication focuses on concerns with taxonomic and nomenclatural issues relevant to Venezuelan amphibians and not on major, broad changes in species relationships or names.

Material and Methods

Several methods were used to clarify how the determination of the taxonomic status was made for some taxa. The majority of species are listed by their generic and specific names, under the Family level. Not used are unranked taxa uniting families (Arboranae, Terraranae), which can facilitate classification uses in some cases (Hedges et al. 2008; Duellman et al. 2016). Rather, families are placed in alphabetical order. Where there are doubts regarding specific identity, three disclaimers are used. The first is the placement of *aff.* (for *affinis*, from the Latin for closely related or akin, but not identical to) between the generic and specific names. This is used to identify taxa for which evidence indicates existing differences from a named, very similar taxon, but for which this difference has not yet been further evaluated. Thus, a species may be presented under a name, and a second entry may be made for the species name with *aff.*

inserted. A second disclaimer is *cf.* (for *confer*, from the Latin for compare with), used in cases where there is insufficient evidence to connect the form to an existing name, or to determine whether a close affinity exists. The last disclaimer is the addition of the term “sp.” to only the generic name, for forms with no current specific name which may represent undescribed or uninvestigated species.

This update is produced with a cut-off date of 1 January 2019, based on the earlier lists by Barrio-Amorós (2009c, 2013). Six appendices complete the information as follows: Appendix 1: Species known to inhabit Venezuela, but not yet described or correctly identified; Appendix 2: Taxonomic checklist of the amphibians of Venezuela; Appendix 3: List of amphibian species of Venezuela by biogeographic areas; Appendix 4: Additions of new species for Venezuela between 2009–2018; Appendix 5: Species deleted here from previous lists or reported after and deleted herein; and Appendix 6: Taxonomic changes at the generic and specific levels, with emendations that occurred since Barrio-Amorós’ (2009c) last systematic list, including changes to new species added in the previous list. For each species, the holotype, type locality, overall distributions, and Venezuelan distributions (as the biogeographic regions and generic or specific localities are noted) are referenced, but extensive locality lists are not provided. New localities are added when determined to be valid and useful. For a more complete listing of locality data see Barrio-Amorós (1998) and Gorzula and Señaris (1998). Taxonomic or biogeographic comments are added (under Remarks). Relevant new localities or noteworthy shifts in the reported distribution are noted in the Distribution section of the accounts, listing vouchers when possible. An asterisk after the species authority indicates that the species is endemic to Venezuela. To avoid repeating the work by Frost (2019), synonymies are not provided under each species, but rather the reader can direct their attention to an extensive online database (<http://research.amnh.org/vz/herpetology/amphibia/index.php>). The current conservation status of each species can be checked in both the general (<http://www.iucnredlist.org>) and local Red Lists (<http://animalesamenazados.provita.org.ve/>) that are constantly being updated. In alphabetical order, selected relevant literature dealing only with Venezuelan taxa follows each account. References dealing with the majority of species (e.g., La Marca 1992; Barrio-Amorós 1998, 2004; Frost 2019) are not repeated in each account. Acronyms follow Barrio-Amorós (1998, 2004), Frost (1985, 2016), and Sabaj (2016) with the addition of MBLUZ (Museo de Biología, La Universidad del Zulia, Maracaibo, Venezuela), IRSNB (Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium), and MUSM (Museo de Historia Natural Universidad San Marcos, Lima, Peru). The International Code on Zoological Nomenclature (ICZN) [<http://www.iczn.org/iczn/index.jsp>] is hereafter referred to as the Code.

Biogeography

Rivero (1961) was the first to present a zoogeography of Venezuelan amphibians. His approach was insightful, especially considering the level of knowledge at the time and lack of Internet resources, and it has only changed in detail over time. Barrio-Amorós (1998) excluded the Falcon Region as it has not been reported as having biogeographic importance for amphibians (though it is important for reptiles; see Rivas et al. 2012). Péfaur and Rivero (2000) presented a biogeographic scenario encompassing both amphibians and reptiles, and in so doing included coastal and island ranges, and returned to consider a Falcon-Lara xerophytic region. Señaris and Rojas-Runjaic (2009) analyzed and commented on the distribution and biogeography of Venezuelan amphibians without further changes.

Barrio-Amorós (1998, 2013) and Molina et al. (2009) presented the biogeographic patterns of Venezuela (mainly based on Rivero 1961) adapted for amphibians, with seven major bioregions, including the Andes; the Cordillera de la Costa (coastal mountain range); the Llanos (the great plains); the Amazonian Region (including the eastern versant of the Andes); the Venezuelan and Guayanan including the Pantepui (the Venezuelan part of the Guiana Shield); the Orinoco Delta; and the Maracaibo Lake Basin. This arrangement is followed herein with one significant change: the Orinoco Delta is not considered a standalone region any longer, since it actually represents an assembly fed by the herpetofauna from the Llanos, the Amazonian Region, and the Guiana Shield, with no significance for amphibians on its own. Not a single species is known to inhabit only the Orinoco Delta or to be endemic there (Barrio-Amorós 2004). Gorzula and Señaris (1998) also included the Delta of the Orinoco as a part of the Venezuelan Guayana. The Guayana Esequiba, a territory administered by Guyana and historically claimed by Venezuela, is not considered herein.

Venezuela is located on the northern coast of South America, between the Equator and 12° North, and the Western Meridians 60° and 74°. It is delimited in the north by the Caribbean Sea and in the northeast by the Atlantic Ocean; it borders Brazil to the south, Guyana to the east, and Colombia to the west. It has a landmass area of 916,445 km² and a coastline of 4.261 km (Barrio-Amorós 1998) [Fig. 2].

Venezuela’s Bioregions

1. The Andes

The great Andean mountain range extends into Venezuela for about 450 km. Within the borders of the country it has a maximum width of about 100 km, and peaks reach a maximum elevation of almost 5,000 m. Only two small glaciers still exist, although their sizes have diminished

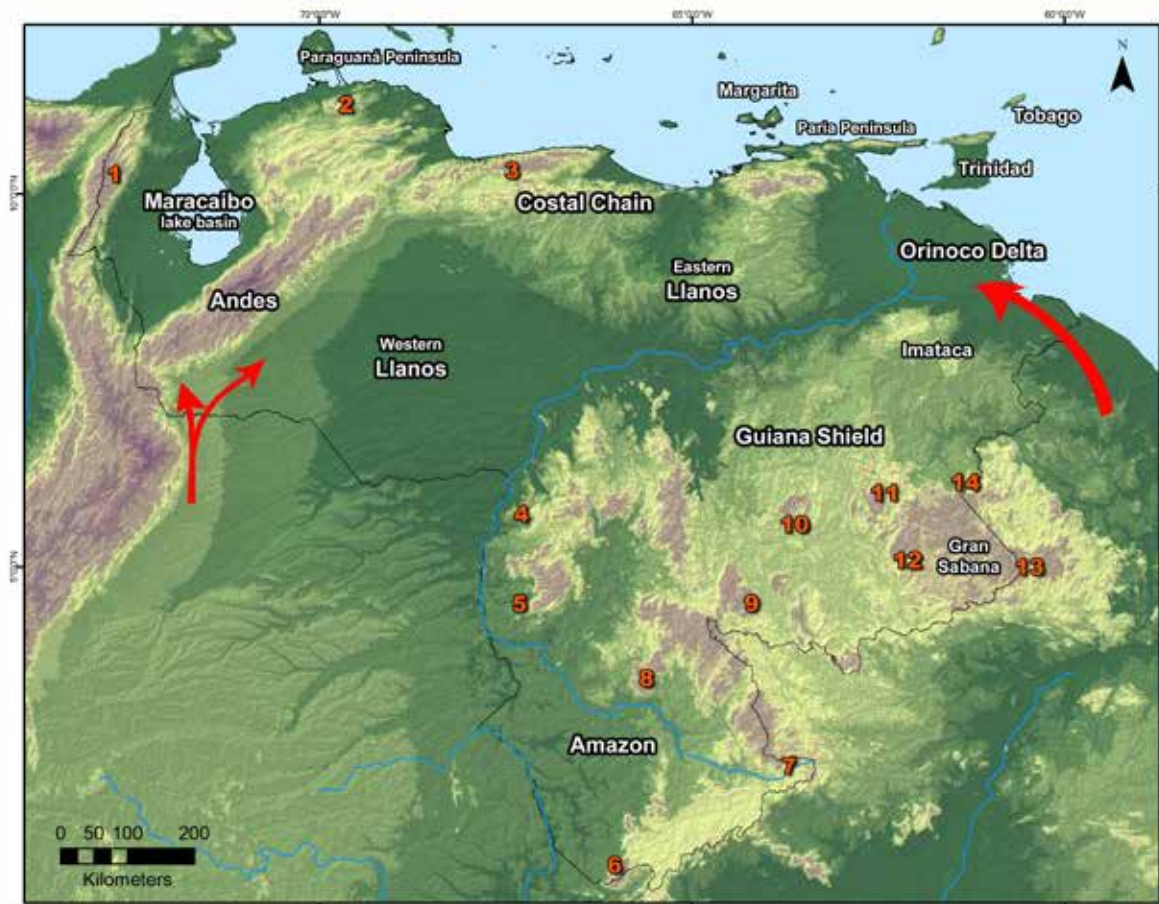


Fig. 2. Map of Venezuela corresponding to the current geographic limits. The major bioregions mentioned in the text can be distinguished along with the main physiographic features. Some noteworthy geographic elements are numbered. 1. Serranía de Perijá (Zulia state); 2. Sierra de San Luis (Falcón state); 3. Rancho Grande Biological station in Henri Pittier National Park (Aragua state); 4. Puerto Ayacucho and surroundings (Amazonas state); 5. Cerro Autana (Amazonas state); 6. Serranía de la Neblina (Amazonas state); 7. Source of the Orinoco River, between Serranías Tapirapecó and Parima (Amazonas state); 8. Cerro Duida, Duida-Marahuaka National Park (Amazonas state); 9. Sarisariñama-tepui, in Jaua-Sarisariñama National Park (Bolívar state); 10. Guaiquinima tepui (Bolívar state); 11. Auyan-tepui (Bolívar state); 12. Chimantá massif (Bolívar state); 13. Roraima-tepui (Bolívar state); 14. Sierra de Lema (Bolívar state).

in recent years. Several habitats provide excellent conditions for amphibians (Barrio-Amorós 1998), especially the sub-Andean forest, deciduous forest, and cloud forest that collectively extend from 600–3,000 m, and the *páramos* that range from about 2,400 m to over 4,600 m (Rivero 1961). A dry-climate depression in Táchira State (*Depresion del Táchira*) at elevations as low as 600 m acts as a natural barrier to dispersal of high-Andean species between the *Cordillera Oriental de Colombia* (of which the only part in Venezuela is the massif of Tamá) and the *Cordillera de Mérida*.

The Sierra, or *Serranía de Perijá*, in the northwestern corner of Venezuela, is also part of this montane environment. It is about 240 km long and 35 km wide, with a maximum elevation of 3,750 m. The Venezuelan Andes lie entirely within the states of Barinas, Lara, Mérida, Táchira, Trujillo, and Zulia, with only a small area in Apure State.

Currently, 128 species of amphibians are known from the Venezuelan Andes (120 anurans, two caecilians,

and six salamanders) that account for 32.9% of the total number of species in Venezuela. Of these Andean species, 78 (61%) are endemic to Venezuela with known localities only in the Andes. This is the greatest amphibian endemism for any biogeographic region in Venezuela.

2. The Coastal Range

The furthest outreaches of the Andes form the Coastal Range or “*Cordillera de la Costa*” (Rivero 1964a) that runs west-to-east across the entire northern part of the country, from Falcón and Yaracuy States to the westernmost state of Sucre (and ultimately continuing onto the continental-shelf island of Trinidad). The Coastal Range has two distinct physiographic formations separated by the valley of the Unare River, which cuts across the mountain range and allows penetration of the eastern Llanos ecosystem and herpetofauna towards the Caribbean (Barrio-Amorós 1998). The western part of the Coastal Range lies in the states of Falcón, Yaracuy,

Carabobo, Aragua, Miranda, and Guárico, including the Capital District around the capital city, Caracas. The eastern part lies mainly in the states of Anzoátegui, Monagas, and Sucre, forming the mountains of the Turimiquire Massif and the *Serranía de Paria* (Kaiser et al. 2015). The typical vegetation is evergreen cloud forest at elevations over 900 m. Maximum elevation is slightly above 2,500 m (e.g., Naiguatá 2,765 m; Turimiquire 2,630 m), although it never snows there. The amphibian fauna includes 89 species (86 frogs, two caecilians, and one salamander) and accounts for 23.2% of Venezuela's batrachofauna. Fifty-three (60%) of the Coastal Range species are endemic to Venezuela and 61 (68.9%) occur only in the Coastal Range.

3. The Llanos

The Llanos of Venezuela occupy an area of more than 180,000 km². The main characteristic of the landscape is the predominance of extensive savannahs irrigated by large, seasonally-fluctuating rivers. The climate is distinctive, encompassing two markedly different seasons (dry and wet). The change from a dry season in January-April to an extremely rainy one in May-November markedly alters the living conditions of the biota. The floods of the rainy season change the landscape dramatically, from green savannah to a seemingly endless lake. The temperature averages about 24 °C (ranging from 19–35 °C during the day) but commonly stays above 23 °C even at night. The biotopes are gallery forests fringing the watercourses, savannahs of diverse vegetation with temporary and/or permanent ponds, palm fields known as *morchales*, as well as rivers and lagoons (Rivero-Blanco and Dixon 1979).

Three major landscapes can be distinguished in the Llanos. The upper Llanos situated to the West are forested and connected with the Amazon biotope through the Andean piedmont. The lower Llanos are endless savannahs with scattered trees and gallery forest only along rivers. The eastern Llanos are primarily covered in shrubby vegetation. Included in the Llanos are the savannahs located in the states of Apure, Anzoátegui, Barinas, Cojedes, Guárico, Monagas, northern Amazonas, and northern Bolívar. The fauna of the Llanos is less-diverse than that of the other Venezuelan bioregions, although population densities of individual species can be extremely high. In total, there are 30 species of amphibians (29 frogs and one caecilian) constituting 7.8% of the total Venezuelan amphibian fauna. None of them is endemic either to the Llanos or to Venezuela.

4. The Amazonian Region

The vast Amazon Basin extends into Venezuela as lowlands (up to 200 m in elevation) through the Casiquiare canal, a natural connection between the Amazon and Orinoco Basins that flows southwards from the Orinoco

and reaches as far north as the Sipapo and Autana Rivers. The Amazonian Region (as a bioregion) must not be confused with Amazonas State, which is a political unit comprising the Amazonian Region, but also part of other bioregions; the Amazon Region occupies a third of the Amazonas State while the rest is of Orinoquian origin (Gorzula and Señaris 1998). The region is characterized by a perennially humid forest that is furrowed by a complex net of *caños* and tributaries to the Orinoco and Rio Negro (Barrio-Amorós 1998).

As in the Llanos, two seasons are distinguishable; the rainy season causes floods in the lowlands, and even during the so-called dry season there are frequent rains. The climate is hot and humid, with an annual mean temperature varying from 24–27 °C (Lizot 1988). The Amazonian Region is an extremely favorable biotope for amphibians, though it does not constitute a center of speciation in Venezuela. There are only 70 known amphibian species recognized from the region (66 frogs and four caecilians) that constitute 18.4% of the total Venezuelan amphibian fauna; none are endemic to Venezuela. The Amazonian Region is a known corridor for the expansion of amphibians into other biomes. Amazonian herpetofaunal elements have penetrated the eastern versant of the Venezuelan Andes (Barrio-Amorós 1998) as indicated by the presence of a variety of typical Amazonian species, such as *Bolitoglossa aff. altamazonica* (but see Barrio-Amorós et al. (2015a)), *Boana boans*, *Scinax wandae*, *Lithodytes lineatus*, and *Rhaebo glaberrimus* (Barrio et al. 1999, 2002; Barrio-Amorós 1999a, 2001b; Chacón et al. 2000; Barrio and Chacón 2002; Schargel and Rivas 2003). Although previous authors have used the term “Orinoco Delta” to define a distinct bioregion, this concept is inadequate since the fauna there is primarily composed of elements from the Amazonian and the Llanos Regions, with some Guiana Shield influences.

5. The Venezuelan Guayana

The Venezuelan part of the Guiana Shield is considered here as following the concept developed by Hoogmoed (1979), Barrio-Amorós (1998), and Duellman (1999), but it is not in complete agreement with the definition used by Gorzula and Señaris (1998), who extended it to the southern section of the state of Sucre. Herein, the Venezuelan Guayana is delimited by the northern part of the Orinoco Delta. This area is the most extensive bioregion of Venezuela and the most ecologically complex. It is one of the oldest geological regions on Earth, dating back to the Precambrian (Aubrecht et al. 2012). Geographically, it includes Delta Amacuro, Bolívar, and Amazonas States, except for the savannahs in the north that border the southern shore of the Orinoco River and which are considered part of the Llanos, and the lowland rainforest west of the Parima-Tapirapecó mountain chain, which are typically Amazonian Region

elements. The Gran Sabana, a savannah-covered plateau, encompasses elevations from 800–1,400 m, and is included in the Venezuelan Guayana as it is not linked geographically to the similar savannahs in the north of Bolívar and Amazonas States. Characteristic of the Venezuelan Guayana are high tabletop mountains known as tepuis, composed of Precambrian sandstone. Some of the more famous tepuis include Cerro La Neblina (elevation 3,014 m), Monte Duida (2,480 m), Roraima (2,810 m), Sarisariñama (2,100 m), and Auyántepeui (2,460 m). Approximately 100 tepuis occur in Venezuela and there are additional tepuis in Guyana, Suriname, and northern Brazil (Brewer-Carías 1988). Surrounding these “insular” habitats is a wide variety of biotopes. The most extensive ones are evergreen rainforest, similar to the forests of the Amazonian Region, and cloud forest on the slopes of each tepui (from 600–1,500 m elevation). The climate is divided into two seasons, dry (December–May) and rainy (June–November). Temperatures in the lowlands oscillate between 24 °C and 27 °C. An introduction to the region and an overview of the tepui biota was provided by Aubrecht et al. (2012). Señaris et al. (2014) provided a useful guide to the amphibians of the Gran Sabana Region. The amphibian fauna of the Venezuelan Guayana includes 163 species (156 frogs and seven caecilians) that account for 42.8% of the amphibian species in the country. Sixty-five species (17.1% of the total and 39.8% of the bioregion) are endemic to the tepuis.

6. The Maracaibo Lake Basin

The basin of Lake Maracaibo occupies parts of the states of Zulia and Trujillo, and the northern parts of Mérida and Táchira in northwestern Venezuela, as well as the western versant of the Serranía de Siruma in Falcón State. The basin contains xerophilous vegetation in the coastal areas of the North (Barrio-Amorós 1998; Infante-Rivero 2009). Toward the south this formation grades into original pluvial forest and swamps along a gradient of increasing humidity and more forested conditions. However, the area is currently being deforested and more pastures are being established, resembling those established in the Llanos Region. In addition, extensive plantations of banana and African Oil Palm now replace part of the natural landscape. This region contrasts with the Andes (with the Cordillera de Mérida to the east and the Serranía de Perijá to the west) that surround it above an elevation of 250 m. Lake Maracaibo, the largest natural lake in South America, is fed mainly by rivers from the Sierra de Perijá and from the Andes in the states of Mérida and Trujillo. There are 24 known species of amphibians (23 frogs and one caecilian) that account for 6.3% of the amphibian species in the country, with no endemics.

SYSTEMATIC ACCOUNTS

Class AMPHIBIA Linnaeus, 1758 Order ANURA Fischer von Waldheim, 1813

Family Allophrynidae Gaige, 1926

Selected references: Savage 1986; Duellman 1993; Barrio 1998; Frost et al. 2006; Guayasamin et al. 2009; Castroviejo-Fisher et al. 2012; Caramashi et al. 2013.

Genus *Allophryne* Gaige, 1926

Type species: *Allophryne ruthveni* Gaige, 1926, by original designation.

Allophryne ruthveni Gaige, 1926

Holotype: UMMZ 63419.

Type locality: “Tukeit Hill, below Kaitour Falls, British Guiana.”

Distribution: Widely distributed in the Amazonian Region of Venezuela, Guyana, and Suriname into central Brazil. Regions 4 and 5. In Venezuela, known from several localities south of the Orinoco River, in states Amazonas (Surumoni) and Bolívar (upper Caura River, upper Paragua River, Sierra de Imataca, San Martín de Turumbán, Cuyuní, upper Uey River). See Duellman (1997); Barrio-Amorós (1998); Señaris and Rivas (2008), and Señaris et al. (2009).

Remarks: Until recently, *Allophryne* was considered a monotypic genus, containing only *A. ruthveni*. Two additional species have been described: *A. resplendens* from the upper Amazon in Peru (Castroviejo-Fisher et al. 2012) and *A. relictata* from the Mata Atlantica Forest in Brazil (Caramaschi et al. 2013).

Selected references: Lynch and Freeman (1966); Hoogmoed (1969); Rivero et al. (1986); Duellman (1997); Caldwell and Hoogmoed (1998); Fabrezi and Langone (2000); Señaris and Rivas (2008); Señaris et al. (2009); Castroviejo-Fisher et al. (2012); Caramaschi et al. (2013).

Family Bufonidae Gray, 1825

Remarks: Frost et al. (2006) proposed a monophyletic taxonomy for several bufonid clades, such as *Rhaebo* for the *Bufo guttatus* species group, *Rhinella* for the *Bufo margaritifera* species group, and *Chaunus* for a number of other South American species groups of *Bufo*. Chaparro et al. (2007) embedded the genus *Chaunus* within *Rhinella*. *Bufo nasicus* shown to be basal to *Rhaebo* by implication; however, implication is not a resolution, but merely implicates the need for elucidation and further evidence. Barrio-Amorós (2009) supposed *Bufo*

nasicus to be a member of *Rhinella* based on external characters and transferred it to that genus without further clarification. Barrio-Amorós and Castroviejo-Fisher (2008a) considered *Rhaebo anderssoni* a synonym of *R. guttatus*. Genus *Dendrophryniscus* Jiménez de la Espada, 1870 was split by Fouquet et al. (2012a), and the Amazonian-Guianan clade was then named *Amazonella*. Fouquet et al. (2012b) realized that *Amazonella* was a preoccupied unavailable name according to the Code and proposed *Amazophrynella* as a replacement name for the clade.

Genus *Amazophrynella* Fouquet, Recoder, Teixeira, Cassimiro, Amaro, Camacho, Damasceno, Carnaval, Moritz, and Rodrigues, 2012

Type species: *Atelopus minutus* Melin, 1941. *Amazophrynella* is a replacement name (see above) for *Amazonella* (Fouquet et al. 2012a).

Amazophrynella minuta (Melin 1941)

Holotype: BM 1968.940.

Type locality: Taracúa, Uaupés, Brazil.

Distribution: Widely dispersed in Amazonia occurring in Brazil, Ecuador, Colombia, Bolivia, the Guianas, and Peru. In Venezuela, known only from near Raudal de Danto, Cuao River, Amazonas State (Rojas-Runjaic et al. 2013).

Remarks: *Amazophrynella minuta* is an abundant terrestrial species of the forest floor leaf litter throughout its distribution. In Venezuela it is very rare. Only one specimen found in many years of monitoring amphibians in Amazonas State (Rojas-Runjaic et al. 2013). Fouquet et al. (2012a) suggested a different species of the *A. minuta* complex may exist in the Guianas and, thus, populations currently considered to belong to species *A. minuta* need to be better defined to delineate specification. Rojas et al. (2016) further examined the *A. minuta* complex.

Selected references: Fouquet et al. (2012a,b); Rojas-Runjaic et al. (2013); Rojas et al. (2014).

Genus *Atelopus* A.M.C. Dumeril and Bibron, 1841

Type species: *Atelopus flavescens* A. M. C. Dumeril and Bibron, 1841, by monotypy.

Atelopus carbonerensis Rivero, 1972*

Holotype: BM 1968.940.

Type locality: “La Carbonera (San Eusebio), 2,330 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Páramo el Tambor; surroundings of the type locality.

Remarks: Considered the most endangered species of the genus in Venezuela, probably extinct (Rueda-Almonacid et al. 2005). The last sighting of a live specimen was in

1998 (Torres and Barrio-Amorós 2001). La Carbonera has been extensively deforested and used as pasture land, and little original cloud forest remains in the Sierra de la Culata National Park. Recent sightings (as recent as 2016) have not been proven, and must be verified.

Selected references: Rivero (1972, 1980); Dole and Durant (1974); Durant and Dole (1974a,b); La Marca (1984a, 1992); Rodríguez and Rojas-Suárez (1995, 1999); Lötters (1996); La Marca and Lötters (1997); Torres and Barrio-Amorós (2001); Barrio-Amorós (2001c, 2013); Rueda-Almonacid et al. (2005); Barrio-Amorós and Torres (2010).

Atelopus chrysocorallus La Marca, 1994*

Holotype: ULABG 1814.

Type locality: Venezuela: Estado Trujillo: Distrito Boconó: La Aguada, a stream flowing to Quebrada El Molino (a tributary of río Burate), nearly 2.5 km South of Niquitao, 2,200 m.

Distribution: Region 1. Known only from type locality.

Remarks: García-Pérez et al. (2013) reported several hundred tadpoles in creeks in the type locality between September 2010 and November 2011, but found no adult specimens. A visit to the type locality in January 2016 by FRR also failed to detect any adult individuals.

Selected references: La Marca (1994d); La Marca and Lötters (1997); Barrio-Amorós (2001, 2013); Rueda-Almonacid et al. (2005); García-Pérez et al. (2013).

Atelopus cruciger

(Lichtenstein and von Martens 1856)*

Neotype: ZSM 93/1947/10

Type locality: Veragua, Panamá (error); corrected to the locality of the neotype: “vicinity of Rancho Grande on the road from Maracay to Ocumare de la Costa (ca. 1,000 m above sea level), Estado Aragua, Venezuela” (Lötters and La Marca 2001).

Distribution: Region 2. Known from at least 30 historical localities in the Cordillera de la Costa, from Aragua, Carabobo, Cojedes, Miranda, Vargas, and Yaracuy States, as well as the Distrito Capital (Manzanilla and La Marca 2004). Currently, considered extinct at all localities except for two populations in Aragua State (Rodríguez-Contreras et al. 2008). A third surviving population was mentioned by Rodríguez and Rojas-Suárez (2008); its current status is unknown.

Remarks: The nomenclatural history of the species was detailed by Lötters et al. (1998) and Lötters and La Marca (2001). Lampo et al. (2011) provided data on the current status of populations. González et al. (2010) studied the diet in museum specimens. *Atelopus cruciger* is a species complex (JCS, FRR, and CBA, unpub. data).

Selected references: Lichtenstein and von Martens (1856); Günther (1858); Lutz (1927); Müller (1935); Sexton (1958); Ginés (1959); Rohl (1959); Rivero (1961,

Catalogue of the amphibians of Venezuela

Images. The task of gathering photos of all possible species of amphibians from Venezuela for a project like this began some time ago. We conducted an exhaustive search, asking many collaborators for permission to use their photos. Many species are already extinct or believed to be (such as all *Atelopus* except *A. cruciger*); for some other species the photos presented herein are the only published so far (for example, *Metaphryniscus sosae*, *Oreophrynella huberi*, *Hyalinobatrachium guairarepanensis*, *Pristimantis marahuaka*, *Dendropsophus yaracuyanus*, *Scinax baumgardneri*), and for many other species they are the first reproduced in color. For some species a picture taken in Venezuela could not be found, so a decision was made to either show the same species from other close countries, or show specimens from Venezuela and also from other countries for comparison.

Finally, we illustrate with preserved material some species that remain problematic or were never photographed alive (such as *Atelopus vogli*, *Dendropsophus battersbyi*, *Dischidodactylus colonnelloi*, *Pristimantis longicarpus*, *Stefania breweri*, and *Boana* sp. cf. *rufitela*).



1A. *Allophryne ruthveni*. Female, Cuyuni, Bolivar. Photo: César Barrio-Amorós.



1B. *Allophryne ruthveni*. Male, Sierra de Imatata, Delta Amacuro. Photo: César Barrio-Amorós.



2. *Amazonophrynella minuta*. Raudal de Danto, río Cuao, Amazonas. Photo: Fernando Rojas-Runjaic.



3. *Atelopus carbonerensis*. Amplexus, La Carbonera, Mérida. Photo: Amelia Díaz de Pascual.



4A. *Atelopus cruciger*. Male, Cuyagua, Aragua. Photo: César Barrio-Amorós.



4B. *Atelopus cruciger*. Male, Quebrada Chacaito, Miranda. Photo: Charles Brewer-Carías.

1964a); Tello (1968); La Marca et al. (1989); Cocroft et al. (1990); La Marca (1992, 1995a,c); Rodríguez and Rojas-Suárez (1995, 1999); Barrio (1996b); Lötters (1996); La Marca and Lötters (1997); Lötters et al. (1998, 2004); Rivas (1998); Barrio-Amorós (2001, 2006c, 2013); Lötters and La Marca (2001); Bonaccorso et al. (2003); Manzanilla and La Marca (2004); Rueda-Almonacid et al. (2005); Rodríguez-Contreras et al. (2008); Barrio-Amorós and Torres (2010); González et al. (2010); Lampo et al. (2011).

Atelopus mucubajiensis Rivero, 1972*

Holotype: BM 1971.763.

Type locality: “Región de Mucubají, Santo Domingo, 3,100 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Surroundings of the type locality, *páramo* and *subpáramo*, 2,800–3,500 m asl.

Remarks: In September 2004, the last known individual was delivered to CBA (Barrio-Amorós 2004). Soon afterwards a project was begun to search for the species (Barrio-Amorós 2009a), but unfortunately this effort yielded no positive results despite an intensive search effort. The female individual died a few weeks after being received and tested weakly positive for the presence of the fungus *Batrachochytrium dendrobatidis* (*Bd*; Lampo et al. 2007).

Selected references: Rivero (1972, 1980); La Marca et al. (1989); La Marca (1994, 1992, 1995a,c); Rodríguez and Rojas-Suárez (1995, 1999); Barrio (1996b); Durant and Díaz (1996); Lötters (1996); La Marca and Lötters (1997); Barrio-Amorós (2001, 2004, 2009a); Rueda-Almonacid et al. (2005); Lampo et al. (2007); Barrio-Amorós and Torres (2010).

Atelopus oxyrhynchus Boulenger, 1903*

Lectotype: BM 1947.2.14.66. designated by Rivero (1972).

Type locality (of the lectotype): Río Albarregas, La Culata, Sierra Nevada de Mérida, Venezuela (elevation 3,330 m).

Distribution: Region 1. Sierra de la Culata, Mérida State.

Remarks: Apparently extinct, and not seen alive since 1994 (Lötters and La Marca 1997).

Selected references: Boulenger (1903); Ginés (1959); Rivero (1961, 1963b, 1964d, 1972); La Marca et al. (1989); Durant (1993); Piñero and Durant (1993); La Marca (1994, 1992, 1995a,c); Rodríguez and Rojas-Suárez (1995, 1999); Lötters (1996); La Marca and Lötters (1997); Barrio-Amorós (2001, 2013); Rueda-Almonacid et al. (2005).

Atelopus pinangoi Rivero, 1980*

Type: UPRM 5354.

Type locality: “Piñango, 2,920 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Surroundings of the type locality.

Remarks: Last seen *in situ* in 1997 (Barrio-Amorós 2013). García-Pérez et al. (2013) reported finding a postmetamorph at the type locality in December 2008, but several searches (2010–2013) found no additional individuals.

Selected references: Rivero (1980); La Marca et al. (1989); Rodríguez and Rojas-Suárez (1995, 1999); Lötters (1996); La Marca and Lötters (1997); Barrio-Amorós (2001, 2013); Rueda-Almonacid et al. (2005); García-Pérez et al. (2013).

Atelopus soriano La Marca, 1983*

Holotype: CVULA IV-2783.

Type locality: “Bosque nublado 10 km SSE de Tovar, 2,718 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Initially thought restricted to the type locality, but photographs of a specimen shown to T.R. Kahn by E. La Marca in 2007 indicated a population exists outside type locality. The type locality was destroyed by a landslide (pers. comm., T.R. Kahn from E. La Marca). Further work is required to determine if this disjunct population is extant.

Remarks: Not seen in the type locality since 1990; possibly extinct at the type locality, but also possibly extant at a disjunct valley not far from the type locality.

Selected references: La Marca (1983, 1992, 1995a,c); La Marca et al. (1989); Rodríguez and Rojas-Suárez (1995, 1999); Barrio (1996b); Lötters (1996); La Marca and Lötters (1997); Barrio-Amorós (2001, 2013); Rueda-Almonacid et al. (2005).

Atelopus tamaense La Marca, Pérez and Renjifo, 1989*

Holotype: ULABG 1820.

Type locality: “Estado Apure, Distrito Páez, Cercanías del “Boquerón del río Oirá,” Páramo de Tamá, Parque Nacional El Tamá, aproximadamente 7°25’N, 72°23’W, elevation 2,950 m.”

Distribution: Region 1. Only known from the type locality, in Venezuela and probably ranging into nearby Colombia in Tamá National Park.

Remarks: Population status unknown, but not seen since its description.

Selected references: La Marca et al. (1989); La Marca (1992, 1995c); Rodríguez and Rojas-Suárez (1995, 1999); Lötters (1996); La Marca and Lötters (1997); Barrio-Amorós (2001, 2013); Rueda-Almonacid et al. (2005).

Atelopus vogli Müller, 1934*

Holotype: ZSM 3/1933.



5. *Atelopus mucubajensis*. Female, Santo Domingo, Mérida. Photo: César Barrio-Amorós.



6. *Atelopus oxyrhynchus*. Lectotype from Culata, 3,000 m, Mérida. Photo: Stefan Lötters.



7. *Atelopus tamaense*. Boquerón del río Oirá, páramo de Tamá, Apure. Photo: Juan M. Renjifo.



8. *Atelopus vogli*. MCNC 72, Montalbán, Carabobo. Photo: César Barrio-Amorós.



9. *Metaphryniscus sosae*. Marahuaka sur Summit, Amazonas. Photo: Charles Brewer-Carías.



10. *Oreophrynella cryptica*. Summit of Auyan-tepui, Bolívar. Photo: Josefa Celsa Señaris.

Type locality: “Cascadas superiores del Río Güey, en la región llamada Las Peñas, cerca de la Hacienda de la Trinidad, Maracay, 700 m,” Aragua State, Venezuela.

Distribution: Region 2. Known from two localities, the type locality and a record reported by Barrio-Amorós and Rojas-Runjaic (2009) in Montalbán (Carabobo State); last specimen known was collected in 1957.

Remarks: Lötters et al. (2004) elevated *Atelopus cruciger vogli* to a full species. Currently considered the only Venezuelan amphibian verified as extinct (Rodríguez and Rojas-Suárez 2008; La Marca and Señaris 2015).

Selected references: Müller (1935); Lötters et al. (2004); Rueda-Almonacid et al. (2005); Rodríguez and Rojas-Suárez (2008); Barrio-Amorós and Rojas-Runjaic

(2009); Barrio-Amorós (2013); La Marca and Señaris (2015).

Genus *Metaphryniscus*

Señaris, Ayarzagüena and Gorzula, 1994

Type species: *Metaphryniscus sosai* Señaris et al., 1994, by original designation.

Metaphryniscus sosae

Señaris, Ayarzagüena and Gorzula, 1994*

Holotype: MHNLS 12347.

Type locality: “Tepuy Marahuaca-Sur, Estado Amazonas, Venezuela (3°40’N, 65°27’W). 2,600 m snm.”

Distribution: Region 5. Endemic to Marahuaca-tepui in Amazonas State.

Remarks: Since its discovery and subsequent description, no additional specimens of this genus and species have been collected. Barrio-Amorós (1998) emended the name *sosai* to *sosae* (as the species was dedicated to a woman), without explanation. Naming here follows Article 31.1.2 of the Code in retaining the emendation of *sosae*, the *-ae* ending.

Selected references: Señaris et al. (1994).

Genus *Oreophrynella* Boulenger, 1895

Type species: *Oreophryne quelchii* Boulenger, 1895, by monotypy.

Oreophrynella cryptica Señaris, 1995*

Holotype: EBRG 2956.

Type locality: Eastern sector of the Auyan-tepui summit, Bolívar State, Venezuela (5°53’36”N, 62°29’12”W), 1,750 m.

Distribution: Region 5. Endemic to Auyan-tepui in Bolívar State.

Remarks: A very rare species described from only two specimens (Señaris 1995). Despite numerous expeditions to the type locality, only five additional specimens have been collected (in 1974) and deposited in the BMNH (Myers and Donnelly 2008).

Selected references: Señaris (1995); Myers (1997); Myers and Donnelly (2008); Señaris et al. (2014).

Oreophrynella huberi

Diego-Aransay and Gorzula, 1987*

Holotype: MHNLS 11148.

Type locality: Cerro El Sol, northeast of Auyán-tepui (6°6’N, 62°32’W), Bolívar State, Venezuela, elevation 1,700 m.

Distribution: Region 5. Endemic to Cerro El Sol-tepui in Bolívar State.

Selected references: Diego-Aransay and Gorzula

(1985); Señaris et al. (1994, 2014); Gorzula and Señaris (1998).

Oreophrynella macconnelli (Boulenger 1895)

Holotype: BM 1947.2.14.49.

Type locality: “Base of Mount Roraima, 3,500 feet (1,066 m),” Guyana.

Distribution: Region 5. Known from the base of Roraima (type locality) and Maringma-tepui in Guyana (Kok 2009). It has been surmised to occur in the Venezuelan foothills surrounding the base of Mt. Roraima (Rivero 1961; La Marca 1992; Barrio-Amorós 1998). To date there are no vouchers from Venezuela in any known scientific collection.

Remarks: It is not possible to designate the exact type locality or determine whether it is in Venezuela or Guyana, since Boulenger (1900) listed it as “the base of Mt. Roraima, 3,500 ft (ca. 1,066 m),” which could be in either Guyana, Venezuela or Brazil. Barrio-Amorós (1998) considered Boulenger’s type locality to be in Venezuela without explanation. He also incorrectly stated that the type material in the BMNH was lost. Kok (2009) assumed the type specimen was collected on the Guyanan side of Roraima, as the title of Boulenger’s article states, but provided no further information or evidence. The journey made by F.V. McConnell and J.J. Quelch in 1898, during which the specimen was collected, originated in Guyana, but the only access to the summit of Roraima by foot is on the Venezuelan side. The exact route by which the two collectors walked around the base of Roraima follows the Mazaruni-Cako-Aruparu Rivers to reach the foot of Roraima. Here, only one place at the Aruparu River seems to be at 1,066 m (5°15’10.93”N, 60°42’28.57”W), while still seeing the tepui from its base. Therefore, we restrict the type locality to be in Guyana. But see a different conclusion by Kok et al. (2018) for *Pristimantis marmoratus*.

We are unable to distinguish *Oreophrynella macconnelli* from *O. dendronastes* Lathrop and MacCulloch, 2007. The only listed difference is the shape of the snout, reported as truncated for *O. dendronastes* and pointed or acuminate for *O. macconnelli* (Lathrop and MacCulloch 2007). Kok (2009) had examined a larger set of specimens of *O. macconnelli* and noted variation in this character, but snout shape alone may be insufficient evidence to distinguish between these taxa. The larger size of *O. dendronastes*, with a female of 37.3 mm SVL (as opposed to an SVL of 22.7 mm in males of *O. macconnelli*, for which females are unknown) seems significant, but could be attributed to maturity and/or dimorphism. Furthermore, Kok et al. (2012) found insufficient genetic differentiation to support the recognition of *O. dendronastes*. We therefore suggest considering *O. dendronastes* Lathrop and MacCulloch, 2007 as a junior synonym of *O. macconnelli* (Boulenger 1895). Barrio-Amorós (1998, 2004, 2009) incorrectly



11. *Oreophrynella huberi*. Cerro el Sol summit, Bolivar. Photo: Anonymous.



12. *Oreophrynella macconnelli*. Maringma tepui, Guyana. Photo: Philippe Kok.



13. *Oreophrynella nigra*. Yuruani Summit, Bolivar. Photo: César Barrio-Amorós.



14A. *Oreophrynella quelchii*. Summit of Mount Roraima, Bolivar. Photo: Roger Manrique.



14B. *Oreophrynella quelchii*. Summit of Mount Roraima, Bolivar. Photo: Roger Manrique.



15. *Oreophrynella vasquezi*. Summit of Ilú-tepui, Bolivar. Photo: Javier Mesa.

gave the species name as *O. macconelli* (*lapsus calami*).
Selected references: Boulenger (1900); Ginés (1959); Rivero (1961, 1964b); McDiarmid (1971); Warren (1971); Señaris et al. (1994, 2014); McDiarmid and Donnelly (2005); Lathrop and MacCulloch (2007); Kok (2009); Kok et al. (2018).

Oreophrynella nigra

Señaris, Ayarzagüena and Gorzula, 1994

Holotype: MHNLS 10583.

Type locality: Kukenan-tepui I, Bolívar State, Venezuela (9°51'N, 60°48'W), 2,500 m asl.

Distribution: Region 5. Endemic to Kukenan and Yuruani Tepuis in Bolívar State.

Remarks: Kok et al. (2012) implied that *O. nigra* could be a synonym of *O. quelchii* due to the low genetic divergence between these forms. However, inhabiting different tepuis means reproductive isolation (allopatry), and having a different color pattern could be sufficient reason at the moment to maintain it as a valid species.

Selected references: McDiarmid and Gorzula (1989); Solano (1989); Señaris et al. (1994, 2014); Gorzula and Señaris (1998); McDiarmid and Donnelly (2005).

Oreophrynella quelchii (Boulenger 1895)

Syntypes: BM 95.4.19.1–5; 99.3.25.7–13; UK 126081–82; ZFMK, MCZ 3500–02.

Type locality: “Summit of Mt. Roraima, between British Guiana and Venezuela, at an altitude (elevation) of 8,500 feet.”

Distribution: Region 5. Known from the summit of Mt. Roraima, a tepui extending across three countries: Venezuela, Guyana, and Brazil.

Selected references: Boulenger (1895a,b; 1900); Ginés (1959); Rivero (1961, 1964b); McDiarmid (1971); Hoogmoed (1979b); McDiarmid and Gorzula (1989); La Marca (1992); Señaris et al. (1994, 2014); Gorzula and Señaris (1998); McDiarmid and Donnelly (2005).

Oreophrynella vasquezi

Señaris, Ayarzagüena and Gorzula, 1994*

Holotype: MHNLS 10244.

Type locality: Ilú-tepui I, Bolívar State, Venezuela (5°25'N, 60°58'W); elevation 2,650 m.

Distribution: Region 5. Endemic to Ilú, a tepui in Bolívar State.

Selected references: Señaris et al. (1994, 2014); Gorzula and Señaris (1998).

Genus ***Rhaebo*** Cope, 1862

Type species: *Bufo haematiticus* Cope, 1862, by monotypy.

Rhaebo glaberrimus (Günther 1869)

Holotype: BM 1947.2.20.56. (formerly 68.3.4.9).

Type locality: “Bogota” (Bogotá), Cundinamarca, Colombia (in error: Mueses-Cisneros et al. (2012) regard Bogotá as the origin of shipment, not the locality where the type specimen was collected).

Distribution: Regions 1, 4. Amazonian piedmont of the Cordillera Oriental in Colombia, and southeastern versant of the Venezuelan Andes. In Venezuela, known from a single locality in the Doradas River Basin, Táchira State (Chacón et al. 2000).

Selected references: Chacón et al. (2000, 2001); Mueses-Cisneros et al. (2012).

Rhaebo guttatus (Schneider 1799)

Holotype: ZMB 3517.

Type locality: “India Orientali.” In error; Rivero (1961) clarifies that the label of the holotype states the type specimen was collected in Suriname.

Distribution: Regions 4, 5. Typical Guyano-Amazonian element, present in Bolivia, Peru, Ecuador, Colombia, Venezuela, Suriname, French Guiana, Guyana, and Brazil. In Venezuela, widespread in Amazonas and Bolívar States, also occurs in one disjunct area of Apure State (Barrio et al. 2001).

Remarks: *Bufo anderssoni* Melin, 1941 was shown to be a junior synonym of *Rhaebo guttatus* (Barrio-Amorós and Castroviejo-Fisher 2008a).

Selected references: Ginés (1959); Rivero (1961, 1964b, 1967a); Hoogmoed and Gorzula (1979); Rivero et al. (1986); La Marca (1992); Duellman (1997); Gorzula and Señaris (1998); Barrio et al. (2001, 2011b); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós and Castroviejo-Fisher (2008a); Barrio-Amorós and Duellman (2009); Señaris et al. (2014).

Rhaebo haematiticus Cope, 1862

Syntypes: USNM 48448–49.

Type locality: “Region of the Truando (Chocó), New Grenada (Colombia).”

Distribution: Region 1. From eastern Honduras into southern Costa Rica throughout the western slopes of the Cordillera Occidental and eastern versant of Cordillera Central of Colombia, also occurring in the Chococoan Region of northwestern Ecuador and northwestern Venezuela. In Venezuela, known from scattered localities within the Sierra de Perijá, the northernmost point of the Andes on the border with Colombia and Venezuela (Barrio-Amorós 2001; Rojas-Runjaic et al. 2007; Vieira-Fernandes et al. 2016). Another single record is from Cordillera de Mérida (Vieira-Fernandes et al. 2016). Apparently, *R. haematiticus* is likely a complex of cryptic species (Mueses-Cisneros 2009). Venezuelan populations could be represented by an undescribed species (Mueses-



16. *Rhaebo glaberrimus*. Río Frío, Táchira. Photo: César Barrio-Amorós.



17A. *Rhaebo guttatus*. Female. Las Lajas, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



17B. *Rhaebo guttatus*. Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.



18A. *Rhaebo haematiticus*. Subadult. Ipika, Tukuko river basin, Serranía de Perijá, Zulia. Photo: Edwin Infante-Rivero.



18B. *Rhaebo haematiticus*. Female. Ipika, Tukuko river basin, Serranía de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



19A. *Rhaebo nasicus*. Subadult. Kavanayen, Gran Sabaja, Bolívar state. Photo: Edward Camargo.

Cisneros 2009; Vieira-Fernandes et al. 2016).
Selected references: Barrio-Amorós (2001); Rojas-Runjaic et al. (2007); Mueses-Cisneros (2009).

Rhaebo nasicus (Werner 1903)

Holotype: MRHN I.G. 9422 reg. 1015.

Type locality: Type without locality data, restricted to “South America, probably along the Atlantic drainage” by Smith and Laurent (1950).

Distribution: Region 5. Known from eastern Venezuela and northwestern Guyana. In Venezuela it was previously known only from the La Escalera Region of Bolívar State (Barrio-Amorós 2009). Occurrence reported here from

7.1 km N Kavanayen (EBRG 5581, 5583, 5588, 5763), and from the Churún River, near the base of Angel Falls, on the northern side of Auyán-tepui (MHNS 20429).

Remarks: See remarks under *Rhaebo ceratophrys*. Barrio-Amorós (2009) and Barrio-Amorós and Duellman (2009) were reluctant to recognize *nasicus* as a member of *Rhaebo*, but thought it should be placed in *Rhinella* based on external characteristics. Pramuk (2006) showed the relationship of *nasicus* as being the most basal in the *Bufo guttatus* species group (now *Rhaebo*).

Selected references: Hoogmoed (1977, 1979b, 1986, 1990a); Duellman (1997); Pramuk (2006); Kok and Kalamandeen (2008); Barrio-Amorós (2009); Barrio-Amorós and Duellman (2009); MacCulloch and Lathrop (2009); Señaris et al. (2014).

Genus *Rhinella* Fitzinger, 1826

Type species: *Bufo proboscideus* Spix, 1824, by monotypy.

Rhinella beebei (Gallardo, 1965)

Holotype: AMNH 557774.

Type locality: Churchill-Roosevelt highway, Trinidad, Trinidad and Tobago, 30 m.

Distribution: Regions 3, 5, 6. Widespread in open areas throughout northern Venezuela and Trinidad. In Venezuela species is found in lowland open areas, north and south of the Orinoco River, and has also been documented on Margarita Island (Ugueto and Rivas 2010).

Remarks: Narvaes and Rodrigues (2009) changed the previous concept of the *R. granulosa* species group, recognizing available subspecific names as full species levels, and invalidating others. *Bufo granulosa barbouri* from Isla Margarita and *B. g. beebei* from the Orinoco Basin and northern Venezuela were considered synonyms of *R. humboldti*. Pereyra et al. (2016) showed two parapatric populations (one on lowlands around Puerto Ayacucho, another in uplands of Gran Sabana) as monophyletic under the name *R. humboldti*. Murphy et al. (2017) revised the name *beebei* for populations in Trinidad and northern Venezuela, noting differences in genetics and vocalizations among *R. humboldti* (a trans-Andean species) and *R. beebei*. Notably, no specimens from the Lake Maracaibo Basin were analyzed. Further work is required to determine if that population represents *R. humboldti*, *R. beebei*, or *R. centralis*, and/or a combination of these species living in sympatry.

Selected references: Some of these references are based on populations of *R. beebei* under the names *Bufo granulosa* or *Rhinella humboldti*. Boettger (1892); Lutz (1927); Parker (1936); Ginés (1959); Rivero (1961, 1964a-c, 1967c); Roze (1964); Gallardo (1965); Tello (1968); Cochran and Goin (1970); Staton and Dixon (1977); Duellman (1979a, 1997); Hoogmoed (1979b,

1990a); Hoogmoed and Gorzula (1979); Péfaur and Díaz De Pascual (1982, 1987); Rivero et al. (1986); Ramo and Busto (1989, 1990); La Marca (1992); Manzanilla et al. (1995); Péfaur and Pérez (1995); Yústiz (1996); Murphy (1997); Gorzula and Señaris (1998); Rivas and Barrio-Amorós (2005); Narvaes and Rodrigues (2009); Tárano (2010); Ugueto and Rivas (2010); Barrio-Amorós et al. (2011b); Pereyra et al. (2016).

Rhinella ceratophrys (Boulenger 1882)

Holotype: BM 80.12.5.151.

Type locality: “Ecuador.”

Distribution: Region 5. Widely distributed in upper Amazon Basin, from northeastern Peru, through eastern Ecuador and southeastern Colombia, into southern Venezuela. Its occurrence in Brazil was presumed (Fenolio et al. 2012) and verified by Rojas-Runjaic et al. (2017). These last authors reported new localities for this species with specimens from Venezuela at Cerro Marahuaca and at Cerro de la Neblina, Amazonas State. Elevations 1,350–2,713 m asl.

Remarks: Mijares-Urrútia and Arends (2001) confused a female specimen of *Rhaebo nasicus* from La Escalera with *Rhinella ceratophrys* (CBA, personal observation). Barrio-Amorós (1998) doubted the identity of Rivero’s record (based on a single juvenile of 12 mm SVL). However, Fenolio et al. (2012) recently verified the Venezuelan specimen and confirmed its identity using morphological and morphometric data. Recent reports of this species from up- and highland western tepuis solves its distribution in Venezuela. Further sampling and analyses will determine if a species complex exists and may further be elucidated (Rojas-Runjaic et al. 2017). Fouquet et al. (2007a) removed this species from the *Rhinella margaritifera* species group.

Selected references: Rivero (1961, 1964b); Cochran and Goin (1970); Mijares-Urrútia and Arends (2001); Fenolio et al. (2012); Rojas-Runjaic et al. (2017).

Rhinella horribilis (Wiegmann 1833)

Syntypes: ZMB 3479 (Misantla), ZMB 3480 (no locality given), ZMB 3481 (Veracruz), ZMB 3493 (Mexico), all from Mexico, based on the original description. Lectotype: ZMB 3480, assigned by Fouquette and Dubois (2014).

Type locality: “In der Umgegend von Vera Cruze,” Mexico.

Distribution: Regions 1, 6. In Venezuela west of the Andes, including the dry valley of Chama River (Mérida State), up to 2,000 m asl (Barrio-Amorós 1998; Acevedo et al. 2016); northern Colombia and Panama north throughout Central America and into the southern United States (Frost 2018).

Remarks: This taxon was recently removed from synonymy with *Rhinella marina* by Acevedo et al. (2016).



19B. *Rhaebo nasiscus*. Female. Sierra de Lema, Bolivar. Photo: Alan Highton.



20A. *Rhinella beebei*. Puerto Ayacucho, Amazonas. Photo: César Barrio-Amorós.



20B. *Rhinella beebei*. Barinas, Barinas. Photo: Fernando Rojas-Runjaic.



20C. *Rhinella beebei*. La Guaquira, Yaracuy. Photo: Fernando Rojas-Runjaic.



20D. *Rhinella* cf. *beebei*. Northern piedmont Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



21A. *Rhinella ceratophrys*. Loreto, Peru. Photo: Danté Fenolio.

Populations west of the Andes formerly referred to as *R. marina* are genetically and osteologically distinct from populations east of the Andes. The form ranging from western Venezuela through northwestern South America north into Mexico and the southern United States should be considered as *R. horribilis*.

Selected references: Mostly under the names *Rhinella marina* or *Bufo marinus*. Alemán (1952); Péfaur and Pérez (1995); Acevedo et al. (2016).

Rhinella margaritifera (Laurenti 1768)

Neotype: MNRJ 71538, assigned by Lavilla et al. (2013).

Type locality: “Brasilia.” The neotype is from Municipality Humaitá, Amazonas State, Brazil (Lavilla et al. 2013).

Distribution: Regions 4, 5. Widespread in the Amazonian Region. In Venezuela this species is present in rainforests and cloud forests of the Cordillera de la Costa, the Andes, and south of the Orinoco. It is absent from the Llanos Region.

Remarks: *Rhinella margaritifera* represents a species complex likely including several undescribed and/or misidentified taxa. At least two distinct taxa are present on the eastern versant of the Cordillera de Mérida. One from Falcon State was removed from this complex and redescribed as *Rhinella sclerocephala* by Mijares-Urrútia and Arends (2001; see account). Rivero (1964) considered specimens from Guatopo and Falcon as *Bufo typhonius alatus*. La Marca (1997) followed Rivero’s example, but the decision to use *alatus* as the name for populations in the complex north of the Orinoco River was premature and speculative. Santos et al. (2015) restricted the distribution of *R. alata* to Panama, Western Colombia, and Ecuador. La Marca (1992, 1997) included *R. acutirostris* in the amphibian fauna of Venezuela, but no populations of this species have been documented based on voucher specimens. In Venezuela south of the Orinoco River, at least four distinct populations of the *Rhinella margaritifera* species complex occur, one in western Amazonas State (CBA, unpub. data), one in the Sarisariñama foothills (Barrio-Amorós and Brewer-Carías 2008), one in El Paují, southern Gran Sabana, where females lack prominent crests, and one along the northern versant of the Serranía de Lema (Barrio-Amorós et al. 2011b). Pending formal identification, this last population could correspond to *Rhinella martyi* (Fouquet et al. 2007), a taxon so far not reported from Venezuela.

Selected references: Spix (1824); Ginés (1959); Rivero (1961, 1964a,b,d, 1967a, 1971a); Yústiz (1976a, 1996); Hoogmoed (1977, 1986, 1989, 1990); Péfaur and Díaz De Pascual (1982, 1987); Hoogmoed and Gruber (1983); Rivero et al. (1986); Hass et al. (1995); Velez (1995); Gorzula and Señaris (1998); Rivas and Barrio-Amorós (2005); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós (2010a); Barrio-Amorós et al. (2011b); Señaris et al. (2014); Santos et al. (2015).

Rhinella marina (Linnaeus 1758)

Holotype: Not identified (originally in the collection of Albertus Seba).

Type locality: “America.” Restricted to Suriname by Müller and Hellmich (1936).

Distribution: Regions 3, 4, 5. After the partition of *Rhinella marina* into two species (Acevedo et al. 2016), the name *marina* is now applied to populations occurring east of the Andes in Venezuela and Colombia, south to central Brazil to Bolivia. This species has been introduced onto several islands and into countries in the Caribbean, Pacific, and Indian Oceans (Zug and Zug 1979), although distinction between *R. marina* and *R. horribilis* invasive populations has yet to be determined.

Remarks: All populations sampled west of the Andes are currently recognized as *Rhinella horribilis* (Acevedo et al. 2016). These authors, however, did not include in their analysis samples of *R. marina* from the majority of Venezuela. The current authors have observed important morphological and acoustic differences in populations east of the Andes, at least in Venezuela. A wider sample should be analyzed to properly assess the complex taxonomy and nomenclature of these species and/or species complex.

Selected references: Lichtenstein and von Martens (1856); Lutz (1927); Ginés (1959); Rohl (1959); Rivero (1961, 1964a–d, 1967a); Heatwole et al. (1965); Tello (1968); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rivero-Blanco and Dixon (1979); Zug and Zug (1979); Péfaur and Díaz De Pascual (1982, 1987); Hoogmoed and Gruber (1983); Gremone et al. (1986); Rivero et al. (1986); Hoogmoed (1989); La Marca (1992); Manzanilla et al. (1995); Evans and Lampo (1996); Duellman (1997); Gorzula and Señaris (1998); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós (2010a); Ugueto and Rivas-Fuenmayor (2010); Barrio-Amorós et al. (2011b); Señaris et al. (2014); Acevedo et al. (2016).

Rhinella merianae (Gallardo 1965)

Holotype: AMNH 46531.

Type locality: “Head falls of Essequibo River, British Guiana (= Guyana).”

Distribution: Regions 5, 6. Brazil, Suriname, Guyana, French Guiana, and Venezuela. In Venezuela, known from the Orinoco River, Gran Sabana (Bolívar State), and a disjunct record in Zulia State (Narvaes and Rodrigues 2009). Obviously, the last record is likely in error. It may be *R. beebei* or another species within the *granulosus* species group.

Remarks: A member of the *Rhinella granulosa* species group. Even though Narvaes and Rodrigues (2009) stated examining voucher specimens, the biogeography is not evidential to the current authors. There are specimens from Puerto Ayacucho, Gran Sabana, the Orinoco River,



21B. *Rhinella ceratophrys*. Parque Nacional Pico da Neblina, Brazil. Photo: Vinicius T. de Carvalho.



22. *Rhinella horribilis*. La Mucuy Baja, Mérida. Photo: César Barrio-Amorós.



23A. *Rhinella margaritifera*. Male. Río Autana, Amazonas. Photo: Javier Mesa.



23B. *Rhinella margaritifera*. Female. Río Doradas, Táchira. Photo: César Barrio-Amorós.



23C. *Rhinella margaritifera*. Female. El Paují, Bolívar. Photo: César Barrio-Amorós.



23D. *Rhinella margaritifera*. Male. Los Alcaravanes, Calderas, Barinas state. Photo: César Barrio-Amorós.

and Zulia State. The authors consider particularly the Zulia State specimen doubtful, and believe it is more likely to be *R. beebei* or *R. centralis* (the last would be a first record for Venezuela). However, if the distribution is valid, then that of *R. merianae* would overlap with that of *R. beebei* along the Orinoco River and with that of *R. nattereri* in the Gran Sabana Region.

Selected references: Narvaes and Rodrigues (2009); Señaris et al. (2014); Pereyra et al. (2016).

Rhinella nattereri (Bokermann 1967)

Holotype: MZUSP 73715.

Type locality: Cachoeira Urandiue, Mau River, Roraima, Brazil.

Distribution: Region 5. Brazil, Guyana, and Venezuela. In Venezuela this species is known only from the Gran Sabana Region in Bolívar State (Narvaes and Rodrigues 2009).

Remarks: A member of the *Rhinella granulosa* species group; little is known about this species in Venezuela. Pereyra et al. (2016) could not obtain genetic samples to test its phylogenetic relationships. The morphological characteristics of this form should be more carefully compared with *R. beebei* and *R. merianae* to determine and support species-level validity.

Selected references: Narvaes and Rodrigues (2009); Señaris et al. (2014); Pereyra et al. (2016).

Rhinella sclerocephala

(Mijares-Urrútia and Arends 2001)*

Holotype: EBRG 3415.

Type locality: “1.5 km (by road) from Curimagua to Cerro Galicia, municipio Petit, Sierra de San Luis, Estado Falcón, Venezuela (about 11°10'N, 69°41'W), about 1,150 m.”

Distribution: Region 2. Apparently endemic to the cloud forests at Sierra de San Luis, Falcón State. No additional specimens of this species have been collected in the last 25 or so years, according to material preserved in Venezuelan museums. Other than the series by Mijares-Urrútia and Arends (2001) no other specimens are known in the scientific collections examined.

Selected references: Mijares-Urrútia and Arends (2001).

Rhinella sternosignata (Günther 1858)

Syntypes: BM 1947.2.21.68–69; 1947.2.21.70; 1947.2.21.87; 1947.2.21.88.

Type locality: “Venezuela;” “Puerto Cabello;” “Córdova;” “México;” restricted to Puerto Cabello by Cochran and Goin (1970).

Distribution: Regions 1, 2. The eastern versant of the Cordillera Oriental of Colombia and Venezuela. In Venezuela the species is distributed in cloud and rainforests of the Cordillera de la Costa and in the eastern

Andean versant, or so-called Andean Piedmont.

Remarks: Pereyra et al. (2016) found *Rhinella sternosignata* closely related to the *R. margaritifera* and *R. veraguensis* species groups.

Selected references: Boulenger (1882); Boettger (1892); Lutz (1927); Ginés (1959); Rivero (1961, 1964a,d); Cochran and Goin (1970); Hoogmoed (1990); La Marca (1992); Manzanilla et al. (1995); La Marca and Mijares (1996); Yústiz (1996); La Marca and Manzanilla (1997); Vélez (1999); Pereyra et al. (2016).

Family Centrolenidae Jiménez de la Espada, 1872

Remarks: We follow the taxonomic arrangement proposed by Guayasamin et al. (2009).

Subfamily Centroleninae Taylor, 1951

Genus *Centrolene* Jiménez de la Espada, 1872

Type species: *Centrolene geckoideum* Jiménez de la Espada, 1872, by monotypy.

Remarks: The generic name *Centrolene* is feminine, not neuter as Myers and Donnelly (1997) interpreted. Jimenez de la Espada (1872) described *Centrolene* without indicating a gender and associated the name with a neuter species name (*geckoideum*) in error. Following the Code it must be corrected (M.A. Alonso de Zarazaga, pers. comm.), as *Centrolene* is feminine from the Greek nouns (kéntron -sting, spur- and òlénē -elbow-, thus feminine in Greek), so, the emendations proposed by Myers and Donnelly (1997) require revision. Following Article 30.1.2 of the Code, the species names are amended to feminine when determined to require correction according to the Code (ICZN 1999). The amended *Centrolene* follows, as feminine: *Centrolene altitudinalis* (Rivero 1968), *Centrolene antioquiensis* (Noble 1920), *Centrolene bacata* Wild, 1994, *Centrolene daidalea* (Ruíz-Carranza and Lynch 1991), *Centrolene geckoidea* Jiménez de la Espada, 1872, *Centrolene gemmata* (Flores 1985), *Centrolene hesperia* (Cadle and McDiarmid 1990), *Centrolene huilensis* Ruíz-Carranza and Lynch, 1995, *Centrolene lemniscata* Duellman and Schulte, 1993, *Centrolene notosticta* Ruíz-Carranza and Lynch, 1991, *Centrolene peristicta* (Lynch and Duellman 1973), *Centrolene pipilata* (Lynch and Duellman 1973), and *Centrolene venezuelensis* (Rivero 1968). The species not mentioned remain as previously published.

Centrolene altitudinalis (Rivero 1968)*

Holotype: MCZ 72500.

Type locality: “Quebrada cerca de Río Albarregas, 2,400 m. Estado Mérida, Venezuela.”

Distribution: Region 1. Andes of Mérida State. Known from five localities, including (1) the type locality; (2) Monte Zerpa, N of the city of Mérida; (3) La Joya, NE of



23E. *Rhinella margaritifera*. Male. Triunfo, Bolivar. This population could represent *R. martyi*. Photo: César Barrio-Amorós.



23F. *Rhinella margaritifera*. Female. Yacambú, Lara state. Photo: César Barrio-Amorós.



23G. *Rhinella margaritifera*. Female. Kanarakuni, base of Sarisariñama tepui, Bolivar. Photo: César Barrio-Amorós.



24A. *Rhinella marina*. Female. San Vicente, Apure. Photo: César Barrio-Amorós.



24B. *Rhinella marina*. Female. Santa María de Erebató, Caura river basin, Bolivar. Photo: César Barrio-Amorós.



25. *Rhinella nattereri*. Chivatón, Gran Sabana, Bolivar. Photo: César Barrio-Amorós.

Mérida; (4) Altos de San Luis and El Chorotal, towards Mérida to La Azulita; and (5) Altos de San Luis.

Selected references: Rivero (1968b); Señaris and Ayarzagüena (2005).

Centrolene daidalea (Ruíz-Carranza and Lynch 1991)

Holotype: ICN 18008.

Type locality: Granja Infantil del Padre Luna, Albán Municipality, Cundinamarca, Departamento, western slopes of the Cordillera Oriental, Colombia (4°45'56"N, 74°26', 2,060 m).

Distribution: Region 1. Colombia and Venezuela. In Venezuela, known from eight localities on the eastern versant of the Sierra de Perijá, 800–1,832 m asl.

Selected references: Rojas-Runjaic et al. (2010).

Centrolene notosticta Ruíz-Carranza and Lynch, 1991

Holotype: ICN 12632.

Type locality: “Departamento de Santander, vertiente occidental de la Cordillera Oriental, municipio de Charalá, Virolín (= Inspección de Policía de Cañaverales), sitio “El Encino” ca. cabeceras Río Luisito, Latitud 6°13’N, 73°05’W de Greenwich, 1,750 m,” Colombia.

Distribution: Region 1. Colombia and Venezuela. In Venezuela, known from only one locality (Campamento Guacharaca, 1,660 m asl) in the eastern versant of the Sierra de Perijá, Zulia State (Rojas-Runjaic et al. 2012).

Selected references: Rojas-Runjaic et al. (2012).

Centrolene venezuelensis (Rivero 1968)*

Holotype: MCZ 77503.

Type locality: “Valle de la Culata, bosque a 2,700 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Occurs throughout the Venezuelan Andes, from Táchira to Mérida States, and in the Sierra de Perijá (Zulia State), 2,100–3,050 m asl. *Centrolene venezuelensis* is speculated to occur in Colombia, yet has not been documented.

Remarks: Myers and Donnelly (1997) elevated *Centrolene buckleyi venezuelensis* to species level, as *C. venezuelense*, without explanation. This decision was supported by Señaris and Ayarzagüena (2005). Guayasamin et al. (2009) validated this species elevation.

Selected references: Ginés (1959); Rivero (1961, 1963b, 1964a, 1968b); Péfaur and Díaz De Pascual (1982); Gremone et al. (1986); La Marca (1991b “1994,” 1996c); Ruíz-Carranza and Lynch (1991); Ayarzagüena (1992); Myers and Donnelly (1997); Señaris and Ayarzagüena (2005); Rojas-Runjaic et al. (2012).

Genus *Cochranella* Taylor, 1951

Type species: *Centrolenella granulosa* Taylor, 1949, by original designation.

Remarks: The species *riveroi* and *duidaeana* were not evaluated by Guayasamin et al. (2009) in their phylogeny of Centrolenidae. They are left as taxa *incertae sedis* within *Cochranella sensu lato*, until more data becomes available.

Cochranella duidaeana (Ayarzagüena 1992)*

Holotype: MHNLS 12000.

Type locality: Region 5. “Cumbre sur del Monte Duida. Territorio Federal Amazonas. Venezuela. (3°19’N, 65°38’W), 2,140 m snm.”

Distribution: Endemic to Cerro Duida, a tepui in Amazonas State.

Selected references: Ayarzagüena (1992); Ayarzagüena and Señaris (1996); Señaris and Ayarzagüena (2005);

Guayasamin et al. (2009).

Cochranella riveroi (Ayarzagüena 1992)*

Holotype: MBUCV 6190.

Type locality: Cumbre Cerro Aracamuni, Amazonas State, 1,600 m asl.

Distribution: Region 5. Endemic to Cerro Aracamuni, a granitic mountain in Amazonas State.

Selected references: Ayarzagüena (1992); Ayarzagüena and Señaris (1996); Señaris and Ayarzagüena (2005); Guayasamin et al. (2009).

Genus *Espadarana* Guayasamin, Castroviejo-Fisher, Trueb, Ayarzagüena, Rada and Vilà, 2009

Type species: *Centrolenella andina* Rivero, 1968, by original designation.

Espadarana andina (Rivero 1968)

Holotype: MCZ 72502.

Type locality: “La Azulita, 1,050 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Colombia and Venezuela. Widely distributed throughout the Cordillera de Mérida and the Sierra de Perijá, in Mérida, Táchira, and Zulia States, 505–2,200 m asl.

Selected references: Rivero (1968b, 1985); Mijares-Urrútia (1990a); La Marca (1994c); Ruíz-Carranza and Lynch (1995); Guayasamin and Barrio-Amorós (2005); Señaris and Ayarzagüena (2005); Guayasamin et al. (2009); Rojas-Runjaic et al. (2012).

Genus *Vitreorana* Guayasamin, Castroviejo-Fisher, Trueb, Ayarzagüena, Rada and Vilà, 2009

Type species: *Centrolenella antisthenesi* Goin, 1963, by original designation.

Vitreorana antisthenesi (Goin 1963)*

Holotype: MBUCV 4033.

Type locality: “Parque Nacional de Rancho Grande, Aragua, Venezuela.”

Distribution: Region 2. Cordillera de la Costa, 220–1,200 m asl.

Selected references: Goin (1963); Rivero (1968b); Cannatella and Lamar (1986); Manzanilla et al. (1995); Señaris and Ayarzagüena (2005); Barrio-Amorós (2006c); Guayasamin et al. (2009).

Vitreorana castroviejoi Ayarzagüena and Señaris, 1997*

Holotype: MHNLS 13356.

Type locality: “Cerro El Humo, Península de Paria, Estado Sucre, Venezuela. (10°42’N–62°37’W). 750 m snm.”



26. *Rhinella* aff. *proboscidea*. La Escalera, Bolívar. Photo: Javier Mesa.



27A. *Rhinella sternosignata*. Campamento Arassari, Acequias River, Barinas. Photo: César Barrio-Amorós.



27B. *Rhinella sternosignata*. Ventral view. Campamento Arassari, Acequias River, Barinas. Photo: César Barrio-Amorós.



28. *Centrolene altitudinalis*. El Cedral, Altos de San Luis, Mérida. Photo: César Barrio-Amorós.



29. *Centrolene daidalea*. Male. Cerro Las Antenas, Lajas river basin, sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



30. *Centrolene notosticta*. Male. Campamento Guacharaca, Caño Tétari, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.

Distribution: Region 2. Endemic on the Península de Paria, Sucre State, 750–800 m asl.

Selected references: Ayarzagüena and Señaris (1997); Señaris and Ayarzagüena (2005); Guayasamin et al. (2009).

Vitreorana gorzulae (Ayarzagüena 1992)

Holotype: MHNLS 11221.

Type locality: “Cerro Auyantepuy-Centro. Edo. Bolívar. Venezuela. (5°56’N-62°34’W). 1,850 m snm.”

Distribution: Region 5. Widespread in the Guiana Shield (Venezuela and Guyana), 430–1,850 m asl. In Venezuela, known from several localities in the Sierra de Lema, the Gran Sabana, and Auyan-tepui.

Remarks: Duellman and Señaris (2003) place *Centrolenella auyantepuiana* (Ayarzagüena 1992) (reported as *Hyalinobatrachium auyantepuianum* by

Barrio-Amorós 1998), in synonymy with *Centrolene gorzulae* based on its trilobate liver and a small humeral spine not reported before in this taxon. Kok and Castroviejo-Fisher (2008) synonymized *Centrolene papillahallicum* Noonan and Harvey, 2000 with what they called *V. gorzulai*. Later, using integrative taxonomy, Castroviejo-Fisher et al. (2009) placed *Centrolene lema* into synonymy with *V. gorzulae*. Though the name *gorzulae* is a masculine patronym (honoring Stefan Gorzula) that seems to be correctly emended to *gorzulai*, this is not the case according to Article 31.1.1 of the Code (ICZN 1999).

Selected references: Ayarzagüena (1992); Duellman (1997); Gorzula and Señaris (1998); ICZN (1999); Duellman and Señaris (2003); Señaris and Ayarzagüena (2005); Kok and Castroviejo-Fisher (2008); Kok and Kalamandeen (2008); Myers and Donnelly (2008); Barrio-Amorós and Duellman (2009); Castroviejo-Fisher et al. (2009); Guayasamin et al. (2009); Señaris et al. (2014).

Vitreorana helenae (Ayarzagüena 1992)

Holotype: MHNLS 9431.

Type locality: “Quebrada Jaspe, San Ignacio de Yuruaní, Edo. Bolívar. Venezuela.”

Distribution: Region 5. Venezuela and Guyana. In Venezuela the species is known from several localities in the Gran Sabana Region.

Remarks: Señaris (1997) reported *Cochranella oyampiensis* from Salto Karuay, a locality in the Gran Sabana Region, Bolívar State. Kok and Castroviejo-Fisher (2008) demonstrated that those specimens correspond to *Vitreorana helenae*. Purported differences between both taxa listed by Señaris and Ayarzagüena (2005) were interpreted as intraspecific variation.

Selected references: Ayarzagüena (1992); Duellman (1993); Señaris (1997); Señaris and Ayarzagüena (2005); Kok and Castroviejo-Fisher (2008); Kok and Kalamandeen (2008); Guayasamin et al. (2009); Señaris et al. (2014).

Subfamily Hyalinobatrachinae
Guayasamin, Castroviejo-Fisher, Trueb,
Ayarzagüena, Rada and Vilà, 2009

Genus *Celsiella* Guayasamin, Castroviejo-Fisher, Trueb, Ayarzagüena, Rada and Vilà, 2009

Type species: *Centrolenella revocata* Rivero, 1985, by original designation.

Celsiella revocata (Rivero 1985)*

Holotype: UPR-M 5295.

Type locality: Colonia Tovar, 1,800 m, D.F., Venezuela.

Distribution: Region 2. Southern versant of the

Cordillera Litoral and the western sector of the Cordillera de la Costa, 1,200–1,800 m asl.

Selected references: Rivero (1985); Ruiz-Carranza and Lynch (1991, 1998); Myers and Donnelly (1997); Señaris and Ayarzagüena (2005); Guayasamin et al. (2009).

Celsiella vozmedianoi

(Ayarzagüena and Señaris 1997)*

Holotype: MHNLS 13355.

Type locality: “Cerro El Humo, Península de Paria, Estado Sucre, Venezuela. (10°42’N-62°37’W), 750 m snm.”

Distribution: Region 2. Endemic on the Península de Paria, Sucre State.

Selected references: Ayarzagüena and Señaris (1997); Señaris and Ayarzagüena (2005); Guayasamin et al. (2009).

Genus *Hyalinobatrachium*

Ruiz-Carranza and Lynch, 1991

Type species: *Hylella fleischmanni* Boettger, 1893, by original designation.

Hyalinobatrachium cappellei

(van Lidth de Jeude 1904)

Holotype: RMNH 4463.

Type locality: River Saramacca and neighboring areas, Suriname.

Distribution: Region 5. Brazil, Venezuela, Guyana, Suriname, and French Guiana. Widespread in the Venezuelan Guayana (Amazonas and Bolívar States).

Remarks: Many references to this species are found under the names: *Hyalinobatrachium crurifasciatum* Myers and Donnelly, 1997, *H. eccentricum* Myers and Donnelly, 2001, *H. ignioculus* Noonan and Bonett, 2003 and *H. taylori*. Barrio-Amorós and Castroviejo-Fisher (2008b) commented on variation, vocalization and several morphological traits (under *H. ignioculus*). Castroviejo-Fisher et al. (2011) placed the three previous names into the synonymy of *H. cappellei* and identified many published records of *H. taylori* as *H. cappellei*.

Selected references: Goin (1964); Señaris and Ayarzagüena (1994, 2005); Myers and Donnelly (1997, 2001); Duellman and Señaris (2003); Barrio-Amorós and Castroviejo-Fisher (2008b); Kok and Kalamandeen (2008); Barrio-Amorós and Duellman (2009); Guayasamin et al. (2009); Castroviejo-Fisher et al. (2011); Señaris et al. (2014).

Hyalinobatrachium durantei (Rivero 1985)*

Holotype: UPR-M 5811.

Type locality: La Mucuy, 2,172 m, Estado Mérida, Venezuela (also type locality of synonyms *H.*



31A. *Centrolene venezuelensis*. Female. Páramo Tétari, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



31B. *Centrolene venezuelensis*. Male. La Motús, Mérida. Photo: César Barrio-Amorós.



32A. *Espadarana andina*. Male. San Juan de Colón, Táchira. Photo: César Barrio-Amorós.



32B. *Espadarana andina*. Male. La Azulita, Mérida. Photo: César Barrio-Amorós.



33. *Vitreorana antisthenesi*. Male. Palmichal, Bejuma, Carabobo. Photo: César Barrio-Amorós.



34. *Vitreorana castroviejoi*. Male. Las Melenas, Irapa, Sucre. Photo: César Barrio-Amorós.

loreocarinarum (Rivero 1985) and *H. ostracodermoides* (Rivero 1985).

Distribution: Region 1. Andes of Mérida State, 1,830–2,400 m asl.

Remarks: Señaris (1999) considered *Hyalinobatrachium loreocarinarum*, *H. pleurostriatus*, and *H. ostracodermoides* synonymous with *H. durantei*.

Selected references: Rivero (1985); Señaris (1999); Señaris and Ayarzagüena (2005).

Hyalinobatrachium fragile* (Rivero 1985)

Type: UPR-M 5938.

Type locality: “Mundo Nuevo, entre Manrique y La Sierra, 396 m, Estado Cojedes, Venezuela.”

Distribution: Region 2. Western and central sectors of the Cordillera de la Costa, 100–1,200 m asl.

Remarks: *Hyalinobatrachium fleischmanni* has been listed as occurring in Venezuela until recently, but is not

longer considered part of the Venezuelan herpetofauna. Most of the older records were misidentifications between *H. fragile* and *H. guairarepanense*.

Selected references: Rivero (1985); Señaris and Ayarzagüena (2005); Barrio-Amorós (2006c).

Hyalinobatrachium guairarepanense Señaris, 1999*

Holotype: MHNLS 13731.

Type locality: “Quebrada Chacaíto, Parque Nacional El Ávila, (10°30'36"N, 66°51'44"W), 980 m, Distrito Federal, Venezuela.”

Distribution: Region 2. Known only from the central sector of Cordillera Litoral, in Cordillera de la Costa, 720–1,200 m asl.

Remarks: *Hyalinobatrachium fleischmanni* was listed as occurring in northern Venezuela in error (Rivero 1961). Most records were misidentifications of *H. fragile* and *H. guairarepanense*. The image presented here (Image 41) is of an individual from near the type locality (but at around 1,200 m; J. Vieira, pers. comm.), where it had not been seen since its original description. Considered Endangered under Venezuelan Red Book criteria (Señaris et al. 2015a). Here the ending of the original species name *guairarepanensis* is emended as *guairarepanense*, as *Hyalinobatrachium* is a neuter genus (Ruiz-Carranza and Lynch 1991), following the Code's article 30.1.2. (ICZN 1999).

Selected references: Ginés (1959); Rivero (1961, 1964a,b); Goin (1964); Tello (1968); Cannatella and Lamar (1986); Manzanilla et al. (1995); Myers and Donnelly (1997); ICZN (1999); Señaris (1999); Barrio-Amorós (2013); Señaris et al. (2015).

Hyalinobatrachium iaspidiense (Ayarzagüena 1992)

Holotype: EBD 28803.

Type locality: “Quebrada Jaspe, San Ignacio de Yuruaní, Edo. Bolívar, Venezuela.”

Distribution: Region 5. Considered until recently endemic to the Venezuelan Gran Sabana. For several years, reports of this species have come from French Guiana, Surinam, Brazil, Ecuador, and Peru (Guayasamin and North 2009; Yáñez-Muñoz et al. 2009), showing one of the widest distributions among centrolenid frogs. In Venezuela, however, only known from the southeastern sector (east of the Parima-Maigualida mountain chain).

Selected references: Ayarzagüena (1992); Señaris and Ayarzagüena (2004, 2005); Guayasamin and North (2009); Yáñez-Muñoz et al. (2009); Castroviejo-Fisher et al. (2011); Señaris et al. (2014).

Hyalinobatrachium mesai

Barrio-Amorós and Brewer-Carías, 2008*

Holotype: EBRG 4644.

Type locality: Southern slope of Sarisariñama-tepui,

Bolívar State, Venezuela (4°25'N, 64°7'W), elevation 420 m.

Distribution: Region 5. Only known from the type locality.

Remarks: Guayasamin and North (2009) believe that due to the similarity with *Hyalinobatrachium iaspidiense*, *H. mesai* is likely a synonym. However, CBA field notes clearly note green bones as the main distinguishing character (Barrio-Amorós and Brewer-Carías 2008).

Selected references: Barrio-Amorós and Brewer-Carías (2008); Guayasamin and North (2009); Castroviejo-Fisher et al. (2011).

Hyalinobatrachium mondolfii

Ayarzagüena and Señaris, 2001

Holotype: MHNLS 12710.

Type locality: “Primer raudal del Caño Acoima, afluente del Río Grande (8°22'N, 61°32'W), 15 m snm, estribaciones de la serranía de Imataca, Estado Delta Amacuro.”

Distribution: Regions 4, 5, 6. Widespread in lowlands of Amazonia in southern Venezuela and the Guianas, and from Colombia and Brazil into Bolivia. In Venezuela, only known from Delta Amacuro State.

Selected references: Señaris and Ayarzagüena (2001, 2004, 2005); Castroviejo-Fisher et al. (2011).

Hyalinobatrachium orientale (Rivero 1968)

Holotype: MCZ 72497.

Type locality: “Cerro Turumiquire, 1,200 m, Estados Sucre-Monagas, Venezuela.”

Distribution: Region 2. Tobago and northeastern Venezuela. In Venezuela, restricted to the eastern part of Cordillera de la Costa (Serranía de Paria and Macizo de Turimiquire), in Monagas and Sucre States.

Remarks: *Hyalinobatrachium orientale* was believed to be a species complex including *H. orocostale* (Cannatella and Lamar 1986). Castroviejo-Fisher et al. (2008) demonstrated that *H. orocostale* may be differentiated, as *H. orientale* remains only known from NE Venezuela and Tobago (Hardy 1984b; Jowers et al. 2014). The genetic distance between Venezuelan and Tobagoan populations is low enough that Jowers et al. (2014) did not elevate subspecies *tobagoensis* to species status. However, a biogeographic rationale could support its elevation, but would require further investigation. CBA and G. Rivas collected *H. orientale* in Macuro (Península de Paria) at near sea level (elevation 5 m; specimens at CVULA), extending the elevational range from 5–1,200 m.

Selected references: Rivero (1968b); Hardy (1984b); Cannatella and Lamar (1986); Ruiz-Carranza and Lynch (1991); Señaris and Ayarzagüena (1993, 2005); Manzanilla et al. (1995); Ayarzagüena and Señaris (1996); Duellman (1997); Gorzula and Señaris (1998); Castroviejo-Fisher et al. (2008); Jowers et al. (2014).



35A. *Vitreorana gorzulae*. Male. Las Lajas, Sierra de Lema, Bolivar. Photo: Charles Brewer-Carías.



35B. *Vitreorana gorzulae*. Female. Las Lajas, Sierra de Lema, Bolivar. Photo: César Barrio-Amorós.



36. *Vitreorana helena*. Male. Chivatón, Gran Sabana, Bolivar. Photo: César Barrio-Amorós.



37. *Celsiella vozmediano*. Male. Las Melenas, Irapa, Sucre. Photo: César Barrio-Amorós.



38A. *Hyalinobatrachium cappellei*. Male. Chivatón, Gran Sabana, Bolivar. Photo: César Barrio-Amorós.



38B. *Hyalinobatrachium cappellei*. Male. Quebrada de Jaspe, Bolivar. Photo: César Barrio-Amorós.



38C. *Hyalinobatrachium cappellei*. Detail of the iris. La Laja, Sierra de Lema, Bolívar. Photo: Charles Brewer-Carías.



39. *Hyalinobatrachium durantii*. Male. Chorotal, Mérida. Photo: César Barrio-Amorós.



40A. *Hyalinobatrachium fragile*. Hacienda la Elvira, Guatopo, Guárico. Photo: Walter Schargel.



40B. *Hyalinobatrachium fragile*. Cerro El Tigre, Sierra de Aroa, Yaracuy. Photo: Fernando Rojas-Runjaic.



41. *Hyalinobatrachium guairarepanense*. Quebrada Chacaíto, Caracas. Photo: Jose Vieira.



42. *Hyalinobatrachium iaspidiense*. Salto Río Lindo, Sierra de Imataca, Delta Amacuro. Photo: César Barrio-Amorós.

Hyalinobatrachium orocostale* (Rivero 1968)

Holotype: MCZ 47501

Type locality: “Cerro Platillón (Hacienda Picachitos), Cordillera del Interior, 1,200 m, Estado Guárico, Venezuela.”

Distribution: Region 2. Apparently restricted to humid mountainous forests of Serranía del Interior, a small

mountain chain parallel to the Serranía del Litoral, both within the central sector of Cordillera de la Costa in Venezuela.

Remarks: Erected from synonymy with *Hyalinobatrachium orientale* by Castroviejo-Fisher et al. (2008).

Selected references: Rivero (1968); Señaris and Ayarzagüena (2005); Castroviejo-Fisher et al. (2008).

Hyalinobatrachium pallidum (Rivero 1985)*

Holotype: UPR-M 4554.

Type locality: “Guacharaquita, entre La Grita y Páramo de La Negra, 1,768 m, Edo Táchira, Venezuela.”

Distribution: Region 1. Cordillera de Mérida in its western, southern, and eastern versants (Mérida, Táchira, and Barinas States), and Sierra de Perijá (Zulia State).

Remarks: This species has a wider distribution than previously known. Formerly only known from its type locality until Señaris and Ayarzagüena (2005) redescribed the species based on new topotypic specimens. Later, Guayasamin et al. (2009) assigned a population from the eastern versant of the Andes, reported as *Hyalinobatrachium ibama* by Barrio-Amorós (2006d) to *H. cf. pallidum*. Based on molecular work (Guayasamin et al. 2009 and unpub.), it is doubtful that *H. ibama* is the species occupying the eastern versant of the Cordillera de Mérida (Barrio-Amorós 2006d), but is more likely *H. pallidum* (Image 47A). Actually, this implies that *H. ibama* from Colombia could be a junior synonym of *H. pallidum*. Another population from Quebrada La Rana, near La Macana, Mérida, is morphologically slightly different from the *H. pallidum* population at San Isidro, Barinas (Image 47B). More research is needed to resolve the status of *H. pallidum* in the Venezuelan Andes. More recently, Rojas-Runjaic et al. (2012) reported four additional localities, along the eastern versant of the Sierra de Perijá, at elevations 1,132–1,832 m asl.

Selected references: Rivero (1985); Señaris and Ayarzagüena (2005); Barrio-Amorós (2006d); Guayasamin et al. (2009); Rojas-Runjaic et al. (2012).

Hyalinobatrachium tatayoi

Castroviejo-Fisher, Ayarzagüena and Vilà, 2007

Holotype: MHNSL 17174.

Type locality: “Stream near Tokuko (09°50'30.6"N, 72°49'13.6"W; 301 m asl.), Estado Zulia, Venezuela.”

Distribution: Regions 1, 6. Known from four localities in lowlands and uplands of the eastern versant of Sierra de Perijá, Zulia State (Rojas-Runjaic et al. 2012). CBA and Erik Arrieta also collected this species at Río Frío (CVULA 8201–09) at 40 m, in a small stream flowing from Cordillera de Mérida through the lowlands facing Lake Maracaibo, Mérida State. Elevation range 40–512 m asl.

Remarks: Castroviejo-Fisher et al. (2009) showed that *Hyalinobatrachium tatayoi* is embedded in a clade of specimens of *H. fleischmanni* and these two species could be conspecific. If *H. fleischmanni* is a species complex it requires further taxonomic and nomenclatural revision.

Selected references: Castroviejo-Fisher et al. (2007, 2009); Rojas-Runjaic et al. (2012).

Hyalinobatrachium taylori (Goin 1968)

Holotype: BM 1939.1.1.65.

Type locality: “750 ft. (228 m) along the New River, Guyana”

Distribution: Region 5. Venezuela, Guyana, Suriname, and French Guyana. Widespread in the Venezuelan Guayanas. Elevational distribution in Venezuela from 450 m (La Laja, Sierra de Lema) to 1,850 on Auyan-tepui (Señaris and Ayarzagüena 1994). Lower elevations are known in Guyana, French Guiana, and Suriname (Kok and Castroviejo-Fisher 2008). Amazonas state reports (Señaris and Ayarzagüena 2005) are doubtful and must be verified.

Remarks: *Hyalinobatrachium taylori* has a long history of misidentifications. The type series contained three different species, and many published records refer to *H. cappellei* (Castroviejo-Fisher et al. 2011).

Selected references: Goin (1968); Ruíz-Carranza and Lynch (1991); Ayarzagüena (1992); Señaris and Ayarzagüena (1993, 2005); Gorzula and Señaris (1998); Lescure and Marty (2000); Noonan and Bonet (2003); Kok and Castroviejo-Fisher (2008); Kok and Kalamandeen (2008); Barrio-Amorós and Duellman (2009); Castroviejo-Fisher et al. (2011); Señaris et al. (2014).

Family Ceratophryidae Tschudi, 1838

Remarks: Recovered **Leptodactylidae** by Frost (2006). Faivovich et al. (2014) treated its phylogenetic relationships.

Selected references: Frost (2006); Faivovich et al. (2014).

Genus *Ceratophrys* Wied-Neuwied, 1824

Type species: *Ceratophrys varius* Wied-Neuwied, 1824 (= *Bufo auritus* Raddi, 1823), by subsequent designation of Fitzinger (1843).

Remarks: *Ceratophrys cornuta* (Linnaeus 1758) was considered to occur in Venezuela (Rivero 1961; Lynch 1982). This was accepted by many subsequent authors until Barrio-Amorós (2004) deleted it from the Venezuelan checklist for lack of any voucher or photographs of the species in the country.

Ceratophrys calcarata Boulenger, 1890

Holotype: BMNH 1947.2.17.28 (formerly 89.12.16.168).

Type locality: “Colombia.”

Distribution: Region 3, 6. Caribbean lowlands of Colombia and Venezuela. In Venezuela, distribution is in the northwestern portion of the country (Maracaibo Lake Basin, Falcón and Lara States), with a disjunct population



43. *Hyalinobatrachium mesai*. Male. Southern slope of Sarisariñama tepui, Bolívar. Photo: Mark Moffett.



44. *Hyalinobatrachium mondolfii*. Male. Salto Río Lindo, Sierra de Imataca, Delta Amacuro. Photo: Fernando Rojas-Runjaic.



45. *Hyalinobatrachium orientale*. Male. Macuro, Península de Paria, Sucre. Photo: César Barrio-Amorós.



46. *Hyalinobatrachium orocostale*. Cerro Platillón, Guárico. Photo: Santiago Castroviejo-Fisher.



47A. *Hyalinobatrachium* aff. *pallidum*. Male. San Isidro, Barinas. Photo: César Barrio-Amorós.



47B. *Hyalinobatrachium pallidum*. Male. Quebrada La Rana, south of Santa Cruz de Mora, Mérida. Photo: César Barrio-Amorós.



48A. *Hyalinobatrachium tatayoi*. Male. Río Frío, Mérida. Photo: César Barrio-Amorós.



48B. *Hyalinobatrachium tatayoi*. Female. Ipika, Tokuko river basin, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



49. *Hyalinobatrachium taylori*. Female. Quebrada de Jaspe, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



50A. *Ceratothryx calcarata*. Puerto Nuevo, Falcón. Photo: César Barrio-Amorós.



50B. *Ceratothryx calcarata*. Falcón. Photo: Edward Camargo.



50C. *Ceratothryx calcarata*. Puerto Ayacucho, Amazonas. Photo: Zelimir Cernelic.

in the surroundings of Puerto Ayacucho, southeast of the Orinoco River in Amazonas State.

Remarks: Faivovich et al. (2014) recovered the phylogenetic relationships of the family Ceratophryidae, placing *Ceratothryx calcarata* as a sister species of *C. cornuta*.

Selected references: Boulenger (1890); Lutz (1927); Ginés (1959); Rivero (1961, 1964b); Lynch (1982); La Marca (1986, 1995a); Mijares-Urrútia and Arends

(1993); Frost et al. (2006); Faivovich et al. (2014).

Family Ceuthomantidae
Heinicke, Duellman, Trueb, Means,
MacCulloch and Hedges, 2009

Remarks: Includes *Pristimantinae sensu* Padial et al. (2014), including *Ceuthomantinae* Heinicke et al. (2009),

and follows Heinicke et al (2018) intended for a robust framework for a standardized and revised Terraranae taxonomy.

Genus *Ceuthomantis* Heinicke, Duellman, Trueb, Means, MacCulloch and Hedges, 2009

Type species: *Ceuthomantis smaragdinus* Heinicke, Duellman, Trueb, Means, MacCulloch, and Hedges, 2009, by original designation.

Ceuthomantis aracamuni
(Barrio-Amorós and Molina 2006)*

Holotype: MHNLS 17042.

Type locality: Summit of Cerro Aracamuni (01°28'36"N, 65°50'7"W), elevation 1,493 m, Amazonas State, Venezuela.

Distribution: Region 5. Endemic to Cerro Aracamuni, a granitic mountain in Amazonas State, southern Venezuela.

Remarks: Described originally in genus *Eleutherodactylus* (Barrio-Amorós and Molina 2006), subsequently transferred to *Pristimantis* based on Heinicke et al. (2007), and finally transferred to *Ceuthomantis* by Heinicke et al. (2009).

Selected references: Barrio-Amorós and Molina (2006); Heinicke et al. (2009); Barrio-Amorós (2010c).

Ceuthomantis cavernibardus
(Myers and Donnelly 1997)

Holotype: AMNH 131537.

Type locality: “North base of Pico Tamacuari, 1,160–1,200 m elevation. Sierra Tapirapecó, Amazonas, Venezuela (1°13'N, 64°42'W).”

Distribution: Region 5. Restricted to the Sierra Tapirapecó, in the extreme south of Amazonas State in Venezuela along the northern border of Brazil.

Remarks: Described originally as a member of genus *Eleutherodactylus* (Myers and Donnelly 1997), and considered a member of *Pristimantis* by Barrio-Amorós and Brewer-Carías (2008), before being transferred to *Ceuthomantis* by Heinicke et al. (2009).

Selected references: Myers and Donnelly (1997); Caramaschi and Niemeyer (2005); Barrio-Amorós and Brewer-Carías (2008); Heinicke et al. (2009); Barrio-Amorós (2010c).

Ceuthomantis duellmani Barrio-Amorós, 2010*

Holotype: EBRG 4676.

Type locality: Edge of Sima Mayor, Sarisariñama-tepui (1°28'36"N, 65°50'7"W), elevation 1,350 m, Bolívar State, Venezuela.

Distribution: Region 5. Endemic to Cerro Sarisariñama-tepui in Bolívar State; southeastern Venezuela.

Selected references: Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós (2010c).

Family Craugastoridae Hedges, Duellman and Heinicke, 2008

Remarks: This very diverse group of Terrarana is still under revision (e.g., Padial et al. 2014; Heinicke et al. 2015, 2018). Pyron and Wiens (2011) found Craugastoridae embedded in Strabomantidae. Padial et al. (2014) validated a monophyletic Craugastoridae including subfamily Ceuthomantinae Heinicke et al., 2009. Heinicke et al. (2018) showed Strabomantidae monophyletic with respect to Craugastoridae, a view shared here. Heinicke et al. (2015) did not allow unequivocal placement of *Tachiramantis* into a subfamily, however, Heinicke et al. (2018) placed it into Craugastoridae.

Genus *Tachiramantis*
Heinicke, Barrio-Amorós and Hedges, 2015

Type species: *Eleutherodactylus prolixodiscus* Lynch, 1978, by original designation.

Remarks: Recently erected by Heinicke et al. (2015) to accommodate a clade of terraranan frogs deeply divergent from *Pristimantis*. More species currently in *Pristimantis* will probably be shown to be members of *Tachiramantis*, such as *P. melanoproctus*, *P. mondolfii* and *P. tayrona* (due to its similarity to *P. prolixodiscus*).

Tachiramantis lentiginosus (Rivero 1984)*

Holotype: UPR-M 6060.

Type locality: “Guacharaquita, 1,768 m, entre La Grita y Páramo de La Negra, Edo. Táchira, Venezuela.”

Distribution: Region 1. Known from scattered localities in cloud forests of Táchira and Mérida States.

Selected references: Rivero (1982c).

Tachiramantis prolixodiscus (Lynch 1978)

Holotype: KU 132726.

Type locality: “30 km ENE Bucaramanga, road to Cúcuta, Departamento Santander, Colombia, 2,485 m.”

Distribution: Region 1. Cordillera Oriental in Colombia and Venezuela. In Venezuela, present in the Cordillera de Mérida and the Sierra de Perijá. Barrio-Amorós (2010a) reported it from Calderas, Barinas State, and Barrio-Amorós et al. (2010i) from Perijá; Camargo et al. (2014) provided first report from Lara State.

Remarks: According to Lynch (2003), *Eleutherodactylus chlorosoma* Rivero, 1984 is a junior synonym. Heinicke et al. (2015) assigned *prolixodiscus* to *Tachiramantis* as its type species.

Selected references: Lynch (1978, 2004); Rivero (1982); Barrio-Amorós (2010a); Barrio-Amorós et al. (2010);



51. *Ceuthomantis duellmani*. Sarisariñama tepui, Bolívar. Photo: Javier Mesa.



52. *Tachiramantis lentiginosus*. Female. Guaraque, Mérida. Photo: César Barrio-Amorós.



53. *Tachiramantis prolixodiscus*. Los Alcaravanes, Calderas; Barinas. Photo: César Barrio-Amorós.



54. *Allobates algorei*. Río Frío, Táchira. Photo: César Barrio-Amorós.



55. *Allobates caribe*. Southern slopes Cerro El Humo, Península de Paria, Sucre. Photo: César Barrio-Amorós.



56. *Allobates femoralis*. Yasuní, Ecuador. Photo: César Barrio-Amorós.

Camargo et al. (2014); Heinicke et al. (2015).

Family Dendrobatidae Cope, 1865

Remarks: Herein, family Dendrobatidae is treated to include subfamilies Aromobatinae and Dendrobatinae, which does not follow Grant's et al. (2006, 2017) classification as two separate families.

Subfamily Aromobatinae Grant, Frost, Caldwell, Gagliardo, Haddad, Kok, Means, Noonan, Schargel and Wheeler, 2006

Remarks: Grant et al. (2006) erected family Aromobatidae for dendrobatoid frogs without alkaloids. Santos et al. (2009) returned to a comprehensive Dendrobatidae with Aromobatinae as a subfamily, which

is followed here. Pyron and Wiens (2011) opined that there was not a need for subfamilies in Dendrobatidae. Grant's et al. (2017) claim against Santos (2009) and Barrio-Amorós et al. (2010b) opinions.

Genus *Prostherapis* Cope, 1868

Type species: *Prostherapis inguinalis* Cope, 1868, by original designation.

Prostherapis dunnii (Rivero 1961)*

Holotype: FMNH 35987.

Type locality: “above Caracas, Distrito Federal, Venezuela.”

Distribution: Region 2. Only found in the Caracas Region.

Remarks: Little is known about this frog. Grant et al. (2006) did not include this species in their molecular analysis, and its morphological characteristics prevent clear assignment to an established genus. Until molecular data become available, it should remain in the genus to which it was originally assigned, which is not currently used for any other dendrobatid species. Its unknown phylogenetic relationships (La Marca 2004; Grant et al. 2006) require more data to determine its proper place among dendrobatids. It has likely suffered a dramatic decline in populations due to habitat destruction in the Caracas area (La Marca 2004). Recent surveys by FRR and collaborators in June, July, and December 2015 failed to detect any individuals. It is currently considered Critically Endangered in the Venezuelan Red Book (Rojas-Runjaic and Señaris 2015a) but could be already extinct.

Selected references: Rivero (1961, 1964a, 1988); Tello (1968); Myers et al. (1991); La Marca (2004); Grant et al. (2006); Barrio-Amorós (2013); Rojas-Runjaic and Señaris (2015a).

Genus *Allobates* Zimmermann and Zimmermann, 1988

Type species: *Prostherapis femoralis* Boulenger, 1884, by original designation.

Remarks: Barrio-Amorós et al. (2011) and Barrio-Amorós and Santos (2012) noted the difficulty of distinguishing some *Allobates* and *Aromobates* species using the morphological traits proposed by Grant et al. (2006).

Allobates algorei Barrio-Amorós and Santos, 2009*

Holotype: EBRG 5560.

Type locality: Río Negro, Municipio Córdoba, Estado Táchira, Venezuela, “07°34.723’N, 72°10.739’W,” elevation 482 m.”

Distribution: Region 1. Cordillera Oriental de Colombia (Acevedo et al. 2019) and extreme southwestern piedmont of the Venezuelan Andes, on both northern and

southern sides of the Táchira depression.

Selected references: Barrio-Amorós and García Porta (2003); Barrio-Amorós and Santos (2009).

Allobates bromelicola (Test 1956)*

Holotype: UMMZ 113027.

Type locality: “1,375 m on Pico Periquito, Rancho Grande, Estado Aragua, Venezuela.”

Distribution: Region 2. Surroundings of the type locality, 1,310–1,375 m asl.

Remarks: Nothing is known of this species beyond the original description and some natural history notes by Dixon and Rivero Blanco (1985). It appears to be quite rare, difficult to observe and collect, or it may have suffered a severe decline.

Selected references: Test (1956); Ginés (1959); Rivero (1961, 1964a, 1988); Dixon and Rivero Blanco (1985); Myers et al. (1991); Manzanilla et al. (1995); La Marca and Mijares-Urrútia (1997); Barrio and Fuentes (1999a); Barrio-Amorós (2006c).

Allobates caribe

(Barrio-Amorós, Rivas and Kaiser 2006)*

Holotype: MHNLS 17462.

Type locality: “Southern slope of Cerro El Humo, Península de Paria, Estado Sucre, Venezuela (10°41’094”N, 62°37’147”W), elevation 1,050 m.”

Distribution: Region 2. Only known from type locality.

Remarks: Described as *Colostethus caribe*, it was transferred to *Allobates* by Lötters et al. (2007: 55) a shift agreeable to the current authors, but later (mistakenly) transferred to *Anomaloglossus* (Lötters et al. 2007: 60) without explanation. Frost (2018) used *Allobates* for this species by implication. Several recent attempts to secure more specimens in the same general area failed (G. Rivas, pers. comm.).

Selected references: Barrio-Amorós et al. (2006a); Lötters et al. (2007).

Allobates femoralis (Boulenger 1884)

Syntypes: BMNH 1947.2.14.21–22; Lectotype designated by Silverstone 1976: BMNH 1947.2.14.21 (*sensu* Frost 2017).

Type locality: “Yurimaguas, Huallaga River, (Departamento Loreto), Northern Peru.”

Distribution: Widely distributed in the Amazonian Region (Colombia, Peru, Ecuador, Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana). In Venezuela, only known from two localities in the extreme east of Bolívar State.

Remarks: *Allobates femoralis* was reported for Venezuela by Duellman (1997) based on one specimen (KU 167335), which was confused with *Ameerega picta* (see explanation in Barrio-Amorós 2004 and Barrio-

Amorós and Santos 2009). Nevertheless, its presence in the country was shown by Barrio-Amorós and Santos (2009) using two different recorded calls; voucher specimens from Venezuela are still lacking.

Selected references: Duellman (1997); Barrio-Amorós and Santos (2009).

Allobates humilis (Rivero 1980)*

Holotype: UPR-M 3526.

Type locality: “Boconó (Laguneta artificial del Ministerio de Agricultura), Edo. Trujillo, Venezuela, 1,470 m.”

Distribution: Region 1. Eastern slopes of Venezuelan Andes, in Trujillo and Barinas States, 1,100–1,470 m asl.

Remarks: Misidentified specimens of *Allobates humilis* reported by Barrio-Amorós and García Porta (2003) from Táchira State actually represent *A. algorei* (Barrio-Amorós and Santos 2009).

Selected references: La Rivero (1980, 1988); Myers et al. (1991); Marca et al. (2002); Barrio-Amorós and García Porta (2003); Barrio-Amorós (2010a).

Allobates mandelorum (Schmidt 1932)*

Holotype: FMNH 17788.

Type locality: “Camp at altitude of 8,000 feet (2,630 m) on Mount Turumiquire, (Estados Sucre and Monagas), Venezuela.”

Distribution: Region 2. Endemic to Macizo de Turumiquire, a mountain in the Cordillera de la Costa Oriental, between Monagas and Sucre states. Known only from type locality and from Elvecia in Sucre State (La Marca 1993).

Remarks: Despite the taxonomic revision of La Marca (1993), where it was not closely related to *Mannophryne* or the *Colosthetus alboguttatus* group (currently *Aromobates*), its status remains unsolved. It was allocated to *Allobates* by Grant et al. (2006) without any substantiation. The relationships within Aromobatinae remain unknown and it has not been collected since 1932.

Selected references: Schmidt (1932); Ginés (1959); Rivero (1961, 1982a, 1988); Hardy (1984a); Myers et al. (1991); La Marca (1993); Grant et al. (2006).

Allobates pittieri

(La Marca, Manzanilla and Mijares-Urrutia 2004)*

Holotype: ULABG 5564.

Type locality: “Venezuela: Estado Aragua: Municipio Ocumare de la Costa de Oro (antes Municipio Mario Briceño Iragorri): quebrada afluente del Río La Trilla, 170 m snm. entre la Estación Biológica de Rancho Grande y Ocumare de la Costa, vertiente Norte del Parque Nacional Henri Pittier (10°22'52"N, 67°44'67"W)”

Distribution: Region 2. Distributed throughout the western Cordillera de la Costa (including

Aragua, Carabobo, and Falcón States) towards the northeasternmost sector of the Andes (Lara State), 150–1,700 m asl.

Selected references: La Marca et al. (2004).

Allobates sanmartini

(Rivero, Langone and Prigioni 1986)*

Holotype: MHNM 540.

Type locality: “Las Majadas, río Orinoco, Estado Bolívar, Venezuela.”

Distribution: Region 5. Known only from the type locality.

Remarks: Known only from the type series (two females). Despite several attempts (by CBA, J.C. Santos, and FRR) no additional individuals have been located. The type locality, Las Majadas, could be either where the expedition gathered to send the specimens, or the last campsite where collected material was processed (P. Langone, pers. comm.). In the authors’ opinion, this area is unsuitable for dendrobatid frogs, as it is dry forest similar to that in the Llanos which is devoid of dendrobatoids. Most likely, the specimens came from the Campamento Cecilia Magdalena, upper Caura River, where most of the other amphibian specimens were collected (Rivero et al. 1986). A recently metamorphosed (CVULA 7860) was collected by CBA in Santa Maria de Erebató, Upper Caura River area, in the same main area of Campamento Cecilia Magdalena, which might be an individual of this species. However, its small size, and absence of molecular data, prevent a positive identification.

Selected references: Rivero et al. (1986); Rivero (1988); Myers et al. (1991); La Marca (1997); Grant et al. (2006).

Allobates undulatus (Myers and Donnelly 2001)*

Holotype: EBRG 3021.

Type locality: “Forest stream on Cerro Yutajé, 1,750 m (5°46'N, 66°8'W), Amazonas, Venezuela.”

Distribution: Region 5. Endemic to Yutajé, a tepui in the north of Amazonas State.

Selected references: Myers and Donnelly (2001); Grant et al. (2006).

Genus *Anomaloglossus*

Grant, Frost, Caldwell, Gagliardo, Haddad, Kok, Means, Noonan, Schargel and Wheeler, 2006

Type species: *Colosthetus beebei* Noble, 1923, by original designation.

Remarks: Genus *Anomaloglossus*, recognized by the presence of a median lingual process (MLP), was described by Grant et al. (1997). Currently 28 species are known from the Guiana Shield and northern Amazon (Frost 2018). The seven trans-Andean species with MLP now belong to *Ectopoglossus* Grant, Rada, Anganoy-



57. *Allobates humilis*. Calderas, Barinas. Photo: César Barrio-Amorós.



58. *Allobates pittieri*. Nirgua massif, Yaracuy. Photo: Sebastian Lotzkat.



59. *Anomaloglossus breweri*. Cueva El Fantasma, Aprada-tepui, Bolívar. Photo: Charles Brewer-Carías.



60. *Anomaloglossus moffetti*. Sarisariñama-tepui, Bolívar. Photo: César Barrio-Amorós.



61. *Anomaloglossus parkerae*. La Escalera region, 860 m asl, Bolívar. Photo: William E. Duellman.



62. *Anomaloglossus praderioi*. Maringma-tepui, Cuyuni-Mazaruni District, Guyana. Photo: Philippe Kok.

Criollo, Batista, Dias, Jeckel, Machado and Rueda-Almonacid, 2017.

Anomaloglossus ayarzaguenai (La Marca 1997)*

Holotype: MHNLS 12949.

Type locality: “Sector central de Cerro Jaua, Estado Bolívar (4°49’55”N, 64°25’54”W).”

Distribution: Region 5. Known only from type locality, a tepui in Bolívar State.

Selected references: La Marca (1997a).

Anomaloglossus breweri (Barrio-Amorós 2006)*

Holotype: MHNLS 17044.

Type locality: “Entry of Cueva del Fantasma,



63. *Anomaloglossus roraima*. Wei Assipu-tepui, Cuyuni-Mazaruni District, Guyana. Photo: Philippe Kok.



64A. *Anomaloglossus rufulus*. Churi-tepui, Chimantá Massif, Bolívar. Dorso-lateral view. Photo: César Barrio-Amorós.



64B. *Anomaloglossus rufulus*. Churi-tepui, Chimantá Massif, Bolívar. Ventral view. Photo: César Barrio-Amorós.



65. *Anomaloglossus tepuyensis*. El Peñón, southern slopes Auyan-tepui, Bolívar. Photo: César Barrio-Amorós.



66. *Anomaloglossus triunfo*. Southern slopes of Cerro Santa Rosa, Bolívar. Photo: César Barrio-Amorós.



67. *Anomaloglossus verbeeksnyderorum*. Male. Tobogán de la Selva, Amazonas. Photo: Zelimir Cernelic.

northwestern slope of Aprada tepui, 05°27'N, 62°27'W, 660 m above sea level, Estado Bolívar, Venezuela.”

Distribution: Region 5. Apparently endemic to Aprada-tepui.

Selected references: Barrio-Amorós (2006a, 2013); Señaris et al. (2014).

Anomaloglossus guanayensis (La Marca 1997)*

Holotype: MHNLS 10708.

Type locality: “Alto río Parguaza, Serranía de Guanay (5°55'N y 66°23'W), Estado Amazonas.” Type locality is actually in Bolívar State.

Distribution: Region 5. Endemic to Guanay, a tepui in Bolívar State.

Selected references: La Marca (1997a); Gorzula and Señaris (1998).

Anomaloglossus moffetti

Barrio-Amorós and Brewer-Carías, 2008*

Holotype: EBRG 4645.

Type locality: Southern slope of Sarisariñama-tepui, Camp IV, Estado Bolívar, Venezuela (4°29'N, 64°8'W), elevation 1,108 m.

Distribution: Region 5. Known only from Sarisariñama, a tepui in Bolívar State.

Remarks: It should be compared to *Anomaloglossus ayarzaguenai*, as both are from neighboring tepuis, and could represent the same taxon.

Selected references: Barrio-Amorós and Brewer-Carías (2008).

Anomaloglossus murisipanensis (La Marca 1997)*

Holotype: MHNLS 11385.

Type locality: “Murisipan-tepui (05°53'N y 62°04'W), Estado Bolívar, Venezuela, 2,350 m snm.”

Distribution: Region 5. Known only from Murisipan, a tepui in Bolívar State.

Remarks: Listed as Vulnerable (VU) in the current Venezuelan Red Book (Rojas-Runjaic and Señaris 2015b).

Selected references: La Marca (1997a); Gorzula and Señaris (1998); Señaris et al. (2014); Rojas-Runjaic and Señaris (2015b).

Anomaloglossus parimae (La Marca 1997)*

Holotype: ULABG 4221.

Type locality: “Pista Constitución (02°13'49”N, 63°20'00”W) en las cercanías del Cerro Delgado Chabaud, (Amazonas State, Venezuela), 670 m snm.”

Distribution: Region 5. Known only from type locality.

Remarks: It should be compared to *Anomaloglossus tamacuarensis*, as both are from the same mountain range, and could represent the same taxon.

Selected references: La Marca (1997a).

Anomaloglossus parkerae

(Meinhardt and Parmelee 1996)*

Holotype: KU 167332.

Type locality: “km 112, El Dorado-Santa Elena de Uairén road (06°01'N, 61°24'W; 860 m), Estado Bolívar, Venezuela.”

Distribution: Region 5. La Escalera Region, Sierra de Lema; probably extended through the Gran Sabana Region to El Paují (Bolívar State).

Remarks: Key species for understanding the

phylogenetic relationships of *Anomaloglossus*, as it was the first species described from Bolívar State, where the majority of *Anomaloglossus* species were discovered afterwards. It inhabits the northern versant of the Sierra de Lema, especially in the sector known as La Escalera. Many expeditions to that area from 2006–2011 failed to find the species, even in pristine zones. Two putative populations, one from Kavanayen (EBRG 5729–32, 5775–78) and another from El Paují (CBA, unpub. data) could demonstrate its survivorship. However, molecular data for *parkerae* (from the type locality) have been never generated, which prevents determination of its affinities.

Selected references: Meinhardt and Parmelee (1996); Duellman (1997); La Marca (1997a); Gorzula and Señaris (1998); Señaris et al. (2014); Fouquet et al. (2015); Barrio-Amorós (2016).

Anomaloglossus praderioi (La Marca 1997)

Holotype: ULABG 4196.

Type locality: “Monte Roraima, tercera quebrada a partir de la base (5°10'N y 60°47'W). Parque Nacional Canaima, sector Oriental (Gran Sabana), Estado Bolívar, Venezuela. 1,950 m snm.”

Distribution: Region 5. Eastern Gran Sabana in Bolívar State, and adjacent Guyana, 1,310–1,850 m asl. Known in Venezuela from Roraima and Sierra de Lema (Kok 2010).

Remarks: The original description (La Marca 1996e) was based on two adult males. Kok (2010) redescribed the species with fresh material.

Selected references: La Marca (1997a); Grant et al. (2006); Kok (2010); Cole et al. (2013); Señaris et al. (2014).

Anomaloglossus roraima (La Marca 1997)

Holotype: ULABG 4197.

Type locality: “Paso de la Muerte,” 60–70 m antes de la cumbre del tepuy, en el camino “La Rampa,” que conduce desde la base a la cima del Monte Roraima, Estado Bolívar, Venezuela. 2,700 m snm.”

Distribution: Region 5. Roraima in Venezuela and Wei Assipu and Maringma tepuis in Guyana, 1,860–2,700 m asl.

Remarks: Kok et al. (2013) redescribed the species with fresh material. Originally described from a single, subadult female.

Selected references: La Marca (1997a); Grant et al. (2006); Cole et al. (2013); Kok et al. (2013); Señaris et al. (2014).

Anomaloglossus rufulus (Gorzula 1990)*

Holotype: MHNLS 10361.

Type locality: “Porción central de Murey Tepui



68. *Anomaloglossus wothuja*. Female. Tobogán del Cuao, Cerro Sipapo, Amazonas. Photo: César Barrio-Amorós.



69A. *Aromobates cannatellai*. Male. Parque Cascada La Escalera, Mesa de Pérez, Táchira. Photo: Liz del Valle.



69B. *Aromobates cannatellai*. Female. Parque Cascada La Escalera, Mesa de Pérez, Táchira. Photo: César Barrio-Amorós.



70. *Aromobates duranti*. Páramo La Culata, Mérida. Photo: Jaime Péfaur.



71A. *Aromobates ericksonae*. Olinda, La Azulita, Mérida. Photo: César Barrio-Amorós.



71B. *Aromobates ericksonae*. Olinda, La Azulita, Mérida. Photo: César Barrio-Amorós.

en el Macizo de Chimantá (CHIMANTA XVIII) 05°22'N-62°05'W. 2,600 m, Estado Bolívar, Venezuela.”

Distribution: Region 5. Endemic to Chimantá, a tepui in Bolívar State.

Remarks: Described originally as *Dendrobates rufulus*, its the generic allocation changed to *Epipedobates* (Walsh 1994; Myers 1997) and *Allobates* (Jungfer and Böhme 2004) until Barrio-Amorós and Santos (2011) allocated it

to its current genus based on the presence of an MLP and (unpub.) genetic data.

Selected references: Gorzula (1988, 1992); Walsh (1994); Myers (1997); Barrio and Fuentes (1999a, 2012); Barrio-Amorós (2001c); Barrio-Amorós and Santos (2011); Señaris et al. (2014).

Anomaloglossus shrevei (Rivero 1961)*

Holotype: MCZ 28567.

Type locality: Monte Marahuaca (1,524–1,829 m), Estado Amazonas, Venezuela.

Distribution: Region 5. Cerros Duida and Marahuaca to the Upper Orinoco, Amazonas State.

Remarks: Little is known about this species beyond its original description. An additional specimen was reported by Rivero (1964b), and a male was described by La Marca (1997).

Selected references: Rivero (1961, 1964b, 1967a, 1988); La Marca (1997a).

Anomaloglossus tamacuarensis

(Myers and Donnelly 1997)

Holotype: AMNH 131347.

Type locality: “North base of Pico Tamacuari, 1,160–1,200 m elevation. Sierra Tapirapécó, Amazonas, Venezuela (1°13'N, 64°42'W).”

Distribution: Region 5. Known at type locality in Venezuela, and an additional locality on the Brazilian side of Tapirapécó (Caramaschi and Niemeyer 2005a).

Selected references: Myers and Donnelly (1997); Caramaschi and Niemeyer (2005a).

Anomaloglossus tepuyensis (La Marca 1997)*

Holotype: ULABG 2557.

Type locality: “Entre Danto y Piñón (= Peñón), a casi una hora caminando desde Danto, en el trayecto desde Kamarata hasta las laderas del Ayún-tepui, Estado Bolívar, Venezuela, 1,650 m snm.”

Distribution: Region 5. Endemic from the slopes of Auyan-tepui in Bolívar State. Probably extended to neighboring tepuis.

Remarks: Myers and Donnelly (2008) comprehensively redescribed this species. The *Anomaloglossus* “*tepuensis*” cited from Guyana (Grant et al. 2006; MacCulloch and Lathrop 2009), is actually a similar species, *A. megacephalus* Kok, MacCulloch, Lathrop, Billaert and Bossuyt, 2010. This taxon could be a synonym of *A. parkerae* (P. Kok, pers. comm.).

Selected references: Grant et al. (1997, 2006); La Marca (1997a); La Marca et al. (2002); Barrio-Amorós and Brewer-Carías (2008); Myers and Donnelly (2008); MacCulloch and Lathrop (2009); Señaris et al. (2014).

Anomaloglossus triunfo

(Barrio-Amorós, Fuentes and Rivas 2004)*

Holotype: EBRG 4756.

Type locality: “Summit of Cerro Santa Rosa, Serranía del Supamo, 685 m above sea level. 6°40'39"N, 62°24'26"W, Estado Bolívar.”

Distribution: Region 5. Only known from two localities, 350–680 m asl, at the northwestern slopes of Sierra de Lema, Bolívar State.

Remarks: This name could be a synonym of *A. parkerae* (P. Kok, pers. comm.).

Selected references: Barrio-Amorós et al. (2004, 2011b); Myers and Donnelly (2008); Kok et al. (2013).

Anomaloglossus verbeeksnyderorum

Barrio-Amorós, Santos and Jovanovic, 2010*

Holotype: MHNLS 19649.

Type locality: “Tobogán de la Selva, Municipio Atures, Estado Amazonas, Venezuela, 5°23'N, 67°34'W, 56 m asl., 5.4109°N, 67.6197°W.”

Distribution: Region 5. Tobogán de la Selva and nearby granitic domes around Puerto Ayacucho area in NW Amazonas State; also at Serranía de los Pijiguas, Bolívar State (Camargo et al. 2014).

Remarks: Kok et al. (2012) showed that *Anomaloglossus verbeeksnyderorum* and *A. wothuja* are not genetically differentiated. There are subtle morphological differences among these species (noted in Barrio-Amorós et al. 2011), but more detailed work is necessary to assess its proper identity.

Selected references: Barrio-Amorós et al. (2010); Camargo et al. (2014).

Anomaloglossus wothuja

(Barrio-Amorós, Fuentes and Rivas 2004)*

Holotype: MBUCV 6689.

Type locality: “Base of Cerro Sipapo, Tobogán del Cuao, 150 m above sea level, 5°05'09"N, 67°27'07"W, Estado Amazonas, Venezuela.”

Distribution: Region 5. Apparently endemic from the uplands of the Cuao Massif; probably occurring more extensively throughout similar granitic areas in Amazonas State.

Remarks: Frost (2016) erroneously used acronym EBRG (instead of MBUCV) for the catalog number of the holotype of *Anomaloglossus wothuja*. See other remarks for this species under *A. verbeeksnyderorum*.

Selected references: Barrio-Amorós et al. (2004); Frost (2016).

Genus *Aromobates* Myers, Paolillo and Daly, 1991

Type species: *Aromobates nocturnus* Myers, Paolillo and Daly, 1991 by original designation.

Remarks: *Aromobates* was known from a single species, *A. nocturnus* until Grant et al. (2006) moved species in the *Colostethus alboguttatus* group (*sensu* Rivero 1988) and *Nephelobates* (*sensu* La Marca 1994) to *Aromobates*, increasing the number to the current 18 species. The current authors recover *A. inflexus* from synonymy (see below in its own account). More species await description from the Venezuelan Andes and beyond. Barrio-Amorós and Santos (2012) provided a phylogeny and a list with current threats for all species of the genus (except *A.*

inflexus).

Selected References: Myers et al. (1991); La Marca (1994); Grant et al. (2006, 2017); Barrio-Amorós et al. (2011); Barrio-Amorós and Santos (2012); Barrio-Amorós (2016).

Aromobates alboguttatus (Boulenger 1903)*

Holotype: BM 1947.2.13.88.

Type locality: “Mérida, Estado Mérida, Venezuela, a 1,600 m.”

Distribution: Region 1. Andes of Estado Mérida.

Remarks: The species appears to have vanished in the wild (Barrio-Amorós and Santos 2012). Rivero (1982a) included *Colostehus inflexus* Rivero, 1978 in the synonymy of *C. alboguttatus*. La Marca (1997) recovered the species as *Nepheleobates inflexus*, without explanation. Barrio-Amorós and Santos (2012) consider this species different from *A. alboguttatus* and valid, but awaiting proper attention and a redescription.

Selected references: Boulenger (1903); Ginés (1959); Rivero (1961, 1963b, 1978, 1988); Péfaur (1985); Myers et al. (1991); La Marca (1992, 1994); Piñero and La Marca (1996); Mijares and La Marca (1997); Barrio and Fuentes (1999a); Barrio-Amorós and Santos (2012); Barrio-Amorós (2013).

Aromobates cannatellai Barrio-Amorós and Santos, 2012*

Holotype: CVULA 8327.

Type locality: “Parque Cascada de la Escalera, at the entrance of Mesa de Pérez, Municipio Uribante, Estado Táchira, Venezuela (8.0031N, 71.7316W), elevation 1,140 m.”

Distribution: Region 1. Only known from its type locality.

Remarks: Some populations of *Aromobates saltuensis* reported from Colombia should probably be compared to *A. cannatellai* (Barrio-Amorós and Santos 2012). Acevedo et al. (2018) report *A. cannatellai* from Norte de Santander, Colombia.

Selected references: Barrio-Amorós and Santos (2012).

Aromobates capurinensis (Péfaur 1993)*

Holotype: CVULA IV.1063.

Type locality: “Páramo El Molino, vía Canaguá, Sierra Nevada, 2,420m, Distrito Arzobispo Chacón, Municipio Libertad, Estado Mérida, Venezuela.”

Distribution: Region 1. Known only from type locality. Has been not observed since the year of its collection.

Selected references: Péfaur (1993); Barrio-Amorós and Santos (2012).

Aromobates durante (Péfaur 1985)*

Holotype: CVULA IV-1608.

Type locality: “Páramo de La Culata, Distrito Libertador,

Estado Mérida, Venezuela, 2,880 m.”

Distribution: Region 1. Surroundings of type locality, in streams of *páramo* and *subpáramo* 2,600–3,000 m asl.

Selected references: Péfaur (1985); Rivero (1988); Myers et al. (1991); Mijares and La Marca (1997); Barrio-Amorós and Santos (2012).

Aromobates ericksonae

Barrio-Amorós and Santos, 2012*

Holotype: CVULA 8309.

Type locality: “Los Ranchos, Santa Cruz de Mora, Estado Mérida, Venezuela (8.3989N, 71.6801W), elevation 1,193 m.”

Distribution: Known from five localities on the western versant of Cordillera de Mérida, at both sides of the Chama River Valley, 676–1,193 m asl.

Selected references: Barrio-Amorós and Santos (2012).

Aromobates haydeae (Rivero 1978)*

Holotype: UPRM 4706.

Type locality: “El Vivero, entre Páramo El Zumbador y Mesa del Aura, 2,570 m, Estado Táchira, Venezuela.”

Distribution: Region 1. Cloud forests of the Andes of Táchira state.

Remarks: No recent data available; this species could be affected by declines (Barrio-Amorós and Santos 2012).

Selected references: Rivero (1978, 1988); Myers et al. (1991); La Marca (1994); Mijares and La Marca (1997); Barrio-Amorós and Santos (2012).

Aromobates inflexus (Rivero 1980)*

Holotype: UPRM 4696.

Type locality: “El Almogral, entre Boca de Monte y el cruce La Grita-Bailadores, Carr. De Pregonero, Estado Táchira, Venezuela, 3,075 m.”

Distribution: Region 1. Surroundings of type locality.

Remarks: Here recovered from synonymy with *Aromobates alboguttatus*, based on the considerations by Barrio-Amorós and Santos (2012). See comment under *A. alboguttatus*. The relationships between it and *A. orostoma* must be evaluated.

Selected references: Rivero (1978, 1980, 1988); Myers et al. (1991); La Marca (1997); Barrio-Amorós and Santos (2012).

Aromobates leopardalis (Rivero 1978)*

Holotype: UPRM 5157.

Type locality: “Mucubají, 3,300 m, Edo. Mérida, Venezuela.”

Distribution: Region 1. *Páramo* and *subpáramo* habitat in Sierra Nevada, Merida State, 2,400–3,300 m asl.

Remarks: Not seen in recent years, probably very endangered or extinct. Barrio-Amorós and Santos (2012)



72. *Aromobates haydeeeae*. Páramo Zumbador, Táchira. Photo: Amelia Díaz de Pascual.



73. *Aromobates mayorgai*. Surroundings of Chorotal, Mérida. Photo: Fernando Rojas-Runjaic.



74A. *Aromobates meridensis*. Altos de San Luis, La Azulita, Mérida. Photo: César Barrio-Amorós.



74B. *Aromobates* cf. *meridensis*. Way from Mérida to El Morro, Mérida. Photo: Aldemar A. Acevedo.



75. *Aromobates ornatissimus*. Aguas de Obispos, Trujillo. Photo: César Barrio-Amorós.



76. *Aromobates saltuensis*. Coloncito, Táchira. Photo: César Barrio-Amorós.

state that 1995 was the last year it was seen.

Selected references: Rivero (1978, 1988); La Marca (1991b); Mijares-Urrútia (1991); Myers et al. (1991); Barrio-Amorós (2001c, 2013); Barrio-Amorós and Santos (2012).

Aromobates mayorgai (Rivero 1980)*

Holotype: UPRM 5160.

Type locality: “El Chorotal (El Sirenal), Carretera Mérida a La Azulita, 1,800 m, Edo. Mérida, Venezuela.”

Distribution: Region 1. Western Sierra de la Culata, 1,700–2,400 m asl.

Remarks: La Marca and Otero (2012) redescribed the species.

Selected references: Rivero (1980, 1988); La Marca and Mijares (1988); Myers et al. (1991); La Marca (1994); Mijares and La Marca (1997); Barrio-Amorós (2001c); Barrio-Amorós and Santos (2012); La Marca and Otero (2012).

Aromobates meridensis (Dole and Durant 1972)*

Holotype: MBUCV 6168.

Type locality: “Chorotal, 15 km. al SE de La Azulita, 1,880 m, Estado Mérida, Venezuela.”

Distribution: Region 1. Southwestern Sierra de la Culata, Mérida, 1,800 to 3,300 m asl. Recently reported along the way from Mérida to El Morro (Image 74B).

Remarks: This species has received some attention (Barrio-Amorós et al. 2010; La Marca and Otero 2012). The first authors reported a surviving population of around 56 to 129 adults in 2006, and redescribed the species from topotypic material. That population had a high presence of fungal pathogen *Batrachochytrium dendrobatidis* (Lampo et al. 2008; Barrio-Amorós and Lampo 2009). La Marca and Otero (2012) also redescribed the species based on the holotype and clarified the confusion regarding the catalog data of the type series and commented on its conservation status.

Selected references: Dole and Durant (1972); Rivero (1988); La Marca (1991a “1994”); Myers et al. (1991); Mijares and La Marca (1997); Barrio-Amorós (2001c); Lampo et al. (2008); Barrio-Amorós and Lampo (2009); Barrio-Amorós et al. (2010g); Barrio-Amorós and Santos (2012); La Marca and Otero (2012).

Aromobates molinari (La Marca 1985)*

Holotype: CVULA 2820.

Type locality: “Las Playitas, 2,270 m, near Bailadores (8°15’N, 71°50’W), Estado Mérida, Venezuela.”

Distribution: Region 1. Surroundings of type locality and road to Estanques, Merida State.

Selected references: La Marca (1985, 1991a “1994”); Rivero (1988); Myers et al. (1991); Mijares and La Marca (1997); Barrio and Fuentes (1999); Barrio-Amorós and

Santos (2012).

Aromobates nocturnus Myers, Paolillo and Daly, 1991*

Holotype: AMNH 130005.

Type locality: “Cloud forest at 2,250 m elevation, about 2 km. Airline ESE Agua de Obispos, Estado Trujillo, Venezuela (9°42’N, 70°05’W).”

Distribution: Region 1. Known only from type locality.

Remarks: Apparently highly endangered, not found in type locality since its original discovery. Several parties have failed to find the species (La Marca 2005; Barrio-Amorós et al. 2011). Considered as Critically Endangered (CR) by the current Venezuelan Red Book (La Marca 2015a) but could be extinct.

Selected references: Myers et al. (1991); Barrio and Fuentes (1999a); Barrio-Amorós (2001c, 2013, 2016); Grant et al. (2006); Barrio-Amorós and Santos (2012); La Marca (2015a).

Aromobates ornatissimus

Barrio-Amorós, Rivero and Santos, 2011*

Holotype: EBRG 5292

Type locality: Las Palmas, Municipio Carache, Estado Trujillo, Venezuela, 09°41’47’’N, 70°08’24’’W (9.6964 N–70.1400 W); elevation 2,350 m

Distribution: Region 1. Apparently endemic from type locality and surroundings.

Remarks: In the phylogenies recovered by Grant et al. (2006; as *Nephelobates* sp. 1321 and ULABG 4445) and Barrio-Amorós and Santos (2012) this species appears as the sister taxon of all other *Aromobates*.

Selected references: Barrio-Amorós et al. (2011a); Barrio-Amorós and Santos (2012).

Aromobates orostoma (Rivero 1978)*

Holotype: UPRM 4509.

Type locality: “Boca del Monte, Camino del Pregonero, 2,615 m, Estado Táchira, Venezuela.”

Distribution: Region 1. Known from the type locality.

Remarks: The species needs taxonomic attention.

Selected references: Rivero (1978, 1988); Péfaur (1985); La Marca (1991a “1994”); Mijares and La Marca (1997); Barrio-Amorós and Santos (2012).

Aromobates saltuensis (Rivero 1978)*

Holotype: UPRM 5147.

Type locality: “de la Fría a Michelena, Edo. Táchira, Venezuela, 830 m.”

Distribution: Region 1. The species is known from the southwestern extreme of the Cordillera de Mérida and northeastern Cordillera Oriental de Colombia in its Venezuelan side. Mentioned from Colombia by Grant et al. (2006) and Anganoy-Criollo (2012) from



77. *Aromobates serranus*. El Morro, Mérida. Photo: Jaime Péfaur.



78. *Aromobates tokuko*. Female paratype MHNLS 18490. Ipika, río Tokuko, Sierra de Perijá, Zulia. Photo: Edwin Infante.



79. *Aromobates zippeli*. Surroundings of Mucuchíes, Mérida. Photo: Fernando Rojas-Runjaic.



80. *Aromobates* sp. 1. Calderas, Barinas. Photo: César Barrio-Amorós.



81. *Mannophryne* aff. *caquetio*. Sierra de San Luis, Falcón. Photo: César Barrio-Amorós.



82A. *Mannophryne collaris*. Male. Estanquillo, Chama river valley, Mérida. Photo: César Barrio-Amorós.

Departamentos of Norte de Santander, Boyacá and Cesar, respectively.

Remarks: Redescribed by Barrio-Amorós and Santos (2012). Data presented by Barrio-Amorós and Santos (2012) show Colombian populations are more closely related with *Aromobates cannatellai* than with *A.*

saltuensis, or could represent new species. See Barrio-Amorós and Santos (2012) for detailed account of the Colombian records of *A.* cf. *saltuensis*.

Selected references: Rivero (1978, 1988); Péfaur (1985); Myers et al. (1991); Grant et al. (2006, 2017); Barrio-Amorós and Santos (2012).

Aromobates serranus (Péfaur 1985)*

Holotype: CVULA: IV-2847.

Type locality: “El Morro, Distrito Libertador, Estado Mérida, Venezuela, 2,300 m.”

Distribution: Region 1. Surroundings of type locality.

Remarks: Not seen or reported in a long time (Barrio-Amorós and Santos 2012). Very likely extinct.

Selected references: Péfaur (1985); Rivero (1988); Myers et al. (1991); Mijares and La Marca (1997); Barrio-Amorós and Santos (2012).

Aromobates tokuko

Rojas-Runjaic, Infante and Barrio-Amorós, 2011*

Holotype: MHNLS 18479.

Type locality: “Surroundings of Ipika, Yukpa indigenous community, Río Tokuko Basin, Municipio Machiques de Perijá, Sierra de Perijá, Estado Zulia, Venezuela (09°52’N, 72°51’W; elevation 595 m).”

Distribution: Region 1. Known from four nearby localities in the central-eastern sector of the Sierra de Perijá.

Remarks: Only member of this genus present in Perijá. More species are expected in such unexplored Sierra. Considered as Critically Endangered by the Venezuelan Red Book (Rojas-Runjaic and Señaris 2015c).

Selected references: Rojas-Runjaic et al. (2011); Barrio-Amorós and Santos (2012); Rojas-Runjaic and Señaris (2015c).

Aromobates walterarpi La Marca and Otero, 2012*

Holotype: ULABG 2087.

Type locality: “Stream at about 500 m away from ‘Plaza Bolívar’ of Piñango, close to the cemetery, on the road from Piñango to Pico El Águila 2,325 m (9°01’59.8”N, 70°53’02.5”W), Estado Mérida, Venezuela.”

Distribution: Region 1. Known only from type locality.

Selected references: La Marca and Otero (2012).

Aromobates zippeli Barrio-Amorós and Santos, 2011*

Holotype: CVULA 8329.

Type locality: “Surroundings of Mucuchíes, Estado Mérida, Venezuela, 8.75N, 70.8833W, elevation 2,970 m.”

Distribution: Region 1. Apparently restricted to surroundings of type locality.

Selected references: Barrio-Amorós and Santos (2012).

Genus *Mannophryne* La Marca, 1992

Type species: *Colostethus yustizi* La Marca, 1989 by original designation.

Mannophryne caquetio Mijares and Arends, 1999*

Holotype: EBRG 3570.

Type locality: “Toma de agua de Maparari, Municipio Federación, Sierra de Churuguara, Estado Falcón, Venezuela (aprox. 10° 47’N, 69° 25’W), 800 m.”

Distribution: Region 2. Apparently endemic from Sierra de Churuguara, Estado Falcón.

Selected references: Mijares and Arends (1999b); Barrio-Amorós et al. (2010b); Mijares-Urrútia and La Marca (2015a).

Mannophryne collaris (Boulenger 1912)*

Lectotype: BM 1947.2.14.42.

Type locality: “Mérida, 5,200 feet, and Río Albireggas (Albarregas), 11,300 feet, Venezuela.”

Distribution: Region 1. Once believed widespread along the Venezuelan Andes. Today restricted to the Chama River Valley and its tributaries (río Mocotíes), between 195–1,900 m by Barrio-Amorós et al. (2010b).

Remarks: This species is vicariant of *Mannophryne urticans* (Barrio-Amorós et al. 2010b).

Selected references: Boulenger (1912); Ginés (1959); Rohl (1959); Rivero (1961, 1963b, 1988); Dole and Durant (1974b); Durant and Dole (1975); Péfaur and Díaz De Pascual (1982, 1987); Péfaur (1987); La Marca (1991c “1994,” 1992, 1994a, 1995a,b); Myers et al. (1991); Barrio (1996a); Barrio and Fuentes (1999a); Barrio-Amorós et al. (2010b); Barrio-Amorós (2013).

Mannophryne cordilleriana La Marca, 1994*

Holotype: ULABG 763.

Type locality: “Presa Hidráulica Jose Antonio Páez, 1,600 m, near La Mitusús on road Santo Domingo-Barinas, Estado Mérida, Venezuela.”

Distribution: Region 1. Once believed to only inhabit the type locality and its surroundings, recent evidence (Barrio-Amorós et al. 2010b) shows that it is widespread along the Eastern versant of the Cordillera de Mérida in states Mérida and Barinas (Barrio-Amorós 2010), 200 to at least 1,950 m asl, and still quite abundant.

Remarks: This is the vicariant species of *Mannophryne orellana* from Táchira state (J.C. Santos and CBA, unpub. data).

Selected references: La Marca (1994a, 1995b); Barrio-Amorós (2010a); Barrio-Amorós et al. (2010b).

Mannophryne herminae (Boettger 1893)*

Syntypes: SMF. Presumably SMF 7286 is a Lectotype by designation, *vide* Edwards, 1974.

Type locality: “Puerto Cabello in Venezuela.”

Distribution: Region 2. Central Cordillera de la Costa (to be better determined).

Remarks: The name *herminae* has long been associated with the abundant populations found in the Cordillera de la Costa. Unpublished genetic data



82B. *Mannophryne collaris*. Female. Estanquillo, Chama river valley, Mérida. Photo: César Barrio-Amorós.



83A. *Mannophryne cordilleriana*. Female. Acequias, Barinas. Photo: César Barrio-Amorós.



83B. *Mannophryne cordilleriana*. Female. Calderas, Barinas. Photo: César Barrio-Amorós.



84A. *Mannophryne* sp. 1 aff. *herminae*. Female. Rancho Grande, Henri Pittier National Park, Aragua. Photo: César Barrio-Amorós.



84B. *Mannophryne* sp. 1 aff. *herminae*. Female. Rancho Grande, Henri Pittier National Park, Aragua. Photo: César Barrio-Amorós.



85A. *Mannophryne lamarcai*. Male. Cerro Socopó, Falcón. Photo: Arlene Cardozo.

(by J.C. Santos) indicates some of these populations belong to an undescribed species. *Mannophryne herminae sensu stricto* apparently is found only in San Esteban (Carabobo state) and surrounding areas, near Puerto Cabello. The identity of other populations from Cordillera de la Costa traditionally determined as *M. herminae* need confirmation. Rojas-Runjaic et al. (2018) redefined *M. herminae* and restricts *Mannophryne herminae sensu stricto* to the northern slope of Cordillera de la Costa between Carabobo and Aragua states. In the *Mannophryne collaris* species group (Manzanilla et al. 2007; Grant et al. 2017).

Selected references: Boettger (1893); Stejneger (1901); Lutz (1927); Schmidt (1932); Alemán (1952); Mertens (1957b); Ginés (1959); Sexton (1960); Rivero (1961, 1964a, 1988); Test (1962); Gremone et al. (1986); La Marca (1991c “1994,” 1992, 1994a, 1995b); Myers et al. (1991); Manzanilla et al. (1995); Barrio-Amorós (2006c); Barrio-Amorós et al. (2010b); Rojas-Runjaic et al. (2018).

Mannophryne lamarcai Mijares and Arends, 1999*

Holotype: EBRG 3281.

Type locality: “Cerro Sopocó, 30 km SW de Guajiro, Municipio Mauroa, Estado Falcón, Venezuela (10° 28’N, 70° 48’W), 1,250 m.”

Distribution: Region 2. Only known from type locality and four additional localities at Serranía de Ziruma (Moran et al. 2016).

Selected references: Barrio and Fuentes (1999a); Mijares and Arends (1999a); Mijares-Urrútia and La Marca (2015b), Moran et al. (2016).

Mannophryne larandina (Yústiz 1991)*

Holotype: UCLA 0087.

Type locality: “Hato Arriba, Distrito Morán, Sierra de Barbacoas, 1,800 m snm.” Estado Lara, Venezuela.

Distribution: Region 1. Surroundings of type locality.

Remarks: Based on genetic and morphological evidence this species is very similar of *Mannophryne yustizi* and could be a synonym of it.

Selected references: Yústiz (1991); Mijares and Arends (1999).

Mannophryne leonardo Manzanilla, La Marca, Jowers, Sánchez, and García-París, 2007*

Holotype: EBRG 4899

Type locality: “Caserío El Toyano, Parroquia Pozuelos, Municipio Sotillo, Estado Anzoátegui, Venezuela, 10°7’30.7”N, 64°29’35.7”W, 875 m”.

Distribution: Region 2. Distributed along the Turimiquire massif, among Anzoátegui, Sucre and Monagas states.

Remarks: Considered as Endangered by the current Venezuelan Red Book (Rojas-Runjaic and Señaris

2015d).

Selected references: Yústiz (1991); Mijares and Arends (1999); Manzanilla et al. (2007b); Barrio-Amorós et al. (2010b); Rojas-Runjaic and Señaris (2015d).

Mannophryne molinai

Rojas-Runjaic, Matta-Pereira and La Marca, 2018*

Holotype: MHNLS 21355.

Type locality: “Quebrada La Rondona, Sierra de Aroa, Sucre municipality, Yaracuy state, Venezuela (10°19’20.8”N, 68°52’24.0”W; 1,180 m asl).”

Distribution: Endemic of the Sierra de Aroa and only known from type locality at the southeastern slope of this mountain chain. Other populations known from northeastern and western foothills of Sierra de Aroa should be evaluated to determine if they correspond to this new species.

Remarks: Apparently pertaining to the species group of *Mannophryne collaris* (*sensu* Manzanilla et al. 2007, and Grant et al. 2017) and closely related to *M. herminae*, though easily distinguished by the advertisement call (Rojas-Runjaic et al. 2018). Its phylogenetic position and relationships into the genus remain unevaluated. Conservation status has not been evaluated by the IUCN, but based on restricted distribution and loss of habitat Rojas-Runjaic et al. (2018) proposed to classify it as VU (vulnerable).

Selected references: Grant et al. (2017), Rojas-Runjaic et al. (2018).

Mannophryne neblina (Test 1956)*

Holotype: UMMZ 113001.

Type locality: “Portachuelo Pass, Rancho Grande, Estado Aragua, Venezuela.”

Distribution: Region 2. Known only from type locality and surroundings, 900–1,100 m asl.

Remarks: Despite numerous searches in the type locality and surroundings during recent decades, no other specimens have been found since its description. At least a local extinction is presumed. Lotzkat (2007) apparently found *M. neblina* at Macizo de Nirgua (Yaracuy State). However, vouchers are not mentioned and the specimens were identified by J. Manzanilla by checking photos. Considered as Critically Endangered (CR) by the current Venezuelan Red Book (La Marca 2015b).

Selected references: Ginés (1959); Rivero (1961, 1964a, 1988); La Marca (1991c “1994,” 1994a, 1995b, 2015b); Myers et al. (1991); Manzanilla et al. (1995); Rodríguez and Rojas-Suárez (2008); Barrio-Amorós et al. (2010b).

Mannophryne obliterata (Rivero 1984)*

Holotype: UPR-M 3492.

Type locality: “Carretera de Sta. Teresa a Higuerote, 10 km hacia abajo del cruce Santa Teresa-Alttagracia, 150 m,



85B. *Mannophryne lamarcai*. Female. Cerro Socopó, Falcón. Photo: Arlene Cardozo.



86. *Mannophryne leonardoii*. Cueva del Guacharo, Monagas. Photo: César Barrio-Amorós.



87. *Mannophryne* cf. *neblina*. Cerro Zapatero, Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



88A. *Mannophryne obliterata*. Male. Guatopo National Park, Guárico. Photo: César Barrio-Amorós.



88B. *Mannophryne obliterata*. Female. Guatopo National Park, Guárico. Photo: Javier Mesa.



89. *Mannophryne orellana*. Female. Pregonero-La Trampa road, Táchira. Photo: César Barrio-Amorós.

Edo. Miranda, Venezuela.”

Distribution: Region 2. Endemic to Guatopo, in the Interior Coastal Range.

Remarks: The description of *Colostethus guatopoensis* Dixon and Rivero-Blanco, 1985 (a current synonym of *M. obliterata* fide Rivero, 1988), and the redescription of La Marca (1994a) are more comprehensive than Rivero’s description.

Selected references: Rivero (1984, 1988); Dixon and

Rivero-Blanco (1985); La Marca (1991c “1994,” 1992, 1994a, 1995b); Myers et al. (1991); Barrio-Amorós et al. (2010b).

Mannophryne orellana

Barrio-Amorós, Molina and Santos, 2010*

Holotype: CVULA 7165.

Type locality: “Road from Pregonero to La Trampa,

Estado Táchira, Venezuela (08°01'N, 71°43'W), elevation 1,192 m.”

Distribution: Region 1. Southwestern edge of Cordillera de Mérida in Uribante Valley, and northeastern side of Cordillera Oriental de Colombia in its Venezuelan side. Probably present in Colombia.

Remarks: Vicariant of *Mannophryne cordilleriana* (Barrio-Amorós et al. 2010b).

Selected references: Barrio-Amorós et al. (2010b).

Mannophryne riveroi
(Donoso-Barros 1964)*

Holotype: MZUC 8566 (Colección de Donoso Barros V-307; see Barrio-Amorós and Ortiz 2015).

Type locality: “Cerro Azul, Macuro,” Estado Sucre, Venezuela.

Distribution: Region 2. Endemic of Peninsula de Paria, Sucre state.

Remarks: Barrio-Amorós et al. (2010b) reported natural history, variation, and malformations. Barrio-Amorós and Ortiz (2015) assign the proper number to the holotype in the collection of the Universidad de Concepción in Chile. Considered as Endangered by the current Venezuelan Red Book (Rojas-Runjaic and Señaris 2015e).

Selected references: Donoso-Barros (1964); Rivero (1967c, 1968a, 1988); La Marca (1991c “1994,” 1994a, 1995b); Myers et al. (1991); Barrio-Amorós et al. (2010b,c); Barrio-Amorós and Ortiz (2015); Rojas-Runjaic and Señaris (2015e).

Mannophryne speeri
La Marca, 2009*

Holotype: ULABG 5393.

Type locality: “Approximately 1 km NNE from Laguneta, 960 m asl., 65.9 km on the road from the crossroads Guanare-Suruguapo heading to Villanueva, Sierra de Portuguesa, Municipio Morán, Estado Lara, Venezuela.”

Distribution: Region 1. Currently known only from type locality and nearby.

Selected references: La Marca (2009); Barrio-Amorós et al. (2010b).

Mannophryne trujillensis
Vargas and La Marca, 2007*

Holotype: ULABG 1160.

Type locality: “Paseo Los Ilustres, Quebrada Los Cedros, 840 m elevation, 9°21'46.0”N, 70°26'41.8”W, Trujillo, Estado Trujillo, Venezuela.”

Distribution: Region 1. Currently known only from type locality and nearby.

Selected references: Vargas and La Marca (2007); Barrio-Amorós et al. (2010b).

Mannophryne urticans

Barrio-Amorós, Molina and Santos, 2010*

Holotype: CVULA 7224.

Type locality: Río Frio, northwestern slope of the Cordillera de Mérida, Estado Mérida, Venezuela (08°51'N, 71°17'W), 676 m asl.

Distribution: Region 1. Known only from type locality, possibly more widespread along similar habitats in the western piedmont of the Cordillera de Mérida.

Remarks: Vicariant of *Mannophryne collaris* (Barrio-Amorós et al. 2010b).

Selected references: Barrio-Amorós et al. (2010b).

Mannophryne yustizi (La Marca 1989)*

Holotype: CVULA: IV-2842.

Type locality: “14 km. SSE Sanare, on stream along road Sanare-Parque Nacional Yacambú, 1,475 m, (ca. 9°43'N, 69°39'W), Distrito Jiménez, Estado Lara, Venezuela.”

Distribution: Region 1. Extended throughout the eastern versant of Cordillera de Mérida in Lara state.

Selected references: La Marca (1989, 1992, 1994a, 1995b); Myers et al. (1991); Yústiz (1996); Barrio-Amorós et al. (2010b).

Mannophryne venezuelensis

Manzanilla, Jowers, La Marca and García-París, 2007*

Holotype: EBRG 4924.

Type locality: “From approximately 4.0 km east of San Juan de Las Galdonas, Municipio Arismendi, Estado Sucre, Venezuela, 10°43'N, 62°48'W, altitude 180 m.”

Distribution: Region 2. Distributed along the Península de Paria, 0–1,000 m asl.

Remarks: Many populations of *Mannophryne* from Coastal Range were previously assigned to *Mannophryne trinitatis* (including *M. venezuelensis*) until Barrio-Amorós et al. (2006b) based on previously published evidence (Rivero 1961; La Marca 1994; Kaiser et al. 2003) restricted its distribution to Trinidad. First species of the genus defined based on an integrative approach with morphological, genetic, and bioacoustic evidence (Manzanilla et al. 2007b).

Selected references: Barrio-Amorós et al. (2006b; 2010b); Manzanilla et al. (2007a, 2009).

Mannophryne vulcano

Barrio-Amorós, Molina and Santos, 2010*

Holotype: CVULA 7170

Type locality: Northern slope of Cerro El Volcán, Baruta, Estado Miranda, Venezuela, collected by Charles Brewer on 30 June, 2007 (10°25'N, 66°51'W), 1,064 m asl.

Distribution: Region 2. Valley of Caracas.

Remarks: Previous mentions of *Mannophryne trinitatis* and *M. herminae* from area around Caracas should be



90A. *Mannophryne riveroi*. Male. Southern slopes Cerro Humo, Península de Paria, Sucre. Photo: César Barrio-Amorós.



90B. *Mannophryne riveroi*. Female. Southern slopes Cerro Humo, Península de Paria, Sucre. Photo: Hinrich Kaiser.



91A. *Mannophryne speeri*. Male. Chavasquén-Guarico road, Portuguesa. Photo: César Barrio-Amorós.



91B. *Mannophryne speeri*. Female. Chavasquén-Guarico road, Portuguesa. Photo: César Barrio-Amorós.



92. *Mannophryne* aff. *trujillensis*. Monte Carmelo, Trujillo. Photo: Juan Pablo Diasparra.



93A. *Mannophryne urticans*. Male. Río Frío, Mérida. Photo: César Barrio-Amorós.



93B. *Mannophryne urticans*. Female. Río Frío, Mérida. Photo: César Barrio-Amorós.



94. *Mannophryne venezuelensis*. Female. Road to Las Melenas, Península de Paria, Sucre. Photo: César Barrio-Amorós.



95. *Mannophryne vulcano*. Male. Cota Mil, Caracas. Photo: César Barrio-Amorós.



96. *Mannophryne yustizi*. Female. Yacambú National Park, Lara. Photo: César Barrio-Amorós.



97. *Mannophryne* sp. 1. aff. *herminae*. Male. Casa María, Bejuma, Carabobo. Photo: César Barrio-Amorós.



98. *Mannophryne* sp. 2. Guatopo National Park, Guarico. Photo: César Barrio-Amorós.

referred to *M. vulcano* (Barrio-Amorós et al. 2010b).
Selected references: Barrio-Amorós et al. (2006b; 2010b).

Subfamily Dendrobatinae Cope, 1865

Genus *Ameerega* Bauer, 1986

Type species: *Hyla trivittata* Spix, 1824 by original designation.

Ameerega picta (Tschudi 1838)

Holotype: MNHNP 4910

Type locality: Santa Cruz, Bolivia.

Distribution: Region 5. Widely distributed in Amazon Region lowlands, through Colombia, Peru, Bolivia, Paraguay, Brazil, and Venezuela. In Venezuela, only known from Northeastern Bolívar and adjacent Delta Amacuro States.

Remarks: Barrio-Amorós (2004) treated the Guayanian

populations of this taxon as *Epipedobates guayanensis*, following Schulte (1999) without arguing about the change. *Ameerega guayanensis* (Heatwole, Solano and Heatwole 1965; type locality: forest between Rancho Alegre and base of Altiplanicie (de Nuria), on trail to Quebrada Cabeza de Burro, 5 km east of Las Chicharras, 47 km north of Tumeremo; Altiplanicie de Nuria, 100–250 m, Estado Bolívar, Venezuela) would be the proper name of Guianan populations if demonstrated to be genetically different from *A. picta* from the type locality. The southwestern Amazonian population is separated from the Guiana population by at least 3,000 km in a straight line (Lötters et al. 2007). However, J.C. Santos (unpub. data) preliminary results do not indicate a clear genetic separation and thus, until more data are published, we consider *guayanensis* under *picta*. As we do not use subspecies, the name must be regarded in its synonymy. See also comment by Avila Pires et al. (2010). **Selected references:** Heatwole et al. (1965); Silverstone (1976); Gremone et al. (1986); Walsh (1994); Duellman (1997); Gorzula and Señaris (1998); Barrio and Fuentes (1999a); Schulte (1999); Señaris and Ayarzagüena (2004 “2002”); Lötters et al. (2007); Barrio-Amorós (2016).

Ameerega trivittata (Spix 1824)

Syntypes: ZSM 43/0; RMNH 1836 (lectotipo).

Type locality: “Iuxta flumen Teffé,” Brazil.

Distribution: Region 5. Widely distributed in Amazon Region lowlands, through Colombia, Peru, Bolivia, Brazil, Venezuela, Guyana, and Suriname. In Venezuela, known only from northeastern Bolívar State and adjacent Delta Amacuro.

Selected references: Zimmermann and Zimmermann (1988); Gorzula (1991); Walsh (1994); Gorzula and Señaris (1998); Barrio and Fuentes (1999a); Señaris and Ayarzagüena (2004 “2002”); Grant et al. (2006); Lötters et al. (2007); Barrio-Amorós (2016).

Genus *Dendrobates* Wagler, 1830

Type species: *Rana tinctoria* Cuvier, 1797 by subsequent designation by Duméril and Bibron, 1841.

Dendrobates leucomelas Steindachner, 1864

Holotype: NHMW 19188.

Type locality: “Colombia.”

Distribution: Regions 4, 5. Widespread south of the Orinoco (see map in Barrio and Fuentes (1999), Lötters et al. (2007), and Molina-Rodríguez and Kahn (2016)). Much more common in Venezuela south of the Orinoco (in Amazonas, Bolívar, and Delta Amacuro States), also present but scattered in southeastern Colombia, northern Brazil, and western Guyana.

Remarks: Different morphs recognized, but so far, not of taxonomic importance. The “sapito minero” has a

key importance in some ethnic mythologies like the Ye'kwana (Barrio-Amorós and Brewer-Carías 2008).

Selected references: Steindachner (1864); Ginés (1959); Rivero (1961, 1964b,d, 1967a); Heatwole et al. (1965); Silverstone (1975); Paolillo (1977); Hoogmoed and Gorzula (1979); Gremone et al. (1986); Rivero et al. (1986); Walsh (1994); Rodríguez and Rojas-Suárez (1995); Duellman (1997); Fuentes and Rodríguez-Acosta (1997); Barrio and Fuentes (1998, 1999a); Gorzula and Señaris (1998); Señaris and Ayarzagüena (2004 “2002”); Grant et al. (2006); Lötters et al. (2007); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós et al. (2011b); Señaris et al. (2014); Molina-Rodríguez and Kahn (2016).

Genus *Minyobates* Myers, 1987

Type species: *Dendrobates steyermarki* Rivero, 1971 by original designation.

Minyobates steyermarki (Rivero 1971)*

Holotype: UPR-M 3399.

Type locality: “Cerro Yapacana, 1,200 m Territorio Federal Amazonas, Venezuela.”

Distribution: Region 5. Endemic to Yapacana, a tepui in Amazonas State.

Remarks: See considerations about conservation in Barrio-Amorós and Fuentes (1999a), Rodríguez and Rojas-Suárez (2009), Barrio-Amorós and Torres (2010), and La Marca (2016). Accounts on morphology and natural history by Lötters et al. (2007) and La Marca (2016).

Selected references: Rivero (1971c); Silverstone (1975); Gremone et al. (1986); Myers (1987); Walsh (1994); Rodríguez and Rojas-Suárez (1995); Gorzula and Señaris (1998); Barrio and Fuentes (1999a); Vences et al. (2000, 2003); Grant et al. (2006); Lötters et al. (2007); Barrio-Amorós and Torres (2010); Barrio-Amorós (2016); La Marca (2016).

Family Eleutherodactylidae Lutz, 1954

Subfamily Eleutherodactylinae Lutz, 1954

Genus *Adelophryne* Hoogmoed and Lescure, 1984

Type species: *Adelophryne adiastrala* Hoogmoed and Lescure, 1984, by original designation.

Adelophryne gutturosa Hoogmoed and Lescure, 1984

Type: BM 1983.1139.

Type locality: “Between camp IV and V, northern slopes of Mount Roraima, Guyana (60°46'W, 5°17'N) 3,000 feet (914 m).”

Distribution: Region 5. Known from a few localities in Sierra de Lema and Gran Sabana, eastern Venezuela.



99. *Ameerega picta*. Sierra Imataca, Delta Amacuro. Photo: César Barrio-Amorós.



100. *Ameerega trivittata*. Sierra Imataca, Delta Amacuro. Photo: César Barrio-Amorós.



101A. *Dendrobates leucomelas*. Piedra de la Virgen, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



101B. *Dendrobates leucomelas*. Serranía del Cuao, Amazonas. Photo: Oswaldo Fuentes Ramos.



102. *Minyobates steyermarki*. Yapacana summit, Amazonas. Photo: Wolfgang Schmidt.



103. *Eleutherodactylus johnstonei*. Ciudad Bolívar, Bolívar. Photo: César Barrio-Amorós.

Selected references: Ayarzagüena and Diego-Aransay (1985); Duellman (1997); MacCulloch et al. (2008); Barrio-Amorós and Duellman (2009); Señaris et al. (2014).

Genus *Eleutherodactylus* Dumeril and Bibron, 1841.

Type species: *Hylodes martinicensis* Tschudi, 1838, by monotypy.

Remarks: After taxonomic rearrangement of Terraranans

based on molecular phylogeny by Heinicke et al. (2007) *Eleutherodactylus* was restricted to the Caribbean clade of direct developing frogs. The only *Eleutherodactylus* in Venezuela is an introduced but well established species.

Eleutherodactylus johnstonei Barbour, 1914

Syntypes: MCZ 2759 (two specimens).

Type locality: St. George Parish, Grenada.

Distribution: Region 2. Introduced populations in different cities with variable success. Likely originally from Sta. Lucia or the Antigua and Barbuda bank (Frost 2016). Currently established in most of Lesser Antilles, several countries in Central America and northern South America (Panamá, Colombia, Venezuela, Guyana, Suriname, and French Guiana). In Venezuela, established populations reported in several cities and towns (e.g., Caracas, Cumaná, Irapa, Maracay, Valencia). See a resumé in Kaiser et al. (2002). Despite being introduced, not reported to affect any autochthonous species, and only known from anthropogenic sites like gardens and parks.

Selected references: Hardy and Harris (1979); Rada (1981b); Gorzula (1989); La Marca (1992); Gorzula and Señaris (1998); Kaiser et al. (2002); Rojas-Runjaic et al. (2007); Barrio-Amorós (2013).

Family Hemiphractidae Peters, 1862

Remarks: Long considered a subfamily of Hylidae. Darst and Cannatella (2004) suggested this group is not monophyletic nor related to Hylidae. For an account of subsequent changes in phylogenetic relationships and taxonomy see Frost (2018). See Duellman (2015) for a thorough review of genera and species included. Recently Castroviejo et al. (2015) inferred a new family phylogeny based on total evidence, recovering it (all six genera) as monophyletic, and sister of Athesphatanura. Several species of *Stefania* await description. In Península de Paria, Sucre State, a *Gastrotheca*, possibly new to science, has been heard calling in the canopy during rainy days and nights.

Subfamily Cryptobatrachinae Frost, Grant, Faivovich, Bain, Haas, Haddad, de Sá, Channing, Wilkinson, Donnellan, Raxworthy, Campbell, Blotto, Moler, Drewes, Nussbaum, Lynch, Green and Wheeler, 2006

Genus *Cryptobatrachus* Ruthven, 1916

Type species: *Cryptobatrachus boulengeri* Ruthven, 1916, by original designation.

Remarks: *Cryptobatrachus nicefori* Cochran and Goin, 1970 from Colombia was excluded from the genus by Infante-Rivero et al. (2009), despite Lynch's (2008)

contrary opinion, and placed into *Hyla incertae sedis*. In their recent phylogenetic analysis Castroviejo et al. (2015) inferred *Cryptobatrachus* as sister of *Flectonotus* and included these two genera in Cryptobatrachinae.

Cryptobatrachus remotus Infante-Rivero, Rojas-Runjaic and Barrio-Amorós, 2009

Holotype: MHNLS 17661.

Type locality: “Fundo ‘El Progreso,’ cuenca alta del río Socuy, sierra de Perijá, Municipio Jesús Enrique Losada, Estado Zulia, Venezuela (10°43'13,30"N, 72°29'16,60"O; ± 845 m).”

Distribution: Region 1. Eastern versant of Sierra de Perijá, Zulia State, Venezuela; very probably in adjacent Colombia.

Remarks: While the description of this species was in press, another work dealing with *Cryptobatrachus* (Lynch 2008) provided the description of *C. pedroruizi*, a species from the Colombian side of Perijá relatively near the known distribution area of *C. remotus*. Comparing both sets of type material (both morphologically and genetically) is imperative to discern if they represent one or two species. *Cryptobatrachus remotus* is considered Endangered (EN) under criteria of the Venezuelan Red Book (Rojas-Runjaic 2015).

Selected references: Infante-Rivero et al. (2008), Lynch (2008); Duellman (2015); Rojas-Runjaic et al. (2015).

Genus *Flectonotus* Miranda-Ribeiro, 1920

Type species: *Nototrema pygmaeum*, Boettger, 1893, by original designation.

Remarks: In their recent phylogenetic analysis Castroviejo et al. (2015) inferred *Flectonotus* as sister of *Cryptobatrachus* including both genera in Cryptobatrachinae.

Flectonotus fitzgeraldi (Parker 1933)

Holotype: BM 1947.2.22.41.

Type locality: “Mt. Tucuche, Trinidad.”

Distribution: Region 2. Northern range of Trinidad (Trinidad and Tobago), and Venezuela, where restricted to the Península de Paria.

Selected references: Duellman and Maness (1980); Duellman and Gray (1983); Duellman et al. (1988, 2011).

Flectonotus pygmaeus (Boettger 1893)

Lectotype: SMF 2679.

Type locality: “Puerto Cabello, Estado Carabobo, Venezuela.”

Distribution: Regions 1, 2. Venezuela and Colombia. In Venezuela, on both sides of the Andes (Cordillera de Mérida) below 1,500 m asl, and Cordillera de la Costa, above 800 m asl.



104. *Adelophryne gutturosa*. La Laja, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



105A. *Cryptobatrachus remotus*. Male. Cerro Las Antenas, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



105B. *Cryptobatrachus remotus*. Female with eggs. Cerro Las Antenas, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



105C. *Cryptobatrachus remotus*. Female with recently hatched froglets. Cerro Las Antenas, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



106A. *Flectonotus fitzgeraldi*. Las Melenas, Península de Paria, Sucre. Photo: César Barrio-Amorós.



106B. *Flectonotus fitzgeraldi*. Macuro, Península de Paria, Sucre. Photo: Diego A. Flores.

Remarks: Populations from Cordillera de la Costa and Andes are indistinguishable genetically (D. Blackburn and W.E. Duellman, pers. comm.).

Selected references: Boettger (1893); Lutz (1927); Rivero (1961, 1964a, 1971a); Mertens (1967); Duellman

and Maness (1980); Duellman and Gray (1983); Péfaur and Díaz De Pascual (1987); Duellman et al. (1988, 2011); Mijares-Urrutia and Arends (1993); Manzanilla et al. (1995); Yústiz (1996); Rivas and Barrio-Amorós (2005); Barrio-Amorós (2006c, 2010a).

Subfamily Hemiphractinae Peters, 1862

Genus *Gastrotheca* Fitzinger, 1843

Type species: *Hyla marsupiata* Duméril and Bibron, 1841, by original designation.

Remarks: In the recent phylogeny of hemiphractids by Castroviejo et al. (2015) none of the taxonomies historically proposed for *Gastrotheca* were found monophyletic (including some subgenera proposed by Duellman 2015). Consequently, they proposed a new infrageneric taxonomy based on four species groups (*fissipes*, *longipes*, *marsupiata*, and *microdiscus*).

Gastrotheca helenae Dunn, 1944

Holotype: MLS 268.

Type locality: Páramo de Tamá, Departamento Norte de Santander, Colombia.

Distribution: Region 1. Endemic of páramo de Tamá, between Colombia and Venezuela.

Remarks: Acevedo et al. (2011) presented natural history data on this rare species. In subgenus *Amphignathodon* by Duellman (2015), or in the *Gastrotheca longipes* species group *sensu* Castroviejo-Fisher et al. (2015).

Selected references: Duellman (1980, 1989b, 2015); Duellman and Ruiz-Carranza (1986); Duellman et al. (1988); Acevedo et al. (2011); Castroviejo-Fisher et al. (2015).

Gastrotheca nicefori Gaige, 1933

Holotype: UMMZ 73242.

Type locality: Pensilvania, Departamento Caldas, Colombia.

Distribution: Region 1. Panama, Colombia, and Venezuela. In Venezuela, distributed throughout the Cordillera de Mérida. Very likely present in Sierra de Perijá.

Remarks: Duellman (1989b) synonymized *Gastrotheca yacambuensis* Yústiz, 1976 with *G. nicefori*, without explanation. La Marca (1992) recognized the synonymy, but Barrio-Amorós (1998, 2004, 2009) was reluctant to do so as it was done without providing any comparison. Duellman (2015) presented arguments for the synonymy (see below), but molecular evidence (Castroviejo et al. 2015) indicated *G. yacambuensis* could be a valid species, different from *G. nicefori*. Further evidence is necessary to assess this issue adequately. The species is included in the subgenus *Duellmania* (Duellman 2015) and in the *Gastrotheca marsupiata* species group *sensu* Castroviejo-Fisher et al. (2015).

Selected references: Yústiz (1976a,b, 1996); Duellman (1980, 1989b, 2015); Duellman et al. (1988); La Marca (1991b “1994,” 1992); Castroviejo-Fisher et al. (2015).

Gastrotheca ovifera (Lichtenstein and Weinland 1854)*

Holotype: ZMB 3073.

Type locality: Puerto Cabello, Carabobo, Venezuela.

Distribution: Region 2. Cordillera de la Costa in states Aragua, Cojedes, Miranda, Distrito Federal, Carabobo, and Yaracuy, 890–2,060 m asl.

Remarks: Reported from the Delta of the Orinoco River (MHNLS 2942) by Valera-Leal et al. (2011) without further comment; but current authors believe this is an error as no *Gastrotheca* specimen has ever been reported from that area. Included in subgenus *Opisthodelphys* (Duellman 2015) or in *Gastrotheca marsupiata* species group *sensu* Castroviejo-Fisher et al. (2015). Despite a 646 man-hour effort, Valera-Leal et al. (2011) failed to locate any surviving population in the Henri Pittier National Park in 2006–2007. Barrio-Amorós (1998) reported it very abundant at Galipán in March 1997, while CBA has heard the species in Cerro Volcán, Caracas, Miranda, as recently as 2009.

Selected references: Lutz (1927); Mertens (1957a,b, 1967); Ginés (1959); Rivero (1961, 1964a,d); Tello (1968); Duellman (1980, 2015); Duellman et al. (1988); La Marca (1995a); Manzanilla et al. (1995); Barrio (1999b); Barrio-Amorós (2001, 2006c, 2013); Schmidt et al. (2002); Manzanilla and Sánchez (2003); Rivas and Barrio-Amorós (2005); Valera-Leal et al. (2011); Castroviejo-Fisher et al. (2015).

Gastrotheca walkeri Duellman, 1980*

Holotype: UMMZ 117177.

Type locality: “From between the Estación Biológica Rancho Grande and Paso Portachuelo, Estado de Aragua, Venezuela,” 1,100 m.

Distribution: Region 2. Cordillera de la Costa in states Aragua, Cojedes, D.F., Carabobo, and Yaracuy.

Remarks: Duellman (2015) stated that no call is associated to this species, but the current authors find it commonly heard from high bromeliads in Coastal cloud forest (e.g., in Rancho Grande, Estado Aragua; see Barrio-Amorós 2006c). In *Gastrotheca longipes* species group *sensu* Castroviejo-Fisher et al. (2015) or in subgenus *Cryptotheca* by Duellman (2015).

Selected references: Duellman (1980, 2015); Duellman et al. (1988); Manzanilla et al. (1995); Barrio (1999c); Rivas and Barrio-Amorós (2005); Barrio-Amorós (2006c).

Gastrotheca williamsoni Gaige, 1922*

Holotype: UMMZ 55559.

Type locality: San Esteban, Carabobo, Venezuela.

Distribution: Region 2. Known only from type locality.

Remarks: Not collected since original description. Either extremely rare, or extinct, or *Gastrotheca walkeri* could be a junior synonym. A review of this species is needed to clarify its taxonomy and conservation status. Duellman



107A. *Flectonotus pygmaeus*. Male. La Azulita, Mérida. Photo: César Barrio-Amorós.



107B. *Flectonotus pygmaeus*. Male. Casa María, Bejuma, Carabobo. Photo: César Barrio-Amorós.



107C. *Flectonotus pygmaeus*. Female. Rancho Grande, Henri Pittier National Park, Aragua. Photo: César Barrio-Amorós.



108. *Gastrotheca helenae*. Páramo Tamá, Norte de Santander, Colombia. Photo: Aldemar A. Acevedo.



109. *Gastrotheca nicefori*. Altos de San Luis, La Azulita, Mérida. Photo: César Barrio-Amorós.



110A. *Gastrotheca ovifera*. Altos de Pipe, Miranda. Photo: Aldemar A. Acevedo.

(2015) distinguished *G. williamsoni* from *G. walkeri* based on four morphological characters (absence of supraciliary processes — vs present in *walkeri*—, fingers $\frac{1}{2}$ webbed — vs $\frac{1}{4}$ webbed in *walkeri*—, first finger longer than second — shorter in *walkeri*—, and granular tympanic annulus — smooth in *walkeri*). The only known locality of *G. williamsoni* lies within the distribution of *G. walkeri*, and no additional specimen obtained for almost a century. As both species share a unique character

among marsupial frogs (paired retroperitoneal brood pouches), have overlapping geographic distributions, and only differ in morphological traits prone to preservation artifacts, makes us doubt the validity of *G. walkeri*; assessing their taxonomic status requires further investigation. Included in subgenus *Cryptotheca* by Duellman (2015) or in *Gastrotheca longipes* species group *sensu* Castroviejo-Fisher et al. (2015).

Selected references: Gaige (1922); Lutz (1927); Ginés

(1959); Rohl (1959); Rivero (1961, 1964a); Duellman (1980, 2015); Duellman et al. (1988); Barrio-Amorós (2013).

Gastrotheca yacambuensis Yústiz, 1976*

Holotype: MBUCO 6015.

Type locality: “Quebrada El Cedral, Parque Nacional Yacambú, ladera Sur de Sierra Portuguesa, Estado Lara, Venezuela, 1,700 m.”

Distribution: Region 1. Parque Nacional Yacambú, Lara State, and probably all Cordillera de Mérida in the Venezuelan Andes.

Remarks: Duellman (1989b) synonymized *Gastrotheca yacambuensis* with *G. nicefori* without providing any argument. Barrio-Amorós (1998, 2004, 2013) and Barrio-Amorós et al. (2009) did not follow the synonymy, waiting for additional evidence. Duellman (2015) compared overall external similarities among names he synonymized (Duellman 1989b) to support his previous statement. Castroviejo et al. (2015) showed that topotypical specimens of *G. nicefori* are significantly different genetically from specimens from the Venezuelan Andes; so, *G. yacambuensis* could be the name for populations previously referred to *G. nicefori* in the Venezuelan Andes. The current authors consider *G. yacambuensis* as a valid species, at least for central Andean populations, while awaiting a comprehensive review of the Andean populations of *Gastrotheca nicefori*.

Selected references: Yústiz (1976a,b, 1996); Duellman (1989b); Castroviejo et al. (2015).

Genus *Stefania* Rivero, 1968

Type species: *Hyla evansi* Boulenger, 1904, by original designation.

Remarks: Infrageneric groups in *Stefania* (*S. evansi* and *S. goini* species group) are no longer recognized, since Kok et al. (2012) and Castroviejo-Fisher et al. (2015) inferred these two groups as non-monophyletic.

Stefania breweri Barrio-Amorós and Fuentes, 2003*

Holotype: MBUCV 6574.

Type locality: “Summit of Cerro Autana (Wahari Kuaway), near the north ridge (4°52'N, 67°27'W), 1,250 m elevation, Municipio Atures, Estado Amazonas, Venezuela.”

Distribution: Region 5. Endemic to Autana, a tepui in Estado Amazonas.

Remarks: Not seen during two expeditions to the top of Autana after the collection of the only known specimen in 1971. Autana has an extremely small surface of 1.9 km², so this is one of the most geographically restricted frog species in the world. However, it is only DD by IUCN (Stuart 2006) and Rodríguez and Rojas-Suárez

(2008) keep it under IUCN category VU/D2; it is not even mentioned in the last edition of the Venezuelan Red Book (Rodríguez et al. 2015). We argue that the species (known from a single specimen, not seen during two expeditions with herpetologists in 1972 and 2001, and restricted to an area of 1.9 km²) should be classified CR B2a.

Selected references: Barrio-Amorós and Fuentes (2003); Stuart (2006); Rodríguez and Rojas-Suárez (2008); Barrio-Amorós and Torres (2010); Barrio-Amorós (2013).

Stefania ginesi Rivero, 1968*

Holotype: FMNH 74041.

Type locality: “Chimanta-tepui, Venezuela, rock outcrops near E. branch of headwater Río Tirica, 7,300 ft. (2,225 m).”

Distribution: Region 5. Endemic to Chimantá massif in Estado Bolívar. Restricted to Chimantá-tepui (type locality) by Kok et al. (2016).

Selected references: Rivero (1966, 1967c, 1970); Duellman and Hoogmoed (1984); Gorzula (1992); Señaris et al. (1996, 2014); Gorzula and Señaris (1998); Barrio-Amorós and Fuentes (2003, 2012); McDiarmid and Donnelly (2005); Salerno and Pauly (2012); Kok et al. (2016, 2017).

Stefania goini Rivero, 1968*

Holotype: AMNH 23193.

Type locality: “Vegas Falls, Mte. Duida, Amazonas, Venezuela, 4,600 ft.”

Distribution: Region 5. Endemic to Duida and Huachamakari, tepuis in Estado Amazonas.

Selected references: Rivero (1966, 1967c, 1970); Duellman and Hoogmoed (1984); Señaris et al. (1996); Barrio-Amorós and Fuentes (2003); McDiarmid and Donnelly (2005).

Stefania marahuaguensis (Rivero 1961)*

Holotype: MCZ 285566.

Type locality: Caño Cajú, Cerro Marahuaca, Estado Amazonas, Venezuela, 120 m.

Distribution: Region 5. Endemic to Duida and Marahuaca, tepuis in Amazonas State.

Selected references: Rivero (1961, 1964b, 1970); Duellman and Hoogmoed (1984); Señaris et al. (1996); Barrio-Amorós and Fuentes (2003); McDiarmid and Donnelly (2005).

Stefania oculosa

Señaris, Ayarzagüena and Gorzula, 1997*

Holotype: MHNLS 12961.

Type locality: “Tepuy Jaua, Estado Bolívar, Venezuela



110B. *Gastrotheca ovifera*. Altos de Pipe, Miranda. Photo: J. Celsa Señaris.



111. *Gastrotheca walkeri*. Rancho Grande, Henri Pittier National Park, Aragua. Photo: Juan Vicente Rueda-Almonacid.



112. *Stefania breweri*. Holotype MBUCV 6574. Top of Cerro Autana, Amazonas. Photo: César Barrio-Amorós.



113A. *Stefania ginesi*. Churi-tepui, Chimantá massif, Bolívar. Photo: César Barrio-Amorós.



113B. *Stefania ginesi*. Female carrying froglets. Churi-tepui, Chimantá massif, Bolívar. Photo: Charles Brewer-Carías.



114A. *Stefania riae*. Pattern A in Barrio-Amorós and Brewer-Carías (2008). Sima Mayor Sarisariñama-tepui, Bolívar. Photo: Javier Mesa.

(04°49'55"N, 64°25'59"W). 1,600 m snm."

Distribution: Region 5. Endemic to Jaua, a tepui in Bolívar State.

Selected references: Señaris et al. (1996); Barrio-Amorós and Fuentes (2003).

Stefania percristata

Señaris, Ayarzagüena and Gorzula, 1997*

Holotype: MHNLS 12952.

Type locality: "Tepuy Jaua, Estado Bolívar, Venezuela (04°49'55"N, 64°25'59"W), 1,600 m snm."

Distribution: Region 5. Endemic to Jaua, a tepui in Bolívar State.

Selected references: Señaris et al. (1996); Barrio-Amorós and Fuentes (2003).

Stefania riae Duellman and Hoogmoed, 1984*

Holotype: KU 174688.

Type locality: "Cerro Sarisariñama, 1,400 m, Estado Bolívar, Venezuela."

Distribution: Region 5. Endemic to Sarisariñama, a tepui in Bolívar State.

Remarks: Barrio-Amorós and Brewer-Carías (2008) present variation of the species not previously noted.

Selected references: Duellman and Hoogmoed (1984); Señaris et al. (1997); Barrio-Amorós and Fuentes (2003); McDiarmid and Donnelly (2005); Barrio-Amorós and Brewer-Carías (2008); Kok et al. (2017).

Stefania riveroi

Señaris, Ayarzagüena and Gorzula, 1997*

Holotype: MHLNS 10413.

Type locality: Yuruani-tepui, Estado Bolívar, Venezuela (05°19'N, 60°51'W), 2,300 m snm.

Distribution: Region 5. Endemic to Yuruani, a tepui in Bolívar State.

Selected references: Señaris et al. (1996, 2014); Gorzula and Señaris (1998); Barrio-Amorós and Fuentes (2003); Sinsch and Juraske (2006); Kok et al. (2017).

Stefania satelles

Señaris, Ayarzagüena and Gorzula, 1997*

Holotype: MHNLS 10433.

Type locality: “Aprada-tepui I, Estado Bolívar, Venezuela (05°24'N, 62°27'W), 2,500 m snm.”

Distribution: Region 5. Described as endemic to several small tepuis in Estado Bolívar: Aprada-tepui, Angasima-tepui (Adanta), and Upuigma-tepui (El Castillo) *sensu* Señaris et al. (1996). Kok et al. (2016) restricted it to Aprada tepui, its type locality, while the rest of *Stefania* on other tepuis formerly identified as *satelles* are confirmed as candidate species (see Appendix 1).

Selected references: Gorzula (1992); Señaris et al. (1996, 2014); Gorzula and Señaris (1998); Barrio-Amorós and Fuentes (2003); Salerno and Pauly (2012); Kok et al. (2016, 2017).

Stefania scalae Rivero, 1970

Holotype: MCZ 64373.

Type locality: “La Escalera, road between El Dorado and Sta. Elena de Uairén, around 1,200 m, Edo. Bolívar, Venezuela.”

Distribution: Region 5. Widespread in uplands of eastern Estado Bolívar.

Remarks: *Stefania evansi* was considered part of the Venezuelan batrachofauna after *S. scalae* was synonymized with *S. evansi* by Duellman and Hoogmoed (1984). MacCulloch and Lathrop (2002) found further evidence to distinguish between *S. evansi* and *S. scalae*. Barrio-Amorós and Fuentes (2003) pointed out, after the resurrection of *S. scalae* by Señaris et al. (1997), that there is no record of *S. evansi* from Venezuela, although its presence is likely.

Selected References: Rivero (1970); Gorzula et al. (1983); Duellman and Hoogmoed (1984); Señaris et al. (1996, 2014); Duellman (1997); Gorzula and Señaris

(1999); MacCulloch and Lathrop (2002); Barrio-Amorós and Fuentes (2003); McDiarmid and Donnelly (2005); Sinsch and Juraske (2006); Barrio-Amorós and Duellman (2009); Barrio-Amorós et al. (2011b).

Stefania schuberti

Señaris, Ayarzagüena and Gorzula, 1997*

Holotype: MHNLS 12917.

Type locality: Sector este, cima del Auyan-tepui, Estado Bolívar, Venezuela (05°53'36"N, 62°29'12"W), 1,750 m asl.

Distribution: Region 5. Endemic to the summit of Auyan-tepui, Bolívar State.

Selected references: Señaris et al. (1996, 2014); Barrio-Amorós and Fuentes (2003, 2012); Myers and Donnelly (2008); Kok et al. (2017).

Stefania tamacuarina Myers and Donnelly, 1997

Holotype: AMNH 131428.

Type locality: “Camp on ridge north Pico Tamacuari, 1,270 m elevation, Sierra Tapirapécó, Amazonas, Venezuela (1°13'N, 64°42'W).”

Distribution: Region 5. Only known from type locality in Venezuela and one nearby locality on the Brazilian side of Tapirapécó (Caramaschi and Niemeyer 2005b).

Selected references: Myers and Donnelly (1997); Barrio-Amorós and Fuentes (2003); Caramaschi and Niemeyer (2005b); McDiarmid and Donnelly (2005).

Family Hylidae Rafinesque, 1815

Remarks: We follow Duellman's et al. (2016) recent revision, where Phyllomedusinae was raised to family level (Phyllomedusidae, see below). Five subfamilies are considered under the family rank in Venezuela: Cophomantinae, Dendropsophinae, Lophyohylineae, Pseudinae, and Scinaxinae. Dubois (2017) argues that *Boana* Gray, 1825 has priority over *Hypsiboas*.

Subfamily Cophomantinae Hoffmann, 1878

Remarks: After Duellman et al. (2016), this subfamily contains six genera: *Aplastodiscus*, *Bokermannohyla*, *Colomascirtus* (described by them to accommodate species previously assigned to *Hyloscirtus larinopygion* and *H. armatus* species groups), *Hyloscirtus*, *Hypsiboas* (now *Boana*), and *Myersiohyla*. However, based on molecular evidence, Rojas-Runjaic et al. (2018), synonymized *Colomascirtus* with *Hyloscirtus*.

Genus *Boana* Gray, 1825

Type species: *Rana boans* Linnaeus, 1758, by monotypy. Coined as subgenus of *Hyla* according to Dubois (2017).



114B. *Stefania riae*. Pattern B in Barrio-Amorós and Brewer-Carías (2008). Sima Mayor Sarisariñama-tepui, Bolívar. Photo: Javier Mesa.



115A. *Stefania riveroi*. Summit of Yuruani-tepui, Bolívar. Photo: Philippe Kok.



115B. *Stefania riveroi*. Summit of Yuruani-tepui, Bolívar. Photo: Philippe Kok.



115C. *Stefania riveroi*. Female with eggs. Summit of Yuruani-tepui, Bolívar. Photo: Steve Gorzula.



116. *Stefania satelles*. Aprada-tepui, Bolívar. Photo: Brad Wilson.



117A. *Stefania scalae*. Plain morph. Lowlands of Cuyuni river, Bolívar. Photo: César Barrio-Amorós.

Remarks: Faivovich et al. (2005) assigned *Centrolenella pulidoi* Rivero, 1968 to the *Boana benitezi* group. We agree that description of holotype corresponds to a juvenile *B. benitezi*. Faivovich et al. (2005) examined the holotype (MCZ 72499) but was not sure if it was an adult female or a juvenile. According to our combined field experience, only juveniles of the *B. benitezi* group (*B. benitezi*, *B. lemai*, and *B. tepuianus* at least) have reddish

eyes, as Rivero (1968) reported in *pulidoi*. In Cerro Duida the only known species of the *Boana benitezi* group is *B. benitezi*. We here consider *Centrolenella pulidoi* Rivero, 1968 (recognized currently as *Boana pulidoi* by Frost 2018) as a junior synonym of *Hyla benitezi* (Rivero 1961), as *Boana benitezi*. Recently Dubois (2017) defended the use of *Boana* for the clade preoccupied by *Hypsiboas*, arguing nomenclatural precedence.



117B. *Stefania scalae*. Stripped morph. Lowlands of Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



117C. *Stefania scalae*. Spotted morph. Lowlands of Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



117D. *Stefania scalae*. Female carrying eggs. Sierra de Lema, Bolívar. Photo: Elio Sanoja.



117E. *Stefania scalae*. Female carrying recently hatched froglets. Sierra de Lema, Bolívar. Photo: Alberto Blanco.



118. *Stefania schuberti*. Auyan-tepui Summit, Bolívar. Photo: César Barrio-Amorós.

Boana alemani* (Rivero 1964)

Holotype: MHNLS 238.

Type locality: Cagua, Estado Aragua, Venezuela.

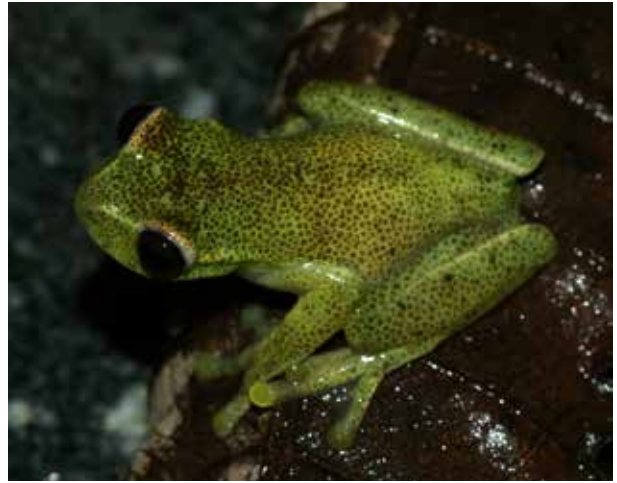
Distribution: Regions 1, 2. Cagua (Aragua State) Kunana, Sierra de Perija (Zulia State), and Hato Los Arrecifes (Guárico State); Cojedes and Falcón States.

Remarks: Currently in *Boana punctata* species group (Faivovich et al. 2005). After original description no

other specimens have been assigned with accuracy to this taxon. Taxonomic status unclear since the species description was based on two old and poorly preserved specimens from disparate bioregions (holotype from Cagua in Cordillera de La Costa, and paratype from Kunana in Sierra de Perijá) and probably not conspecific. Rivero (1964) said this species is narrowly related to *Hyla granosa* (= *Boana cinerascens*) and recognized that the two species only can be differentiated by the dorsal spots and the inclination of the loreal region. La Marca (1992) said *B. alemani* and *B. punctata* are probably synonyms, but *B. punctata* is not known from extreme northern Venezuela. Juveniles of *B. xerophylla* and *H. pugnax* are also green and somewhat similar to *B. punctata*. Based on a preliminary examination of the type series (by FRR) we also suspect *B. alemani* could be conspecific with *B. punctata*, and the paratype (MHNLS 187) could be a juvenile *B. xerophylla*. Specimens assigned to *B. alemani* MHNLS 150 (also from Kunana) and MHNLS 407 (from Caracas) probably also correspond to juvenile *B. xerophylla*. We provisionally consider this name valid, but its taxonomic status should be confirmed, as well as the identity of additional records from Cojedes and Falcón (Manzanilla et al. 2000), Guárico (Camargo et al. 2014), and the tadpole description (Mijares-Urrutia



119A. *Hyloscirtus jahni*. Day color. Monte Zerpa, Mérida. Photo: César Barrio-Amorós.



119B. *Hyloscirtus jahni*. Day color. Monte Zerpa, Mérida. Photo: César Barrio-Amorós.



120. *Hyloscirtus japreria*. Night color. Cerro Las Antenas, Zulia. Photo: Fernando Rojas-Runjaic.



121. *Hyloscirtus lascinius*. Male. La Macana, south of Santa Cruz de Mora, Mérida. Photo: César Barrio-Amorós.



122. *Hyloscirtus platydictylus*. Cedral, San Luis, La Azulita, Mérida. Photo: César Barrio-Amorós.



123A. *Boana boans*. La Laja, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.

1992).

Selected references: Rivero (1964d, 1967c); Mijares-Urrútia (1992); Manzanilla et al. (1995); Barrio-Amorós (2013); Camargo et al. (2014).

Boana benitezi (Rivero 1961)

Type: MCZ 28564.

Type locality: Caño Wanadi, Cerro Marahuaca, Estado Amazonas, Venezuela.

Distribution: Region 5. Western Guayana uplands and highlands, and northernmost Roraima State in Brazil.

Remarks: In *Boana benitezi* species group (Faivovich et al. 2005). *Boana tepuiana* is a vicariant species from the eastern Guayana uplands (Barrio-Amorós and Brewer-Carías 2008).

Selected references: Rivero (1961, 1964b, 1967a, 1971b); Donnelly and Myers (1991); Heyer (1994b); Gorzula and Señaris (1998); Barrio-Amorós and Brewer-Carías (2008).

Boana boans (Linnaeus 1758)

Lectotype: ZIUU 27; designated by implication (Mertens 1940).

Type locality: “America.”

Distribution: Regions 1, 2, 3, 4, 5. Widely distributed in northern South America, in the Darien and Chocó Regions, and Magdalena, Orinoco, and Amazon Basins (Panama, Colombia, Ecuador, Venezuela, Brazil, Guianas, and Trinidad). Common riparian element in the lowlands of southern Venezuela (Amazonas, Bolívar, and Delta Amacuro to as far north as Península de Paria). Also, in the eastern piedmont of the Venezuelan Andes (Barinas and Táchira).

Remarks: The Andean piedmont population (Barrio-Amorós 1999g, 2001a) is continuous from the eastern versant of the Cordillera Oriental de Colombia and thus from the Upper Amazon, fitting the Amazonian distribution pattern for western Venezuela suggested by Barrio-Amorós (1998). However, the Barinas and Táchira populations are much smaller and with a different pattern from those from the south of the Orinoco. Chacón-Ortiz et al. (2005) probably confused by such difference, reported *B. rosenbergi*, a Central American and Chocoan species, from Táchira State, and the same specimens mentioned by Chacón-Ortiz et al. (2005) were previously reported correctly as *B. boans* (Barrio-Amorós 1999, 2001a). Specimens from throughout the whole species distribution should be compared using molecular and bioacoustic data, as they may be a species complex. In the *Boana semilineata* species group (Faivovich et al. 2005). Some specimens are still confused in collections with the very similar *B. wavrini* (Hoogmoed 1990b).

Selected references: Ginés (1959); Rivero (1961, 1964b, 1967a); Heatwole et al. (1965); Duellman (1971a, 1997); Gremone et al. (1986); Hoogmoed (1990b); Donnelly and Myers (1991); Magdefrau et al. (1991); Gorzula and Señaris (1998); Barrio-Amorós (1999, 2001a); Arrington and Arrington (2000); Lynch and Suárez-Mayorga (2001); Chacón et al. (2005); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós et al. (2011b); Mendoza (2014); Señaris et al. (2014).

Boana calcarata (Troschel 1848)

Holotype: Not designated and probably lost.

Type locality: “British Guiana.”

Distribution: Venezuela, Brazil, Colombia, Ecuador,

Bolivia, Guyana, and French Guiana. Widespread in Southern Venezuela, in Amazonas, Bolívar, and Delta Amacuro.

Remarks: Regions 4, 5. Caminer and Ron (2014) reviewed the species and allies from the Upper Amazon, especially Ecuador. They doubted the identity of Colombian and Venezuelan samples despite the fact they were well documented (Barrio-Amorós 1998; Señaris and Barrio 2002). In the *Boana albopunctata* species group (Faivovich et al. 2005).

Selected references: Duellman (1973); Donnelly and Myers (1991); Señaris and Barrio (2002); Señaris and Ayzazagüena (2004 “2002”); Barrio-Amorós et al. (2011b).

Boana cinerascens (Spix 1824)

Syntypes: ZSM 2498/0 (2 specimens), destroyed.

Type locality: “Ecga prope flumen Tefé” (= Ega, Tefé), Amazonas, Brazil.

Distribution: Regions 4, 5. Widely distributed in the Amazon Region (Colombia, Ecuador, Peru, Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana). Widespread in Southern Venezuela, in Amazonas, Bolívar, and Delta Amacuro States.

Remarks: In the *Boana punctata* species group (Faivovich et al. 2005). In Venezuela two species are confused under this name, one from rainforest habitat (Image 125A) and another from open areas (Image 125B). The nomen *cinerascens* hides a complex of species, with several taxa undescribed in the upper Amazon (D. Pareja, pers. comm.). Hoogmoed and Gruber (1983) suggested the use of *B. granosa* (Boulenger 1882) instead of *B. cinerascens* (Spix 1824) to stabilize the use of *granosa*. Barrio-Amorós (2004) used the name *cinerascens*, overlooking Hoogmoed and Gruber’s suggestion. Current situation is complicated, with types of *B. cinerascens* from Tefé apparently representing a different species than lectotype of *B. granosa* from Canelos, Ecuador (P. Kok, pers. comm.).

Selected references: Spix (1824); Boulenger (1882); Rivero (1961, 1964b,d, 1967c, 1971b); Duellman (1974a, 1997); Hoogmoed (1979a); Hoogmoed and Gruber (1983); Gorzula and Señaris (1998); Frost (2004); Kok and Kalamandeen (2008); Barrio-Amorós et al. (2011b); Señaris et al. (2014).

Boana geographica (Spix 1824)

Holotype: Not designed. ZSM 35/0 is part of the type series but is currently lost.

Type locality: Rio Tefé, Amazonas, Brazil.

Distribution: Region 4, 5. Widespread in tropical South America, east of Andes, including Trinidad. Widely distributed in southern and eastern Venezuela (Amazonas, Bolívar, and Delta Amacuro States).

Remarks: Fouquet et al. (2016) show a wider variation of



123B. *Boana boans*. Acequias river, Barinas. Photo: César Barrio-Amorós.



124. *Boana calcarata*. Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



125A. *Boana cinerascens*. Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



125B. *Boana cinerascens*. Savannas surrounding Cerro Autana, Amazonas. Photo: César Barrio-Amorós.



126. *Boana geographica*. Female. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.



127. *Boana hobbsi*. Leticia, Colombia. Photo: Santiago Castroviejo-Fisher.

both *B. geographica* and *B. semilineata*. They described *B. diabolica* from the eastern Guiana Shield. A detailed review should be done with Venezuelan populations. In the *Boana semilineata* species group (Faivovich et al. 2005).
Selected references: Spix (1824); Günther (1858); Lutz (1927); Rivero (1961); Duellman (1971a, 1973, 1997); Hoogmoed and Gorzula (1979); Lynch (1979b); Gremone et al. (1986); Azevedo-Ramos (1995); Gorzula and Señaris (1998); Barrio-Amorós et al. (2011b); Señaris et al. (2014); Fouquet et al. (2016).

Boana hobbsi (Cochran and Goin 1970)

Holotype: MCZ 28052.

Type locality: “Cano Goacayá, a tributary of the Río Apaporis, in Amazonas, Colombia.”

Distribution: Region 4. Colombia and Venezuela. In Venezuela known from a single record from the base of Cerro Neblina in extreme southern Amazonas State.

Remarks: In the *Boana punctata* species group (Faivovich et al. 2005).

Selected references: Cochran and Goin (1970);

Duellman (1974a); Pyburn (1978); McDiarmid and Paolillo (1988).

Boana jimenezii

(Señaris and Ayarzagüena 2006)*

Holotype: MHNLS 16070.

Type locality: Quebrada Ataperé, headwater of the Cucurital River (05°43'17.7"N, 62°34'21.1"W), 970 m, Canaima National Park, Bolívar State, Venezuela

Distribution: Region 5. Endemic to Venezuela, restricted to the uplands of Gran Sabana and the summit of Auyan-tepui. Expected in Guyana.

Remarks: Probably a member of *Boana punctata* species group (Señaris and Ayarzagüena 2006).

Selected references: Cochran and Goin (1970); Duellman (1974a); Pyburn (1978); McDiarmid and Paolillo (1988); Señaris et al. (2014).

Boana lanciformis (Cope 1871)

Holotype: Not designed. Type series unknown.

Type locality: "Pebas, Ecuador."

Distribution: Regions 1, 2, 3, 4. Amazonia, eastern slopes of the Andes, southern slopes of Cordillera de la Costa, Península de Paria.

Remarks: In the *Boana albopunctata* species group (Faivovich et al. 2005). *Hyla lanciformis guerreroi* was described by Rivero (1971) for the Venezuelan form. Discussing with colleagues (L.F. Toledo, A. Chacón), some differences are clear (including morphological and osteological) and *B. lanciformis* could hide a species complex. If so, the distinctiveness of the Venezuelan form should be demonstrated by an integrative taxonomic approach.

Selected references: Duellman (1971a, 1973); Rivero (1971a); Péfaur and Díaz De Pascual (1987); Gorzula and Señaris (1998); Barrio et al. (1999); Barrio-Amorós (2010a).

*Boana lemai** (Rivero 1971)

Holotype: UPR-M 3179.

Type locality: "Paso del Danto, La Escalera, entre El Dorado y Santa Elena de Uairen, 1,300–1,400 m, Serranía de Lema, Estado Bolívar, Venezuela."

Distribution: Region 5. Eastern Guayana uplands (Venezuela and Guyana). In Venezuela, known from Sierra de Lema and some localities in the Gran Sabana.

Remarks: See variation in specimens from Guyana in MacCulloch and Lathrop (2005). In the *Boana benitezi* species group (Faivovich et al. 2005).

Selected references: Rivero (1971b); Duellman (1997); MacCulloch and Lathrop (2005); Myers and Donnelly (2008); Barrio-Amorós and Duellman (2009); Señaris et al. (2009, 2014).

Boana multifasciata (Günther 1859)

Holotype: BM 1947.2.23.6

Type locality: "Para," Brazil.

Distribution: Region 5. Brazil, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, restricted to the Eastern Guayana (Bolívar, Monagas, and Delta Amacuro).

Remarks: In *Boana albopunctata* species group (Faivovich et al. 2005).

Selected references: Rivero (1961, 1964a, 1967a); Hoogmoed and Gorzula (1979); Duellman (1997); Gorzula and Señaris (1998); Señaris and Ayarzagüena (2004); Señaris et al. (2014).

Boana ornatissima (Noble 1923)

Holotype: AMNH 13491.

Type locality: "Meamu, Mazaruni River, Guyana."

Distribution: Region 5. Known in Venezuela from two localities; one in the Gran Sabana (salto Karuay), and another from middle Amazonas State. A picture was shown to CBA of a *B. ornatissima* from Surumoni, near La Esmeralda (Amazonas State), taken by the Austrian Surumoni team from University of Vienna in 1998. This locality fills the gap between the Gran Sabana locality and that from Guainía, eastern Colombia (Lynch and Vargas-Ramírez 2000).

Remarks: In *Boana punctata* species group (Faivovich et al. 2005).

Selected references: Hoogmoed (1979a); Señaris and Vernet (1997); Lynch and Vargas-Ramírez (2000); Señaris et al. (2014).

Boana pugnax (Schmidt 1857)

Holotype: KM 1009.

Type locality: "Chiriquí, Flusse unneit Bocca (*sic!*) del Toro." Köhler (2011) is wrong stating the type locality as "Neugranada."

Distribution: Regions 1, 3, 6. Panama, Colombia, and Venezuela. In Venezuela, widely distributed in open lowlands of Maracaibo Lake Basin and Los Llanos Region (Escalona et al. 2017).

Remarks: In *Boana faber* species group (Faivovich et al. 2005). Many specimens in the Venezuelan collections erroneously identified as *Hyla* or *Hypsiboas crepitans* (FRR and CBA, personal observation: now *Boana xerophylla*); Escalona et al. (2017) distinguished among *B. pugnax* and *B. xerophylla* in four Venezuelan museums, expanding the previous known localities.

Selected references: La Marca (1996a); Chacón (2001); Lynch and Suárez-Mayorga (2001); Tárano (2010); Mendoza (2014); Infante-Rivero and Velozo (2015); Escalona et al. (2017).



128. *Boana jimenezi*. Quebrada Kawi, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



129A. *Boana lanciformis*. Male. Acequias river, Barinas. Photo: César Barrio-Amorós.



129B. *Boana lanciformis*. Juvenile. Acequias river, Barinas. Photo: César Barrio-Amorós.



130A. *Boana lemai*. Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



130B. *Boana lemai*. Quebrada de Jaspe, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



130C. *Boana lemai*. Juvenile. Quebrada Kawi, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.

Boana punctata (Schneider 1799)

Syntypes: NHM 155 (two individuals)

Type locality: “Surinam.”

Distribution: Regions 3, 5. Widespread in South America (Colombia, Venezuela, Ecuador, Peru, Bolivia, Paraguay, Argentina, Brazil, Guyana, Suriname, French Guiana, and Trinidad). Present in the open lowlands of Venezuela, except in Maracaibo Lake Basin.

Remarks: In *Boana punctata* species group (Faivovich et al. 2005).

Selected references: Duellman (1974a); Hoogmoed (1979a); Gorzula and Señaris (1998); Barrio et al. (2000); Señaris et al. (2014).

Boana roraima (Duellman and Hoogmoed 1992)

Holotype: BMNH 1979.560

Type locality: “North slope of Mt. Roraima (05°38’N, 60°44’W, elevation 1,480 m), Rupununi District, Guyana.”

Distribution: Region 5. Guyana and Venezuela. In



131A. *Boana multifasciata*. Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.



131B. *Boana multifasciata*. Amplexus. Chivatón, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



132. *Boana ornatissima*. Karuay river, Gran Sabana, Bolívar. Photo: Manuel González.



133A. *Boana pugnax*. Male calling. San Vicente, Apure. Photo: César Barrio-Amorós.



133B. *Boana pugnax*. Ologá, southwestern Maracaibo Lake, Zulia. Photo: César Barrio-Amorós.



133C. *Boana pugnax*. Juvenile. Pagüey river, Barinas. Photo: César Barrio-Amorós.

Venezuela, restricted to the Eastern half of Bolívar State (Barrio-Amorós et al. 2011).

Remarks: See variation from Guyana in MacCulloch and Lathrop (2005). Barrio-Amorós et al. (2011) officially reported the species from Venezuela, described the call, and commented on distribution. Myers and Donnelly (2008) described *Hypsiboas angelicus* from the summit of Auyan-tepui. Barrio-Amorós et al. (2011) stated that *H. angelicus* is a junior synonym of *B. roraima*. In *Boana benitezi* species group (Faivovich et al. 2005).

Selected references: Duellman and Hoogmoed (1992); MacCulloch and Lathrop (2005); Myers and Donnelly (2008); Barrio-Amorós and Duellman (2009); Barrio-Amorós et al. (2011c); Barrio-Amorós and Fuentes (2012); Señaris et al. (2014).

Boana rhythmica (Señaris and Ayarzagüena 2002)*

Holotype: MHNLS 12957.

Type locality: “Cerro Jaua, Parque nacional Jaua-Sarisariñama, Bolívar State, Venezuela (4°49'55”N, 64°25'54”W), 1,600 m.”

Distribution: Region 5. Endemic to Venezuela. Known only from Cerro Jaua in Bolívar State.

Remarks: In *Boana benitezi* species group (Faivovich et al. 2005).

Selected references: Señaris and Ayarzagüena (2002); Barrio-Amorós (2013).

Boana sibleszi (Rivero 1972)

Holotype: UPRM 3177.

Type locality: “Paso del Danto, La Escalera, entre El Dorado y Santa Elena de Uairén, 1,300–1,400 m, Serranía de Lema, Estado Bolívar, Venezuela.”

Distribution: Region 5. Venezuela and Guyana. In Venezuela, distributed throughout the Eastern Guayana uplands.

Remarks: In *Boana punctata* species group (Faivovich et al. 2005). See variation from Guyana in MacCulloch and Lathrop (2005).

Selected references: Rivero (1972); Hoogmoed (1979a); Gorzula (1992); Duellman (1997); Gorzula and Señaris (1998); MacCulloch and Lathrop (2005); Barrio-Amorós and Duellman (2009); Señaris et al. (2014).

Boana tepuiana

(Barrio-Amorós and Brewer-Carías 2008)

Holotype: EBRG 4653.

Type locality: “Southern slope of Sarisariñama-tepui, Locality VI, Estado

Bolívar, Venezuela (4°25'N, 64°7'W), elevation 420 m.”

Distribution: Region 5. Eastern Guayana uplands.

Remarks: Must be in the *Boana benitezi* species group (*sensu* Faivovich et al. 2005) by implication as it was confused previously with *B. benitezi*, as it was already observed by Frost (2019). See additional comments under *B. benitezi*.

Selected references: Gorzula and Señaris (1998); Barrio-Amorós and Brewer-Carías (2008); Señaris et al. (2014).

Boana wavrini (Parker 1936)

Type: IRSNB 1028.

Type locality: “Upper Orinoco, in the province of Amazonas, Venezuela.”

Distribution: Region 4. Colombia, Venezuela and Brazil. In Venezuela, restricted to the upper Orinoco, in southern portion of Venezuelan Amazonas State.

Remarks: In *Boana semilineata* species group (Faivovich et al. 2005).

Selected references: Parker (1936); Ginés (1959); Rivero (1961, 1967a,c); Hoogmoed (1990); La Marca (1992); Gorzula and Señaris (1998).

Boana xerophylla (Duméril and Bibron 1841)

Lectotype: MNHN 652.

Type locality: Cayenne, French Guiana.

Distribution: Regions 1, 2, 3, 4, 5, 6. Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, and northern Brazil. Widespread in Venezuela in open and disturbed areas, 0–2,300 m asl.

Remarks: In *Boana faber* species group (Faivovich et al. 2005) by implication. Recently recovered from synonymy of *B. crepitans* by Orrico et al. (2017). Several authors gave evidence that *B. crepitans* was a complex (Kluge 1979; Lynch and Suarez-Mayorga 2001; Gorzula and Señaris 1999; Martins et al. 2009). The resurrection of *B. xerophylla* as the northern South American representative of the *crepitans* complex does not change the panorama much. As reported previously by Barrio-Amorós (2004), at least four different taxa were under the name *B. crepitans* only in Venezuela. Now, all of them pass automatically to be named *B. xerophylla*. However, only the southeastern population (a blue morph from rainforest lowlands in eastern Venezuela; Barrio-Amorós et al. 2011b) should be known as *B. xerophylla sensu stricto*, as it is conspecific with the French Guiana population (Lescure and Marty 2000). All other populations from Northern Venezuela, Colombia, and Panama deserve further attention. So, in Venezuela three more populations now being *B. xerophylla* represent different taxa. One is from the Coastal Range and Andes up to 2,300 m plus the upper Llanos; another is from the western piedmont of the Cordillera de Mérida towards the Maracaibo Lake Basin; another is a green morph from the Gran Sabana (mentioned already as different by Duellman 1997).

Selected references: Günther (1858); Boettger (1892, 1893, 1896); Boulenger (1903); Lutz (1927); Alemán (1952, 1953); Ginés (1959); Rohl (1959); Rivero (1961, 1963c, 1964a-d, 1967a, 1971a); Heatwole et al. (1965); Tello (1968); Rivero and Esteves (1969); Donoso-Barros and León-Ochoa (1972); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rivero-Blanco and Dixon (1979); Rada (1981); Péfaur and Díaz De Pascual (1987); Ramo and Busto (1989, 1990); La Marca (1991b “1994,” 1992, 1996a); Magdefrau et al. (1991); Manzanilla et al. (1995); Péfaur and Pérez (1995); Barrio (1996a); Yústiz (1996); Duellman (1997); Gorzula and Señaris (1998); Lynch and Suárez-Mayorga (2002); Barrio-Amorós (2006c); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós et al. (2011b); Mendoza (2014); Señaris et al. (2014); Orrico et al. (2017).

Genus *Hyloscirtus* Peters, 1882

Type species: *Hyloscirtus bogotensis* Peters, 1882.

Remarks: *Centrolenella estevesi* Rivero, 1968 was described from a creek close to Río Albarregas north of Merida city, at 2,400 m asl. This name was used as



134. *Boana punctata*. Acequias river, Barinas. Photo: César Barrio-Amorós.



135A. *Boana roraima*. Male. El Peñon, Auyan-tepui, Bolívar. Photo: César Barrio-Amorós.



135B. *Boana roraima*. Female. La Laja, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



136A. *Boana sibleszi*. Spotted morph. Chivatón, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



136B. *Boana sibleszi*. Stripped morph. Chivatón, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



136C. *Boana sibleszi*. Plain morph, calling male. Paso el Danto, La Escalera, Bolívar. Photo: César Barrio-Amorós.

Hyalinobatrachium by La Marca (1997), but more recently Faivovich et al. (2005) revised the holotype (MCZ 72498), reidentified the specimen as a juvenile *Hyloscirtus*, and considered it as *Hyloscirtus estevesi* (Frost 2018). Two species are reported from the same area, both in the *H. bogotensis* group: *H. jahni* and *H. platydactylus*.

From photographs of the holotype of *Centrolenella estevesi*, the authors suspect it is a juvenile *H. jahni*, due to snout shape projecting beyond the lip in ventral

view and absence of melanophores on fingers I and II. *Centrolenella estevesi* Rivero, 1968 is thus considered a junior synonym of *Hyla jahni* Rivero, 1961.

Hyloscirtus jahni* (Rivero 1961)

Holotype: UMMZ 46465.

Type locality: El Escorial, Mérida State, Venezuela.

Distribution: Endemic of cloud forest of Cordillera de Mérida (Andes), Mérida State.



137A. *Boana tepuiana*. Female holotype EBRG 4653. Southern slopes of Sarisariñama-tepui, Bolívar. Photo: César Barrio-Amorós.



137B. *Boana tepuiana*. Male paratype EBRG 4655. Southern slopes of Sarisariñama-tepui, Bolívar. Photo: César Barrio-Amorós.



137C. *Boana tepuiana*. Female. Pozo Esmeralda, El Paují, Bolívar. Photo: César Barrio-Amorós.



138. *Boana wavrini*. Niñal, Casiquiare arm, Amazonas. Photo: Fernando Rojas-Runjaic.



139A. *Boana xerophylla*. Night color. Parque Los Caobos, Caracas. Photo: César Barrio-Amorós.



139B. *Boana xerophylla*. Day color. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.

Remarks: Formerly in *Hyloscirtus bogotensis* species group (Faivovich et al. 2005). Recently, Rojas-Runjaic et al. (2018) recovered this species in his molecular phylogeny as sister to all other *Hyloscirtus*. To promote taxonomic stability and maintain taxonomy based on monophyletic groups, they excluded *H. jahni* from the *H. bogotensis* species group and created the monospecific *H. jahni* species group, which is morphologically defined by the presence of dermal spicules in adult males, and by the high number of tooth rows in the larval oral disc.

Selected references: Rivero (1961, 1963b); La Marca (1985a, 1994); Duellman (1989a).

Hyloscirtus japreria Rojas-Runjaic, Infante-Rivero, Salerno et Meza-Joya, 2018

Holotype: MHNSL 19236.

Type locality: “Guacharaca Camp, Tetari Kopejoacha creek, Rio Negro Basin, Sierra de Perijá, Machiques de Perijá municipality, Zulia State, Venezuela (10°04’21.9N,



139C. *Boana xerophylla*. Night color. Chivatón, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



139D. *Boana xerophylla*. Day color. El Playón, Caura river, Bolívar. Photo: César Barrio-Amorós.



139E. *Boana xerophylla*. Day color. La Azulita, Mérida. Photo: César Barrio-Amorós.



139F. *Boana xerophylla*. Night color. La Azulita, Mérida. Photo: César Barrio-Amorós.



140. *Boana* sp. (cf. *rufitela*). MCZ 15369. Maracaibo, Zulia. Photo: ©President and Fellows of Harvard College, reproduced with permission of the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA.



141. *Myersiophyla chamaeleo*. Holotype in life (AMNHA-131173). Cerro de la Neblina, Amazonas. Photo: Roy McDiarmid.

72°51'16.7W; elevation 1,661 m asl.)”

Distribution: Known only from several localities on the Venezuelan (Zulia State) and Colombian (Guajira Department) slopes of the Sierra de Perijá.

Remarks: In the *Hyloscirtus bogotensis* species group (Rojas-Runjaic et al. 2018).

Selected references: Rojas-Runjaic et al. (2018).

Hyloscirtus lascinius (Rivero 1969)

Holotype: MCZ 65901.

Type locality: “Tabor, above de Delicias, paramo of Tamá, Táchira, Venezuela.”

Distribution: Region 1. Andes of Colombia (Norte de Santander Department) and Venezuela (Táchira and Mérida States). Recently reported from Sierra de Perijá in Zulia State (Rojas-Runjaic et al. 2016).

Remarks: In *Hyloscirtus bogotensis* species group (Faivovich et al. 2005).

Selected references: Rivero (1969d); Duellman (1989a); Rojas-Runjaic et al. (2016).

Hyloscirtus platydactylus (Boulenger 1905)

Holotype: BM 1947.2.13.14.

Type locality: “Merida, Andes of Venezuela.”

Distribution: Region 1. Andes of Colombia (Norte de Santander Department) and Venezuela (Cordillera de Mérida and Sierra de Perijá).

Remarks: In *Hyloscirtus bogotensis* species group (Faivovich et al. 2005).

Selected references: Boulenger (1905); Ginés (1959); Rivero (1961, 1963b, 1969d); Duellman (1972a, 1979b, 1989a); La Marca (1985a, 1994b); Péfaur and Díaz De Pascual (1987); Barrio-Amorós (2010a).

Genus *Myersiohyla* Faivovich, Haddad, García, Frost, Campbell and Wheeler, 2005

Type species: *Myersiohyla neblinaria* Faivovich, McDiarmid and Myers, 2013. Faivovich et al. (2013) stated the original type species of *Myersiohyla* was *Hyla inparquesi*, Ayarzagüena and Señaris, 1994 due to a misidentified specimen of *M. “inparquesi”* from Neblina, which is now correctly identified as *M. neblinaria*.

Myersiohyla aromatica

(Ayarzagüena and Señaris 1994)*

Holotype: MHNLS 12510

Type locality: “Cumbre del Tepuy Huachamacari, Estado Amazonas, Venezuela (03°50’N, 65°45’O) 1,700 m snm.”

Distribution: Region 5. Endemic to Huachamacari, a tepui in Amazonas State.

Selected references: Ayarzagüena and Señaris (1993); McDiarmid and Donnelly (2005); Faivovich et al. (2013).

Myersiohyla chamaeleo

Faivovich, McDiarmid and Myers, 2013*

Holotype: AMNH A-131173

Type locality: Venezuela: Departamento Amazonas: Cerro de la Neblina: Camp I, 1,820–1,880 m.

Distribution: Region 5. Known from type locality and

surroundings at Cerro de la Neblina in the southern border of Amazonas State.

Selected references: Faivovich et al. (2013).

Myersiohyla inparquesi

(Ayarzagüena and Señaris 1994)*

Holotype: MHNLS 12338.

Type locality: “Cumbre del Tepuy Marahuaca Sur, Estado Amazonas, Venezuela (3°40’N, 65°27’O) 2,600 m snm.”

Distribution: Region 5. Endemic to Marahuaca, a tepui in central Estado Amazonas.

Selected references: Ayarzagüena and Señaris (1994); McDiarmid and Donnelly (2005).

Myersiohyla loveridgei (Rivero 1961)*

Holotype: MCZ 28565.

Type locality: Pico Culebra, Cerro Duida, Amazonas State, Venezuela.

Distribution: Known only from type locality.

Remarks: Region 5. Faivovich et al. (2013) noted the similarity between *Myersiohyla loveridgei* and *M. aromatica*, suggesting the possible synonymy of the latter.

Selected references: Rivero (1961, 1963d, 1964b, 1971b); La Marca and Smith (1982b); Faivovich et al. (2013).

Myersiohyla neblinaria

Faivovich, McDiarmid and Myers, 2013*

Holotype: USNM 562071

Type locality: “Venezuela: Departamento Amazonas: Cerro de la Neblina: Camp VII, 1,730 m.”

Distribution: Region 5. Known from type locality and surroundings at Cerro de la Neblina, in southern border of Amazonas State. Probably also on the Brazilian side.

Selected references: Faivovich et al. (2013).

Subfamily Dendropsophinae Fitzinger, 1843

Genus *Dendropsophus* Fitzinger, 1843

Type species: *Hyla frontalis* Daudin, 1800 (= *Rana leucophyllata* Beireis, 1783), by original designation.

Remarks: The genus was resurrected by Faivovich et al. (2005) to comprise *Hyla* species that have or are suspected to have 30 chromosomes. Duellman et al. (2016) included two genera in the subfamily Dendropsophinae, only one being present in Venezuela: *Dendropsophus*.

Dendropsophus amicum (Mijares-Urrútia 1998)*

Holotype: USNM 216677.

Type locality: Cerro Socopó, 84 km al NO de Carora,



142. *Myersiohyala neblinaria*. Holotype in life (USNM 562071). Cerro de la Neblina, Amazonas. Photo: Roy McDiarmid.



143. *Dendropsophus battersbyi*. Holotype BM 53.2.4.165. Caracas. Photo: Salvador Carranza.



144A. *Dendropsophus luteoocellatus*. Male calling. Calderas, Barinas. Photo: César Barrio-Amorós.



144B. *Dendropsophus luteoocellatus*. Female. Calderas, Barinas. Photo: César Barrio-Amorós.



145. *Dendropsophus marmoratus*. Male. Imataca, Delta Amacuro. Photo: César Barrio-Amorós.



146A. *Dendropsophus meridensis*. Male calling, Los Suarez, way from Mérida to la Azulita, Mérida. Photo: César Barrio-Amorós.

Estado Falcón, Venezuela (10°28'N, 70°48'O).

Distribution: Region 2. Known from type locality.

Remarks: Known only by holotype. No additional specimens collected after it in 1968. Faivovich et al. (2005) assigned this species to *Dendropsophus* but not to any species group. Assessing this apparently rare species is important, as it could be confused with a common species like “*Dendropsophus* aff. *minutus*,” which would have implications for conservation. Currently considered

Critically Endangered by the Venezuelan Red Book (Mijares-Urrútia et al. 2015).

Selected references: Mijares-Urrútia (1998); Faivovich et al. (2005); Mijares-Urrútia et al. (2015).

Dendropsophus battersbyi (Rivero 1961)*

Holotype: BM 53.2.4.165.

Type locality: Caracas, Venezuela.

Distribution: Region 2. Only known from type locality.
Remarks: Not collected since original description. If this is a valid species, it possibly disappeared from the Valley of Caracas due to quick expansion of the city. Mijares-Urrutia (1998) mentioned this species is apparently related to *Dendropsophus amicornum* and *D. minutus* (*sensu lato*). Faivovich et al. (2005) did not assign it to any species group. A thorough examination of holotype by CBA leads authors to believe *Dendropsophus battersbyi* is a valid species and a member of the *D. minutus* species group (*sensu* Gehara et al. 2014); alternatively, it could be conspecific with populations of *D. aff. minutus* from around Caracas that deserve further attention. A detailed revision of the species/populations of *Dendropsophus minutus* species group in the Venezuelan Andes and the Cordillera de La Costa is required to clarify the taxonomic status of this and close species.
Selected references: Rivero (1961, 1964a); Mijares-Urrutia (1998); Faivovich et al. (2005); Barrio-Amorós and Torres (2010); Barrio-Amorós (2013).

Dendropsophus luteocellatus (Roux 1927)*

Lectotype: NHMB 3900.
Type locality: “El Mene, Provincia Falcón, Venezuela.”
Distribution: Regions 1, 2. Endemic to both sides of Cordillera de Mérida and Cordillera de la Costa.
Remarks: In the *Dendropsophus parviceps* species group *sensu* Faivovich et al. (2005).
Selected references: Roux (1927); Ginés (1959); Rivero (1961, 1963c, 1969c, 1971a); Duellman and Crump (1974); Yústiz (1996); Barrio-Amorós (2010a); Barrio-Amorós and Molina (2010).

Dendropsophus marmoratus (Laurenti 1768)

Type: Unknown.
Type locality: “Surinam.”
Distribution: Regions 4, 5. Amazonian lowlands of Colombia, Ecuador, Peru, Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, known from a few localities in Amazonas and Bolívar States, south of the Orinoco River.
Remarks: In the *Dendropsophus marmoratus* species group *sensu* Faivovich et al. (2005).
Selected references: Rivero (1961, 1964b); Bokermann (1964).

Dendropsophus meridensis (Rivero 1961)*

Holotype: MCZ 2527.
Type locality: “Mérida, 1,630 m.”
Distribution: Region 1. Cordillera de Mérida (Venezuelan Andes) in Mérida and Táchira States (see current map by Armesto et al. 2015).
Remarks: So far, differences between *Dendropsophus meridensis* and *D. pelidnus* are almost nonexistent or

insignificant. *Dendropsophus meridensis* is known to inhabit stagnant waters, but specimens of *D. pelidnus* that Duellman (1989) obtained in Tachira were from a stream. Guarnizo et al. (2012) found a maximum genetic distance of 0.9% between central Cordillera de Mérida specimens and others from near the type locality of *D. pelidnus*, which is not significant. Aside from this molecular evidence, calls and morphology should be compared between these populations before proposing a synonymy. Armesto et al. (2015) provide an updated distribution map and model of potential distribution in the Venezuelan Andes. If *D. pelidnus* is a junior synonym of *D. meridensis*, then the latter would be present in Colombia.

Selected references: Rivero (1961, 1963b, 1964d); Duellman (1989a); Mijares-Urrutia (1990b); La Marca (1991b “1994,” 1992); Guarnizo et al. (2012); Armesto et al. (2015).

Dendropsophus microcephalus (Cope 1886)

Syntypes: USNM 13473 (two specimens, lost).
Type locality: “Chiriqui,” Panamá.
Distribution: Regions 3, 6. Widespread from southeastern Mexico to northern South America (Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil, and Trinidad). In Venezuela, widely distributed in open lowlands.
Remarks: *Hyla misera* Werner, 1903 from Caracas, Venezuela (holotype IRSNB 4549) (as *Dendropsophus miserus*) would be the name for Venezuelan populations if, as Duellman (1970) suggested, the subspecies currently recognized (as *D. microcephalus miserus* for the Venezuelan and northern Colombian populations) is proved to be a full species. Fouquette (1968), Duellman (1970), and Savage (2002) already recognized the differences among Central American and South American populations. Molecular work is needed to assess its final taxonomic identity. In the *Dendropsophus microcephalus* species group *sensu* Faivovich et al. (2005).
Selected references: Lutz (1927); Rivero (1961, 1963c, 1964d); Heatwole et al. (1965); Duellman and Fouquette (1968); Fouquette (1968); Duellman (1970, 1974a, 1997); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rivero-Blanco and Dixon (1979); Rada (1981); Yústiz (1996); Gorzula and Señaris (1998); Savage (2002); Tárano (2010); Barrio-Amorós et al. (2011b).

Dendropsophus minusculus (Rivero 1971)

Holotype: UPR-M 3377.
Type locality: Nirgua, Yaracuy State, Venezuela.
Distribution: Regions 2, 3, 4, 5. Colombia, Venezuela, Brazil, Guiana, Suriname, and French Guiana. Widespread in Venezuela, from northern lowlands of Cordillera de la Costa, throughout Los Llanos, to Orinoquian lowlands.
Remarks: In the *Dendropsophus microcephalus* species



146B. *Dendropsophus meridensis*. Los Suarez, way from Mérida to la Azulita, Mérida. Photo: César Barrio-Amorós.



147A. *Dendropsophus microcephalus*. Male calling. Chururú, Táchira. Photo: César Barrio-Amorós.



147B. *Dendropsophus microcephalus*. Arassari rafting camp, Acequias, Barinas. Photo: César Barrio-Amorós.



148A. *Dendropsophus minusculus*. Male calling. El Palmar, Bolívar. Photo: César Barrio-Amorós.



148B. *Dendropsophus minusculus*. Plain morph. San Vicente, Apure. Photo: César Barrio-Amorós.



148C. *Dendropsophus minusculus*. Stripped morph. North of Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.

group *sensu* Faivovich et al. (2005).

Selected references: Rivero (1971a); Hoogmoed and Gorzula (1979); Rivero-Blanco and Dixon (1979); Ramo and Busto (1989, 1990); Duellman (1997); Gorzula and Señaris (1998); Tárano (2010); Barrio-Amorós et al. (2011b); Señaris et al. (2014).

Dendropsophus minutus (Peters 1872)

Syntypes: ZMB 7456.

Type locality: Nova Friburgo, Rio de Janeiro, Brazil.

Distribution: Regions 1, 2, 4, 5. Widespread in

Venezuela, with populations from the Coastal chain, the Andes, the Amazon, and Guiana Shield.

Remarks: Gehara et al. (2014) shows this name hides a complex of species, with at least four putative species in Venezuela. The name *Hyla goughi* Boulenger, 1911 was mentioned to be available for populations clustered together with Trinidadian populations. However, CBA examined the type of *Hyla goughi* (BMNH 1947.2.13.12) and it is considered to be conspecific with *Hyla microcephala* Cope, 1886. A cotype of *H. goughi*, BMNH 1947.2.13.83, is a subadult *Dendropsophus* aff. *minutus*. The status of other populations once attributed



149A. *Dendropsophus* aff. *minutus*. Los Alcaravanes, Calderas, Barinas. Photo: César Barrio-Amorós.



149B. *Dendropsophus* aff. *minutus*. Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



149C. *Dendropsophus* aff. *minutus*. Chivatón, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



149D. *Dendropsophus* aff. *minutus*. Mapurital, Caripe, Monagas. Photo: Diego A. Flores.



150. *Dendropsophus parviceps*. Yasuní, Ecuador. Photo: César Barrio-Amorós.



151. *Dendropsophus pelidmus*. Tamá, Táchira. Photo: Orlando Armesto.

to *Dendropsophus minutus* still need to be clarified.

Selected references: Rivero (1961, 1964b, 1971b); Heatwole et al. (1965); Rivero and Esteves (1969); Hoogmoed and Gorzula (1979); Donnelly and Myers (1991); Magdefrau et al. (1991); Duellman (1997); Gorzula and Señaris (1998); Barrio-Amorós and Duellman (2009); Barrio-Amorós (2010a); Barrio-Amorós et al. (2011b); Gehara et al. (2014); Señaris et al. (2014).

***Dendropsophus parviceps* (Boulenger 1882)**

Holotype: BM 1947.2.13.51

Type locality: “Sarayacu,” Provincia Pastaza, Ecuador.

Distribution: Region 4, 5. Widely distributed in Amazon Basin: Colombia, Ecuador, Peru, Bolivia, Brazil, and Venezuela. In Venezuela, only known from three localities: lower Casiquiare (McDiarmid and Paolillo 1988), Surumoni in Amazonas State (MHNLS 20906–20910), and Guaquinima-tepui in Bolívar State (Schlüter and Mägdefrau 1991).

Remarks: In *Dendropsophus parviceps* species group (Faivovich et al. 2005).

Selected references: McDiarmid and Paolillo (1988);

Magdefrau et al. (1991); Schlüter and Mägdefrau (1991); Amézquita and Hödl (2004).

Dendropsophus pelidnus (Duellman 1989)

Holotype: KU 181109.

Type locality: “Betania (07°30’N, 72°27’W, 2,220 m), Estado Táchira, Venezuela.”

Distribution: Region 1. Departments of Santander and Boyacá in Colombia, and Táchira State in Venezuela, 2,200–3,000 m asl.

Remarks: See comments under *Dendropsophus meridensis*. If *D. pelidnus* is shown to be a junior synonym of *D. meridensis*, then distribution of latter would reach Colombia. The specific name ending is amended to be consistent with the masculine genus, from Greek adjective *pelidnos* (Duellman 1989a). In *Dendropsophus labialis* species group (Duellman 1989a; Faivovich et al. 2005).

Selected references: Duellman (1989a); Guarnizo et al. (2012); Armesto et al. (2014).

Dendropsophus sarayacuensis (Shreve 1935)

Holotype: MCZ 19729.

Type locality: Sarayacu, Provincia Pastaza, Ecuador.

Distribution: Regions 4, 5. Amazon Basin, in Ecuador, Peru, Bolivia, Brazil, and Venezuela. Only record for Venezuela from base of Cerro La Neblina in the southern extreme of Amazonas State (McDiarmid and Paolillo 1988).

Remarks: In *Dendropsophus leucophyllatus* species group (Faivovich et al. 2005).

Selected references: Duellman (1974a); McDiarmid and Paolillo (1988).

Dendropsophus yaracuyanus
(Mijares-Urrútia and Rivero 2000)*

Holotype: EBRG 3311.

Type locality: “Los Bacos, Municipio Bolívar, Sierra de Aroa, Estado Yaracuy, Venezuela.”

Distribution: Region 2. Endemic to Sierra de Aroa in Yaracuy State.

Remarks: Not previously assigned to any species group (Faivovich et al. 2005), herein assigned to *D. parviceps* group, due to overall similarity with the other species in this group.

Selected references: Mijares-Urrútia and Rivero (2000).

Subfamily Lophohylinae Miranda-Ribeiro, 1926

Remarks: Duellman et al. (2016) included five genera present in Venezuela in this subfamily: *Aparasphenodon*, *Osteocephalus*, *Phytotriades*, *Tepuihyla*, and *Trachycephalus*.

Genus *Aparasphenodon* Miranda-Ribeiro, 1920

Type species: *Aparasphenodon brunoi* Miranda Ribeiro, 1920, by monotypy.

Aparasphenodon venezolanus (Mertens 1950)

Holotype: SMF 22168.

Type locality: San Fernando de Atabapo, Amazonas State, Venezuela.

Distribution: Region 4. Amazonian lowlands of Venezuela and nearby Colombia.

Selected references: Mertens (1950, 1967); Ginés (1959); Rivero (1961, 1964b); Paolillo and Cerda (1981); Lynch and Vargas-Ramírez (2000).

Genus *Osteocephalus* Steindachner, 1862

Type species: *Osteocephalus taurinus* Steindachner, 1862, by subsequent designation of Kellogg (1932).

Osteocephalus helenae (Ruthven 1919)

Holotype: UMMZ 52681.

Type locality: Valley of the Demerara River, Dunoon, Guyana.

Distribution: Region 5. Widely distributed in lowlands of Amazon Region (Bolivia, Peru, Colombia, Brazil, Colombia, Venezuela, Guyana, and French Guiana). In Venezuela, known from several localities in Bolívar and Delta Amacuro States (Barrio-Amorós 1998, Señaris and Ayarzagüena 2004).

Remarks: *Osteocephalus helenae* is the name that must apply to southern Venezuela’s green, tuberculated, medium-sized *Osteocephalus*. Specimens of this species in this region have been known under two names: *Osteocephalus buckleyi* (Boulenger 1882) with distribution now restricted to Upper Amazon in Peru, Colombia, and Ecuador (Jungfer et al. 2013); and *Osteocephalus cabrerai* (Cochran and Goin 1970), first reported from Venezuela by Gorzula and Señaris (1998). All specimens examined by Jungfer et al. (2013) from the Guiana Shield fall in the same clade, and only name *O. helenae* is applicable. In *Osteocephalus buckleyi* species group (Jungfer et al. 2013).

Selected references: Cochran and Goin (1970); Trueb and Duellman (1971); Duellman and Mendelson (1995); Gorzula and Señaris (1998); Señaris and Ayarzagüena (2004); Jungfer et al. (2013).

Osteocephalus lepieurii (Dumeril and Bibron 1841)

Holotype: MNHNP 4629.

Type locality: “Cayenne,” French Guiana.

Distribution: Regions 4, 5. Widely distributed in Guiana Shield (Brazil, Venezuela, Guyana, Suriname, and French Guiana). In Venezuela, known from several localities in



152. *Dendropsophus sarayacuensis*. Sarayacu, Ecuador. Photo: William E. Duellman.



153A. *Dendropsophus yaracuyanensis*. Sierra de Aroa, Yaracuy. Photo: Walter Schargel.



153B. *Dendropsophus yaracuyanensis*. Sierra de Aroa, Yaracuy. Photo: Fernando Rojas-Runjaic.



154. *Aparasphenodon venezolanus*. Guainía, Colombia. Photo: John D. Lynch.



155A. *Osteocephalus helenae*. Imataca, Delta Amacuro. Photo: Fernando Rojas-Runjaic.



155B. *Osteocephalus helenae*. Santa María de Erebató, Bolívar. Photo: César Barrio-Amorós.

Amazonas and Bolívar States.

Remarks: In *Osteocephalus leprieurii* species group (Jungfer et al. 2013). *Osteocephalus ayarzaguenai* Gorzula and Señaris, 1997 is a junior synonym (Jungfer and Hödl 2002).

Selected references: Rivero (1971a); Trueb and Duellman (1971); Gorzula and Señaris (1996, 1998); Duellman (1997); Barrio and Fuentes (2000a); Jungfer and Hödl (2002); Señaris et al. (2009, 2014); Jungfer et al. (2013).

Osteocephalus taurinus Steindachner, 1862

Type: NHMW 16492.

Type locality: Barra do Rio Negro, Manaus, Amazonas, Brazil.

Distribution: Region 5. Amazonian species, distributed in southern, central, and upper Amazon in Brazil, Peru, Ecuador, Bolivia, Colombia, and the Guianas. In Venezuela all populations known as *O. taurinus* must be revised. Jungfer et al. (2013) identified two candidate

species under this name from Venezuela, one in NW Amazonas State, and another from the extreme south Amazonas State (Appendix 1). Jungfer et al. (2013) restricts the presence of *O. taurinus sensu stricto* out of Venezuela. However, populations of *O. "taurinus"* from southeastern Venezuela would remain without identification. For now, authors restrict distribution of *O. aff. taurinus* to the lowlands and uplands of Bolívar State.

Remarks: A well-recognized species complex. In Venezuela at least three putative species are reported under this name (Jungfer et al. 2013; Appendix 1).

Selected references: Ginés (1959); Rivero (1961, 1964b); Trueb and Duellman (1971); Donnelly and Myers (1991); Duellman (1997); Gorzula and Señaris (1998); Lynch and Vargas-Ramírez (2000); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós et al. (2011b); Jungfer et al. (2013); Señaris et al. (2014).

Genus *Phytotriades* Jowers, Downie and Cohen, 2008

Type species: *Amphodus auratus* Boulenger, 1917, by original designation.

Phytotriades auratus (Boulenger 1917)

Type: BMNH 1917.9.27.39–41

Type locality: "Mount Tucutche, a little above 3,000 feet altitude," Trinidad.

Distribution: Region 2. Only known from Trinidad island and Cerro El Humo in Península de Paria (northwestern Venezuela), Sucre State. Probably in other localities of Paria over 1,000 m where the giant bromeliad *Glomeropitcairnia erectiflora* (its microhabitat) is present.

Remarks: Considered as Critically Endangered by current Venezuelan Red Book (De Freitas and Rivas 2015).

Selected references: Faivovich et al. (2005); Jowers et al. (2009); De Freitas and Rivas (2015); Rivas and De Freitas (2015).

Genus *Tepuihyla*

Ayarzagüena, Señaris and Gorzula, 1993

Type species: *Hyla rodriguezi* Rivero, 1968, by original designation.

Remarks: The modern concept of *Tepuihyla* includes several species ranging from the Upper Amazon (*Tepuihyla shushupe* and *T. tuberculosa*) to the Guiana Shield (Ron et al. 2016), some only occurring at the tepui summits, and few others from uplands to lowlands. Several new phylogenetic studies suggest that tepui dwellers evolved quite recently from a common ancestor, and not a long time ago as usually suspected for endemics of high tepuis (Kok et al. 2012; Salerno et al. 2012). Although Ayarzagüena et al. (1993) defined the genus

Tepuihyla as masculine, Myers and Stothers (2006) clarified that *Hyla* is feminine so, *Tepuihyla* cannot be assumed as masculine.

Tepuihyla aecii

(Ayarzagüena, Señaris and Gorzula 1993)*

Holotype: MHNLS 12014.

Type locality: "Cumbre Sur del Monte Duida, Estado Amazonas. Venezuela (3°19'N, 65°38'W). 2,150 m snm."

Distribution: Region 5. Endemic to Cerro Duida, Amazonas State, Venezuela.

Selected references: Ayarzagüena et al. (1993a,b).

Tepuihyla edelcae

(Ayarzagüena, Señaris and Gorzula 1993)*

Holotype: MHNLS 10626.

Type locality: "Auyan-tepuy, 10.8 km al este del Salto Angel. Estado Bolívar. Venezuela (5° 58'N, 62° 29'W). 1,970 m snm."

Distribution: Region 5. Endemic to Auyan-tepui, Bolívar State, Venezuela.

Remarks: Specimens referred as *Tepuihyla edelcae* from the Chimanta massif correspond to *T. obscura* (Kok et al. 2015).

Selected references: Ayarzagüena et al. (1992a,b); Gorzula (1992); Gorzula and Señaris (1998); McDiarmid and Donnelly (2005); Barrio-Amorós and Fuentes (2012); Kok et al. (2012, 2015); Salerno et al. (2012, 2014); Señaris et al. (2014).

Tepuihyla exophthalma (Smith and Noonan 2001)

Holotype: UG-CSBD HA-722.

Type locality: 30 km SE Imbaimadai, Mazaruni-Potaro District, Guyana, ca. 585 m.

Distribution: Region 5. Venezuela and Guyana. In Venezuela, only from high sector of Sierra de Lema.

Remarks: Described as *Osteocephalus exophthalmus* by Smith and Noonan (2001) from Mazaruni-Potaro district in Guyana. Later Kok and Kalamandeen (2008) reported a second population from Kaieteur National Park also in Guyana. Barrio-Amorós et al. (2010h) reported the first Venezuelan specimens from the upper sector of La Escalera in Sierra de Lema, Bolívar. Jungfer et al. (2013) passed the species to *Tepuihyla* based on genetic data, though this eliminated one of the most characteristic morphological synapomorphies of *Tepuihyla*: the absence of webbing between toes I and II. *Osteocephalus phasmatus* MacCulloch and Lathrop, 2005 is a junior synonym of *T. exophthalma* according to Jungfer et al. (2013).

Selected references: MacCulloch and Lathrop (2005); Kok and Kalamandeen (2008); Barrio-Amorós et al. (2010h); Jungfer et al. (2013); Señaris et al. (2014).



156A. *Osteocephalus lepreurii*. Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



156B. *Osteocephalus lepreurii*. “*Osteocephalus ayarzagüenai*” pattern. Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



157. *Osteocephalus* aff. *taurinus*. Male. La Laja, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



158. *Phytotriades auratus*. Península de Paria, Sucre. Photo: Gilson Rivas.



159. *Tepuihyla edelcae*. Auyan-tepui summit. Photo: César Barrio-Amorós.



160A. *Tepuihyla exophthalma*. Upper sector of La Escalera, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.

Tepuihyla luteolabris

(Ayarzagüena, Señaris and Gorzula 1993)*

Holotype: MHNLS 9376.

Type locality: “Tepuy Marahuaca Norte, Estado Amazonas. Venezuela. (3° 45’N, 65° 30’W). 2,550 m.”

Distribution: Region 5. Endemic to Cerro Marahuaca, a tepui in Amazonas State, Venezuela.

Remarks: *Tepuihyla celsae* was described from Cerro Galicia in Falcón State by Mijares-Urrútia et al. (1999). Jugfer et al. (2013) synonymized it with *T. luteolabris*, based on communication by colleagues, but not a formal

comparison of type material. However, current authors agree with that decision.

Selected references: Ayarzagüena et al. (1993a,b); Mijares et al. (1999); Jungfer et al. (2013).

Tepuihyla obscura

Kok, Ratz, Tagelaar, Aubret and Means, 2015*

Holotype: IRSNB 4192.

Type locality: “Summit of Chimantá-tepui (5°19’27”N, 62°12’10”W, 2,224 m asl.)”

Distribution: Region 5. Widespread in Chimantá massif

(Bolívar State), on Abakapá, Akopán, Amurí, Apakará, Chimantá, and Churí tepuis, 1,800–2,600 m asl.

Remarks: *Tepuihyla edelcae* was described from Auyán-tepui and referred to date also to Chimantá massif (Ayarzagüena et al. 1992a), but these two populations were recognized as a different species by Kok et al. (2012) and Salerno et al. (2012, 2014).

Selected references: Salerno et al. (2014); Kok et al. (2015).

Tepuihyla rodriguezi (Rivero 1968)

Holotype: MCZ 64740.

Type locality: Paso del Danto, Región de La Escalera, entre El Dorado y Santa Elena de Uairén, 1,300–1,400 m, Serranía de Lema, Estado Bolívar, Venezuela.

Distribution: Region 5. With synonymizing of *Tepuihyla galani*, *T. talbergae*, and *T. rimarum* with *T. rodriguezi* (Jungfer et al. 2013, Kok et al. 2015), the distribution of the latter now extends from Paso el Danto in the northern versant of Sierra de Lema (type locality) through the higher sectors of the Gran Sabana, the foothills of Guadacapiapu tepui (type locality of *T. galani*), atop of Ptari-tepui (type locality of *T. rimarum*), and as low as Kaieteur National Park in Guyana (type locality of *T. talbergae*), altitudinal range 366–2,440 m.

Remarks. *Tepuihyla galani* (Ayarzagüena, Señaris et Gorzula, 1993), *T. talbergae* Duellman and Yoshpa, 1996, and *T. rimarum* (Ayarzagüena, Señaris and Gorzula 1993) recently synonymized with *T. rodriguezi* by Jungfer et al. (2013) and Kok et al. (2015).

Selected References: Rivero (1968); Ayarzagüena et al. (1992a,b); Duellman and Yoshpa (1996); Duellman (1997); Gorzula and Señaris (1998); Kok and Kalamandeen (2008); Jungfer et al. (2013); Señaris et al. (2014); Kok et al. (2015).

Genus *Trachycephalus* Tschudi, 1838

Type species: *Trachycephalus nigromaculatus* Tschudi, 1838, by monotypy.

Trachycephalus resinifictrix (Goeldi 1907)

Holotype: BM 1947.2.23.24.

Type locality: “Mission of San Antonio do Prata, at the River Maracaná,” Brazil.

Distribution: Regions 4, 5. Eastern part of Brazilian Amazon Basin, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela known from the base of Cerro La Neblina in Amazonian lowlands of south Amazonas State, from Delta of the Orinoco in Delta Amacuro State and from the upper Cuyuni area.

Selected references: McDiarmid and Paolillo (1988); Señaris and Ayarzagüena (2004 “2002”); Señaris et al. (2009).

Trachycephalus typhonius (Linnaeus 1758)

Holotype: UMMZ 134.

Type locality: “America.”

Distribution: Regions 1, 2, 3, 4, 5, 6. Widespread from Mexico through Central America and South America to Paraguay and Northern Argentina; also, in Trinidad and Tobago. Widespread in lowland Venezuela, even in disturbed areas.

Remarks: This taxon recently changed genus and species. Most commonly known as *Phrynohyas venulosa*, until Faivovich et al. (2005) transferred it to the genus *Trachycephalus*, as *T. venulosus*. Then Lavilla et al. (2010) elucidated the long controversial nomen *typhonius* (used for a complex of bufonids as *Bufo typhonius*, and for an Asian ranoid) to be applied as *Trachycephalus typhonius*.

Selected references: Lutz (1927); Duellman (1956, 1971b, 1997); Rohl (1959); Rivero (1961, 1964a–d); Tello (1968); Rivero and Esteves (1969); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rivero-Blanco and Dixon (1979); Ramo and Busto (1989, 1990); Barrio (1996a); Yústiz (1996); Lavilla et al. (2010); Tárano (2010); Barrio-Amorós et al. (2011).

Subfamily Pseudinae Fitzinger, 1843

Remarks: The long-recognized family Pseudidae was passed to subfamily of Hylidae by Duellman (2001) and supported by Haas (2003) based on larval characters. Darst and Cannatella (2004) recovered *Pseudis* and *Scarthyra* within hyaline frogs. Faivovich et al. (2005) placed *Pseudis* in their tribe Dendropsophini. Garda and Cannatella (2007) recognized the group with an unranked name, Pseudae Fitzinger, 1843, for *Pseudis* and *Lysapsus*. Aguiar et al. (2007) placed *Lysapsus* in *Pseudis*, followed by Pyron and Wiens (2011), but not by Wiens et al. (2010) who considered a monophyletic *Pseudis sensu stricto* (not including *Lysapsus*). Duellman et al. (2016) recovered Pseudinae as a subfamily of Hylidae.

Genus *Pseudis* Wagler, 1830

Type species: *Rana paradoxa* Linnaeus, 1758, by monotypy.

Pseudis paradoxa (Linnaeus 1758)

Syntypes: MHRM 114–148.

Type locality: Surinam.

Distribution: Regions 2, 3, 4, 5, 6. Widely distributed from northern South America (Colombia, Venezuela, Trinidad, Guyana, Suriname, French Guiana) throughout Brazil to Peru and Bolivia. In Venezuela, in lowlands of Maracaibo Lake Basin, Llanos, Guayana, and Delta of the Orinoco.



160B. *Tepuihyla exophthalma*. Upper sector of La Escalera, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



161. *Tepuihyla obscura*. Churi-tepui, Chimantá Massif, Bolívar. Photo: César Barrio-Amorós.



162A. *Tepuihyla rodriguezi*. Luepa, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



162B. *Tepuihyla rodriguezi*. Guadacapiapu savannas (type locality of syn. *T. galani*), Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



163. *Trachycephalus resinifictrix*. Yasuni, Ecuador. Photo: Pau Cardellach.



164A. *Trachycephalus typhonius*. Puerto Ayacucho, Amazonas. Photo: César Barrio-Amorós.

Remarks: Gallardo (1961) described different taxa (subspecies) of *P. paradoxa* based mainly on chromatic and biogeographic characters. None of them are regarded currently as valid (Garda et al. 2010).

Selected references: Lutz (1927); Ginés (1959); Gallardo (1961); Rivero (1961, 1964a); Heatwole et al. (1965); Rivero and Esteves (1969); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Gremone et al.

(1986); Ramo and Busto (1989, 1990); Barrio (1996a); Gorzula and Señaris (1998); Rojas-Runjaic et al. (2005); Aguiar et al. (2007); Garda et al. (2010); Tárano (2010).

Genus *Scarthyla* Duellman and de Sá, 1988

Type species: *Scarthyla ostinodactyla* (= *Hyla goinorum* Bokermann, 1962), by original designation.

Scarthyla vigilans (Solano 1971)

Type: MBUCV IV-6163

Type locality: “De la carretera entre Coloncito y El Vigía (a los 20 km), Estado Zulia (sic!= Estado Táchira), Venezuela.”

Distribution: Regions 1, 2, 3, 6. Colombia (Magdalena Basin and Llanos), Venezuela and Trinidad (Smith et al. 2011). In Venezuela, apparent disjunct distribution in lowlands of Maracaibo Lake Basin, high Llanos, Falcón State (Barrio-Amorós et al. 2006), northern Coastal Range, and Delta of the Orinoco (Rojas-Runjaic et al. 2008). The type locality was situated in Zulia State by Solano (1971), wrongly corrected to Mérida State by La Marca (1992) and here corrected to Táchira State.

Remarks: *Hyla vigilans* was regarded as *incertae sedis* by Faivovich et al. (2005). Based on osteology and external morphology, Barrio-Amorós et al. (2006c) proposed to assign *H. vigilans* to *Scarthyla* Duellman and de Sá, 1988 despite differences between the tadpoles of both species. Lynch and Suárez-Mayorga (2011) assigned *vigilans* to *Pseudis*, as *P. vigilans*, but that proposal was never considered (Frost 2019). Despite the controversial supraspecific position of this species, molecular evidence indicates a close relationship between *S. goinorum* and *S. vigilans* (B. Noonan and CBA, unpub.).

Selected references: Solano (1971); Duellman and de Sá (1988); La Marca (1992); Mijares and Hero (1997); Barrio-Amorós (1998, 2004); Mijares et al. (1998); Suárez-Mayorga and Lynch (2001); Barrio-Amorós et al. (2006c); Rojas-Runjaic et al. (2007, 2008); Lynch and Suárez-Mayorga (2011); Smith et al. (2011); Frost (2016).

Subfamily Scinaxinae

Duellman, Marion and Hedges, 2016

Remarks: Duellman et al. (2016) erected this new subfamily for two of four genera (*Scinax* and *Sphaenorhynchus*) present in Venezuela.

Genus *Scinax* Wagler, 1830

Type species: *Hyla aurata* Wied-Neuwied, 1821, by subsequent designation of Stejneger (1907).

Scinax baumgardneri (Rivero 1961)*

Holotype: MCZ 28563.

Type locality: “Casa de Julián, entre Tapara y Caño Chana, 609 m, Estado Amazonas, Venezuela”.

Distribution: Region 4. Known from type locality and two other localities (La Culebra and Puerto Ayacucho) in Venezuelan Amazonia.

Remarks: In the *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005). *Scinax lindsayi* Pyburn, 1992 from Vaupes River between Brazil and

Colombia seems similar to *S. baumgardneri*, and could be a synonym. Fresh material of both and direct comparison with types could corroborate this supposition.

Selected references: Rivero (1961, 1964b); Fouquette and Delahoussaye (1977); Duellman and Wiens (1992); Duellman (1997); Barrio-Amorós et al. (2004).

Scinax boesemani (Goin 1966)

Holotype: RMNH 12601.

Type locality: Zanderij, Suriname District, Suriname.

Distribution: Region 5. Venezuela, Guyana, Suriname, French Guiana, and northern Brazil. In Venezuela, several localities in Amazonas and Bolívar States.

Remarks: In *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005).

Selected references: Goin (1966); Rivero (1971b); Duellman (1986, 1997); Duellman and Wiens (1992); Gorzula and Señaris (1998); Barrio-Amorós et al. (2004, 2011b); Señaris et al. (2014).

Scinax danae (Duellman 1986)*

Holotype: KU 167073.

Type locality: “km 127 on El Dorado-Santa Elena de Uairen Road, Estado de Bolívar, Venezuela, 1,250 m (05°57'N, 61°27'W).”

Distribution: Region 5. Apparently endemic to type locality and surroundings in the high Sierra de Lema, Bolívar State, Eastern Venezuela. Possibly also present in Guyana.

Remarks: In *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005).

Selected references: Duellman (1986, 1997); Duellman and Wiens (1992); Pyburn (1992); Gorzula and Señaris (1998); Barrio-Amorós et al. (2004); Señaris et al. (2014).

Scinax exiguus (Duellman 1986)*

Holotype: KU 167094.

Type locality: “km 144 on the El Dorado-Santa Elena de Uairén Road in the Gran Sabana, Estado Bolívar, Venezuela, 1,210 m (05°53'N, 61°23'W).”

Distribution: Region 5. Endemic to Gran Sabana in Bolívar State. Possibly also present in Guyana and northern Brazil.

Remarks: In *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005).

Selected references: Duellman (1986, 1997); Duellman and Wiens (1992); Gorzula and Señaris (1998); Barrio-Amorós et al. (2004); Señaris et al. (2014).

Scinax fuscomarginatus (Lutz 1925)

Lectotype: AL-MN 845 designated by Cardoso and Pombal (2010).

Type locality: “Sao Paulo et Bello Horizonte,” Brazil;



164B. *Trachycephalus typhonius*. Male, showing some milky secretions. El Palmar, Bolívar. Photo: César Barrio-Amorós.



165A. *Pseudis paradoxa*. El Palmar, Bolívar. Photo: César Barrio-Amorós.



165B. *Pseudis paradoxa*. El Vigía, Mérida. Photo: César Barrio-Amorós.



166A. *Scarthyla vigilans*. Male calling. Chururú, Táchira. Photo: César Barrio-Amorós.



166B. *Scarthyla vigilans*. Puerto Concha, Zulia. Photo: César Barrio-Amorós.



167. *Scinax baumgardneri*. Capihuara, Casiquiare, Amazonas. Photo: César Barrio-Amorós.

restricted to Belo Horizonte, Minas Gerais, Brazil.

Distribution: Region 5. Wide distribution area, from southern Brazil, Argentina and Paraguay to Venezuela, Guyana, and Suriname. In Venezuela, several localities in Bolívar State, from lowlands north of Sierra de Lema to uplands in the Gran Sabana.

Remarks: In *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005). *Scinax trilineatus* Hoogmoed and Gorzula, 1979 was synonymized with *S. fuscomarginatus* without explanation by Martins (1998). Barrio-Amorós (2004, 2009) doubted the synonymy. More recently, Brusquetti et al. (2014) comprehensively reviewed *Scinax fuscomarginatus* throughout all its

distribution, formally synonymizing *S. trilineatus* with *S. fuscomarginatus*.

Selected references: Literature refers to *S. trilineatus* in Venezuela. Hoogmoed and Gorzula (1979); Duellman (1986); Duellman and Wiens (1992); Gorzula and Señaris (1998); Martins (1998); Barrio-Amorós et al. (2004); Cardoso and Pombal (2010); Brusquetti et al. (2014); Señaris et al. (2014).

Scinax garbei (Miranda-Ribeiro 1926)

Holotype: MZUSP 277.

Type locality: Eirunepé, rio Juruá, Amazonas, Brazil.



168. *Scinax boesemani*. Las Claritas, Bolívar. Photo: Eric Smith.



169. *Scinax danae*. Upper sector of La Escalera, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



170A. *Scinax exiguus*. Male. Kavanayen, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



170B. *Scinax exiguus*. Female. North of Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.



171A. *Scinax fuscomarginatus*. Male. North of Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.



171B. *Scinax fuscomarginatus*. Amplexus. North of Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.

Distribution: Region 4. Colombia, Ecuador, Peru, Bolivia, Brazil, and Venezuela. In Venezuela, one locality (Caño Iguapo, Upper Orinoco) in southern Amazonas State.

Remarks: In *Scinax rostratus* species group (Faivovich et al. 2005).

Selected references: Rivero (1967); Duellman (1970, 1972b).

Scinax kennedyi (Pyburn 1973)

Holotype: UTA A-3697.

Type locality: Around 110 miles ESE from Puerto

Gaitán, Departamento Meta, Colombia.

Distribution: Region 4. Llanos of Colombia and Amazonas State in Venezuela.

Remarks: In *Scinax rostratus* species group (Faivovich et al. 2005). Only locality known in Venezuela is Puerto Ayacucho (Amazonas State), based on the specimens UPR-M 132–137 collected by Juan Rivero and referred by him to *Hyla boulengeri* (Rivero 1961) but retrospectively reidentified by Pyburn (1973) as *S. kennedyi* (La Marca 1992). Despite many herpetologists working for years around Puerto Ayacucho, it has never been reported again in Venezuela.

Selected references: Pyburn (1973); Duellman and



172. *Scinax garbei*. Male. Puyo, Ecuador. Photo: César Barrio-Amorós.



173. *Scinax kennedyi*. Puerto Carreño, Vichada, Colombia. Photo: Juan David Jiménez.



174A. *Scinax manriquei*. Male. Olinda, La Azulita, Mérida. Photo: César Barrio-Amorós.



174B. *Scinax* cf. *manriquei*. Doradas river, Táchira. Photo: César Barrio-Amorós.



175. *Scinax nebulosus*. Male. Cuyuni river, Bolívar. Photo: César Barrio-Amorós.



176A. *Scinax rostratus*. Casa María, Bejuma, Carabobo. Photo: César Barrio-Amorós.

Wiens (1992).

Scinax manriquei

Barrio-Amorós, Orellana and Chacón, 2004

Holotype: CVULA IV-1094.

Type locality: “Mesa Quintero, Guaraque, Estado Merida, Venezuela, 1,700 m, 08°07’N, 71°36’W.”

Distribution: Region 1. Andes of Venezuela (States Mérida and Táchira) and adjacent Colombia (departamento Norte de Santander).

Remarks: *Scinax flavidus* La Marca, 2004 is a junior synonym of *S. manriquei* (Barrio-Amorós et al. 2010d). In *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005).

Selected references: Nieto-Castro (1999); Barrio-Amorós (2004); Barrio-Amorós et al. (2004, 2010d), La

Marca (2004, 2007).

Scinax nebulosus (Spix 1824)

Neotype: MNRJ 4055 (holotype of *Hyla eglerti* Lutz, 1968).

Type locality: “In sylvis prope flumen Teffé,” Amazonas, Brazil. Neotype from Pirarucu pond of the Museu Goeldi in Belem do Para, Pará, Brazil (Hoogmoed and Gruber 1983).

Distribution: Region 5. Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, several localities in Bolívar State (Imataca, Cuyuni, Triunfo).

Remarks: In *Scinax rostratus* species group (Faivovich et al. 2005). Some reports by Rivero (1961) as *Hyla boulengeri* (especially those south of the Orinoco) can be

nebulosus, *garbei*, or *kennedyi*.

Selected references: Hoogmoed and Gruber (1983); Duellman and Wiens (1992); Duellman (1997); Barrio-Amorós et al. (2004, 2011b); Barrio-Amorós and Duellman (2009); Señaris et al. (2009).

Scinax rostratus (Peters 1863)

Holotype: ZMB 3175.

Type locality: Caracas, Venezuela.

Distribution: Regions 2, 3, 4, 6. Widely distributed in northern South America, from Panama and throughout Colombia, Venezuela, and Guyana to northern Brazil. Widespread in the lowlands of Venezuela.

Remarks: In *Scinax rostratus* species group (Faivovich et al. 2005). Rivero (1961) reported several specimens as *Hyla Boulengeri*. A complex of species, involving at least two different taxa only in Venezuela (CBA, unpub. data). A major review is needed to clarify its taxonomic status and the whole *S. rostratus* species group. In northwestern Venezuela, specimens of *S. rostratus* should be compared with *Scinax Boulengeri* (Cope 1887).

Selected references: Ginés (1959); Rivero (1961, 1964a,b, 1967a, 1968g); Tello (1968); Duellman (1970, 1972b, 1997); Fouquette and Delahoussaye (1977); Duellman and Wiens (1992); Hero and Mijares (1995); Yústiz (1996); Señaris et al. (2014).

Scinax ruber (Laurenti 1768)

Neotype: RMNH 15922B.

Type locality: “America.” Neotype from Paramaribo, Surinam.

Distribution: Regions 2, 5. Widely distributed through the Guiana Shield Basin (northeastern Brazil, south and eastern Venezuela, Guyana, Suriname, French Guiana), Trinidad and Tobago, and St. Lucia in the Lesser Antilles. Introduced in Puerto Rico. In Venezuela, eastern and SE parts, from Península de Paria (type locality of *Hyla robersimoni*, a synonym) to the northern versant of Sierra de Lema. Not known from the uplands of Gran Sabana.

Remarks: Distribution and specimens of this species historically confused in Venezuela with those of *Scinax x-signatus*. Fouquet et al. (2007) showed at least six cryptic species could be hidden under that name. All previously mentioned *S. ruber* from Amazonian Brazil, Colombia, Ecuador, Peru, and Bolivia, as well as Trans-Andean, are representatives of other, undescribed taxa. Since neotype locality is Surinam, *Scinax ruber sensu stricto* occurs from eastern Venezuela and Trinidad to northeastern Brazil through the Guianas, being a Guianan endemic (Hoogmoed 1979b). In *Scinax ruber* clade (Faivovich et al. 2005). Barrio-Amorós and Ortiz (2015) comment on type material of the synonym *Hyla robersimoni* Donoso-Barros, 1966.

Selected references: Daudin (1803); Günther (1858); Ginés (1959); Rivero (1961, 1964a,b, 1967c, 1968g,

1969a); Heatwole et al. (1965); Donoso-Barros (1966); Duellman (1972b, 1979a, 1986, 1997); Fouquette and Delahoussaye (1977); Hoogmoed and Gorzula (1979); Hoogmoed and Gruber (1983); Gorzula (1985a); Duellman and Wiens (1992); Barrio-Amorós et al. (2004, 2011b); Fouquet et al. (2007); Señaris et al. (2014); Barrio-Amorós and Ortiz (2015).

Scinax wandae (Pyburn and Fouquette 1971)

Holotype: USNM 192305.

Type locality: “12 km NNE of Villavicencio, Meta, Colombia, elevation about 580 m.”

Distribution: Regions 1, 3. Llanos of Colombia, and Amazonian lowlands, eastern slopes of Andes and Upper Llanos of Venezuela (Amazonas, Bolívar, Apure, and Barinas States).

Remarks: In *Scinax ruber* clade, but not assigned to any species group (Faivovich et al. 2005).

Selected references: Pyburn and Fouquette (1971); Lynch and Vargas-Ramirez (2000); Barrio and Fuentes (2003); Barrio and Chacón-Ortiz (2004); Barrio-Amorós et al. (2004).

Scinax x-signatus (Spix 1824)

Holotype: ZSM 2494/0 (lost).

Type locality: Bahia, Brazil.

Distribution: Regions 2, 3, 4, 5, 6. Eastern, southeastern, and southern Brazil, Colombia, Venezuela, Guyana, and Suriname. There are at least five species in Venezuela under this name [not three as Barrio-Amorós (2004) referred]. All inhabit non-heavily forested habitats, i.e., temporarily flooded savannas and dry forests to rainforests. Each of the five found in distinct locations: Maracaibo Lake Basin; Coastal Range; the Llanos region; Gran Sabana Region; and Isla de Margarita (Ugueto and Rivas Fuenmayor 2010).

Remarks: The type of *Scinax x-signatus* is lost (Hoogmoed and Gruber 1983), so it is not possible to review the *x-signatus* group until a neotype is designated.

Selected references: Spix (1824); Rivero (1969a); León-Ochoa (1975); Fouquette and Delahoussaye (1977); Hoogmoed and Gorzula (1979); Rada (1981); Hoogmoed and Gruber (1983); Duellman (1986, 1997); Ramo and Busto (1989, 1990); Duellman and Wiens (1992); Gorzula and Señaris (1998); Barrio-Amorós et al. (2004, 2011b); Tárano (2010); Ugueto and Rivas Fuenmayor (2010); Señaris et al. (2014).

Genus *Sphaenorhynchus* Tschudi, 1838

Type species: *Hyla lactea* Daudin, 1802, by original designation.

Sphaenorhynchus lacteus (Daudin 1800)



176B. *Scinax rostratus*. Caño Caiman, Apure-Barinas frontier. Photo: César Barrio-Amorós.



177A. *Scinax ruber*. Day color. Las Claritas, Bolívar. Photo: César Barrio-Amorós.



177B. *Scinax ruber*. Night color. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.



178. *Scinax wandae*. Arassari Rafting Camp, Acequias, Barinas. Photo: César Barrio-Amorós.



179A. *Scinax x-signatus*. Parque Los Caobos, Caracas. Photo: César Barrio-Amorós.



179B. *Scinax x-signatus*. Pagüey river, Barinas. Photo: César Barrio-Amorós.



179C. *Scinax x-signatus*. Arassari Rafting Camp, Acequias river, Barinas. Photo: César Barrio-Amorós.



179D. *Scinax x-signatus*. Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.

Holotype: MNHNP 4871.

Type locality: Brazil.

Distribution: Region 5. Orinoco and Amazon Basins (Colombia, Ecuador, Bolivia, Brazil, Venezuela, Guyana, Suriname, French Guiana), and on the island of Trinidad (Trinidad and Tobago). In Venezuela, only a few localities in the south and east (Amazonas, Bolívar, Delta Amacuro, Monagas, and Sucre states).

Selected references: Rivero (1961, 1969b); Hoogmoed and Gorzula (1979); Duellman and Lynch (1981); Duellman (1997); Barrio and Rivero (1999b); Barrio-Amorós et al. (2011b).

Family Leptodactylidae Werner, 1896 (1838)

Remarks: This family has undergone a massive change of its member taxa since the widespread use of molecular data. Prior to 2004, the nomenclature was quite stable, but Darst and Cannatella (2004) demonstrated Leptodactylidae to be paraphyletic. After several revisions of the major clades of Amphibia (Frost et al. 2006; Grant et al. 2006; Pyron and Wiens 2011; De Sá et al. 2014), it is now mostly restricted to the old Leptodactylinae plus Leiuperinae and Paratelmatobiinae.

Subfamily Leptodactylinae Werner, 1896 (1838)

Genus *Adenomera* Fitzinger, 1867

Type species: *Adenomera marmorata* Steindachner, 1867, by monotypy.

Remarks: Frost et al. (2006) synonymized *Adenomera* with *Leptodactylus*, which was not widely followed. Pyron and Wiens (2011) recognized *Adenomera* and *Lithodytes* as separate genera.

Adenomera andreae (Müller 1923)

Holotype: ZSM 136/1911.

Type locality: “Peixeboi (a.d. Bragançabahn), Staat Pará, Brasilien.”

Distribution: Regions 4, 5. Widely distributed in lowlands east of the Andes, including Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Guyana, Suriname, and French Guiana. In Venezuela, common in lowlands south of Orinoco River.

Remarks: The reported *Adenomera andreae* from the eastern slopes of Venezuelan Andes (Barrio-Amorós 2004) are actually *A. simonstuarti* (see Appendix 1).

Selected references: Heyer (1973, 1977); Rivero et al. (1986); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós (2010); Barrio-Amorós et al. (2011b); Fouquet et al. (2014).

Adenomera hylaedactyla (Cope 1868)

Holotype: ANSP 2240.

Type locality: “From the Napo or upper Marañon River,” Perú.

Distribution: Regions 4, 5. Widely distributed in lowlands east of the Andes, including Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Guyana, Suriname, and French Guiana. In Venezuela, common in lowlands south of Orinoco River.

Selected references: Ginés (1959); Rivero (1961, 1963c, 1964a-c, 1967a); Heyer (1973, 1977); Rivero et al. (1986); Duellman (1997); Gorzula and Señaris (1998); Lynch and Vargas-Ramírez (2000); Barrio-Amorós et al. (2011b); Fouquet et al. (2014); Señaris et al. (2014).

Genus *Leptodactylus* Fitzinger, 1826

Type species: *Rana typhonia* Latreille, in Sonnini and Latreille, 1801 (= *Rana fusca* Schneider, 1799), by subsequent designation by Fitzinger (1843).

Remarks: Following De Sá et al. (2014), the old phenetic groups of *Leptodactylus* established by Heyer are no longer stable. All species now under *L. fuscus*, *L. latrans*, *L. melanonotus*, and *L. pentadactylus* species groups.

Leptodactylus bolivianus

Boulenger, 1898

Lectotype: MSNG 28875A.

Type locality: Barraca, Río Madidi, Bolivia (by designation of the Lectotype).

Distribution: Region 4. Widely distributed in Amazon Region, including Venezuela, Colombia, Peru, Bolivia, and NW Brazil. In Venezuela, lowlands south of Orinoco River.

Remarks: Heyer and De Sá (2011) reviewed the *L. bolivianus* complex, ascribing the northern Venezuelan specimens to *L. insularum* (as did Rivero 1967a, c), and Barrio-Amorós (1998, 2004, 2009). In the *Leptodactylus latrans* species group of De Sá et al. (2014).

Selected references: Many of these apply to *L. insularum sensu* Heyer and De Sá, 2011. Alemán (1952); Ginés (1959); Rivero (1961, 1964a–d, 1967a); Heatwole et al. (1965); Tello (1968); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rivero et al. (1986); Yústiz (1996); Duellman (1997); Heyer and De Sá (2011); De Sá et al. (2014).

Leptodactylus colombiensis Heyer, 1994

Holotype: ICN 7409.

Type locality: “Charalá, Virolín (= Inspección Policía Cañaverales), confluencia del río Cañaverales con el río Guillermo, vertiente occidental, 1,600–1,700 m, 6°13’N, 73°05’W,” Santander Department, Colombia.

Distribution: Region 1. Colombia and Venezuela. In Venezuela, eastern Andean slopes of Táchira State.

Remarks: De Sá et al. (2014) doubt Venezuelan records (Barrio and Chacón 2001) without explanation. Specimens



179E. *Scinax x-signatus*. Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.



179F. *Scinax x-signatus*. Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.



180. *Sphaenorhynchus lacteus*. Male. El Palmar, Bolívar. Photo: César Barrio-Amorós.



181. *Engystomops pustulosus*. Arassari Rafting Camp, Acequias river, Barinas. Photo: César Barrio-Amorós.



182. *Physalaemus cuvieri*. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.



183. *Physalaemus ephippifer*. Santa Elena de Uairén, Bolívar. Photo: César Barrio-Amorós.

CVULA 5638–42 conform to diagnostic characters in Heyer (1994a). In *Leptodactylus melanonotus* species group of De Sá et al. (2014).

Selected references: Heyer (1994a); Barrio and Chacón (2001); De Sá et al. (2014).

Leptodactylus diedrus Heyer, 1994

Holotype: UTA A–3726.

Type locality: “Colombia, Vaupés, 1/2 mi NE Timbó, 1°06’N, 70°01’W.”

Distribution: Regions 4, 5. Western Amazonia

(Colombia, Venezuela, Peru, and Brazil). In Venezuela, only from extreme south of Amazonas (Neblina) and Bolívar (Sarisariñama) States.

Remarks: *Vanzolinius discodactylus* (Boulenger 1884) reported by McDiarmid and Paolillo (1988) from base of Neblina, but specimen later assigned to *Leptodactylus diedrus* (Heyer 1997). In *Leptodactylus melanonotus* species group of De Sá et al. (2014).

Selected references: McDiarmid and Paolillo (1988); Heyer (1994a, 1998); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós et al. (2011b); De Sá et al. (2014).

Leptodactylus fragilis (Brocchi 1877)

Type: MNHNP 6316.

Type locality: “Tehuantepec,” Oaxaca, Mexico.

Distribution: Regions 3, 4, 6. Widely distributed: southern USA (Texas), Central America to northern Colombia and Venezuela. In Venezuela, lowlands north of Orinoco River.

Remarks: Probably a complex of species (CBA, unpub. data). Nomenclatorial history in Heyer and Dubois (1978, 2002) and Heyer (2002). In *Leptodactylus fuscus* species group of De Sá et al. (2014).

Selected References: Staton and Dixon (1977); Heyer (1978, 2002); Ramo and Busto (1989, 1990); Dubois and Heyer (1992); Tárano (2010); De Sá et al. (2014).

Leptodactylus fuscus (Schneider 1799)

Neotype: MNHNP 680.

Type locality: Not designated. Neotype from “Surinam.”

Distribution: Regions 2, 3, 4, 5, 6. Widespread in lowlands from Panama through South America to east of Andes (Colombia, Venezuela, Trinidad and Tobago, Guyana, Suriname, French Guiana, Brazil, Bolivia, Paraguay, and northern extreme of Argentina). In Venezuela, widely distributed in lowlands throughout country, including Margarita Island.

Remarks: A complex of species. In *Leptodactylus fuscus* species group of De Sá et al. (2014).

Selected references: Ginés (1959); Rivero (1964a-d, 1967a); Heatwole et al. (1965); Tello (1968); Bogart (1974); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Péfaur and Díaz De Pascual (1987); Solano (1987a,b); Ramo and Busto (1989, 1990); Magdefrau et al. (1991); Manzanilla et al. (1995); Duellman (1997); Gorzula and Señaris (1998); Barrio-Amorós (2010a); Tárano (2010); Ugueto and Rivas-Fuenmayor (2010); Barrio-Amorós et al. (2011b); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus guianensis Heyer and de Sá, 2011

Holotype: USNM 531509.

Type locality: “Guyana; Rupunini, Iwokrama Forest Reserve, Sipuruni River, Pakatau Camp, 4°45'17"N, 59°01'28"W, 85 m.”

Distribution: Region 5. Lowlands and uplands of Guiana Shield in Venezuela, Guyana, Suriname, and Brazil. In Venezuela, only from eastern Bolívar State.

Remarks: Records from eastern part of Venezuelan Guayana previously assigned to *Leptodactylus bolivianus* are actually *L. guianensis* (e.g., Barrio-Amorós et al. (2011b) from Triunfo). In *Leptodactylus latrans* species group of De Sá et al. (2014).

Selected references: Rivero et al. (1986); Barrio-Amorós et al. (2011b); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus insularum Barbour, 1906

Lectotype: MCZ 2424.

Type locality: “Saboga island,” Bahía de Panamá, Panamá.

Distribution: Regions 2, 3, 4, 6. From Costa Rica in Central America through Panamá and Colombia (incl. San Andrés Island) to Venezuela and Trinidad and Tobago. In Venezuela, common in lowlands north of Orinoco River.

Remarks: Considered a synonym of *Leptodactylus bolivianus* by Heyer (1968) and Savage (2002); Rivero (1967a,c) found important differences, e.g., one spine on thumb in *L. bolivianus*, vs. two in *L. insularum*. Barrio-Amorós (1998, 2004) differentiated between *insularum* north of Orinoco and *bolivianus* to the south. Heyer and De Sá (2011) resolved the question. In *Leptodactylus latrans* species group of De Sá et al. (2014).

Selected references: Sexton (1962); Rivero (1967a,c); Heyer (1968); Bogart (1974); Rivero et al. (1986); Manzanilla et al. (1995); Savage (2002); Tárano (2010); Barrio-Amorós et al. (2011b); Heyer and De Sá (2011); De Sá et al. (2014).

Leptodactylus knudseni Heyer, 1972

Holotype: LACM 72117.

Type locality: “Limoncocha, 0°24'S, 76°37'W, Provincia de Napo, Ecuador.”

Distribution: Regions 4, 5. Widely distributed in Amazon Basin, incl. Bolivia, Peru, Ecuador, Colombia, Brazil, Venezuela, Guyana, Suriname, French Guiana, and Trinidad and Tobago. In Venezuela, widespread south of Orinoco River.

Remarks: In *Leptodactylus pentadactylus* species group of De Sá et al. (2014).

Selected references: Heyer (1972, 1979, 2005); Hero and Galatti (1990); Barrio (1996a); Gorzula and Señaris (1998); Barrio-Amorós et al. (2011b); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus leptodactyloides (Andersson 1945)

Type: NHRM 1945.

Type locality: “Rio Pastaza,” eastern Ecuador.

Distribution: Region 5. Amazon Basin (Colombia, Ecuador, Peru, Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana). Only single locality in Venezuela: Río Cuyuni, km 69 on road to Santa Elena de Uairén, Bolívar State. Probably widespread in southeastern lowlands.

Remarks: Sister taxon of *Leptodactylus petersii*. In *Leptodactylus melanonotus* species group of De Sá et al. (2014).

Selected references: Heyer (1994); Duellman (1997); De Sá et al. (2014).



184. *Physalaemus fisheri*. Las Claritas, Bolívar. Photo: Eric Smith.



185. *Pleurodema brachyops*. San Vicente, Apure. Photo: César Barrio-Amorós.



186. *Pseudopaludicola boliviana*. Lower Caura river basin, Bolívar. Photo: Fernando Rojas-Runjaic.



187A. *Pseudopaludicola llanera*. Puerto Ayacucho, Amazonas. Photo: Zelimir Cernelic.



187B. *Pseudopaludicola llanera*. Puerto Ayacucho, Amazonas. Photo: Fernando Rojas-Runjaic.



188. *Pseudopaludicola pusilla*. Barrancabermeja, Santander, Colombia. Photo: Juan S. Mendoza.



189. *Adenomera andreae*. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.



190A. *Adenomera hylaedactyla*. Lower Serranía del Cuao, Amazonas. Photo: Fernando Rojas-Runjaic.



190B. *Adenomera* cf. *hylaedactyla*. Palmichal, Bejuma, Carabobo.
Photo: César Barrio-Amorós.



191. *Adenomera* cf. *simonstuarti*. San Ramón, Calderas, Barinas.
Photo: César Barrio-Amorós.



192. *Leptodactylus colombiensis*. Doradas river valley, Táchira.
Photo: César Barrio-Amorós.



193. *Leptodactylus fragilis*. Pagüey river, Barinas. Photo: César Barrio-Amorós.



194A. *Leptodactylus fuscus*. San Vicente, Apure. Photo: César Barrio-Amorós.



194B. *Leptodactylus fuscus*. Imataca, Delta Amacuro. Photo: César Barrio-Amorós.



195. *Leptodactylus guianensis*. Female. Triunfo, Eastern sector of Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



196A. *Leptodactylus insularum*. Male. Pagüey river, Barinas. Photo: César Barrio-Amorós.



196B. *Leptodactylus insularum*. Female. Pagüey river, Barinas. Photo: César Barrio-Amorós.



196C. *Leptodactylus insularum*. El Vigía, Mérida. Photo: César Barrio-Amorós.



197. *Leptodactylus knudseni*. Las Claritas, Bolívar. Photo: César Barrio-Amorós.



198. *Leptodactylus lithonaetes*. Raudal del Danto, Autana, Amazonas. Photo: César Barrio-Amorós.



199. *Leptodactylus longirostris*. Salto Ángel, Auyan-tepui, Bolívar. Photo: Fernando Rojas-Runjaic.



200. *Leptodactylus* aff. *macrosternum*. Pagüey river, Barinas. Photo: César Barrio-Amorós.

Leptodactylus lithonaetes Heyer, 1995

Holotype: AMNH. 100656.

Type locality: “Venezuela: Amazonas, SW sector Cerro Yapacana, 600 m, 3° 57’N, 67° 00’W.”

Distribution: Regions 4, 5. Western Guiana Shield (Colombia and Venezuela). In Venezuela, restricted to rocky outcrops of extreme southeastern Apure State, Amazonas, and northwestern Bolívar State.

Remarks: Heyer and Barrio-Amorós (2009) describe the call. Sister species of *Leptodactylus rugosus*. In *Leptodactylus pentadactylus* species group of De Sá et al. (2014).

Selected references: Donnelly and Myers (1991); Heyer

(1995); Lynch and Vargas-Ramírez (2000); Heyer and Heyer (2001); Heyer and Barrio-Amorós (2009); De Sá et al. (2014).

Leptodactylus longirostris Boulenger, 1882

Lectotype: BM 76.5.26.4.

Type locality: “Santarem,” Pará, Brazil.

Distribution: Region 5. Widespread in Guiana Shield of Colombia, Venezuela, Guyana, Suriname, and northern Brazil. In Venezuela, restricted to south of the Orinoco River.

Remarks: In *Leptodactylus fuscus* species group of De Sá et al. (2014).

Selected references: Rivero (1971a); Heyer (1978);

Crombie and Heyer (1983); Donnelly and Myers (1991); Magdefrau et al. (1991); Duellman (1997); Gorzula and Señaris (1998); Heyer and Heyer (2001); Barrio-Amorós and Duellman (2009); Señaris et al. (2009, 2014); Barrio-Amorós et al. (2011b); De Sá et al. (2014).

Leptodactylus magistris

Mijares-Urrútia, 1997*

Holotype: EBRG 3284.

Terra typica: “Cerro Socopó, cerca de 30 km (por carretera) al SO de Guajiro, Municipio Mauroa, Estado Falcón, Venezuela, cerca de 1,250 m.”

Distribution: Region 2. Known only from type locality.

Remarks: Despite recent efforts to find it, *Leptodactylus magistris* seems to have suffered a severe decline. No new information since its description. Considered Critically Endangered by the Venezuelan Red Book (La Marca et al. 2015). In *Leptodactylus melanonotus* species group of De Sá et al. (2014).

Selected references: Mijares-Urrútia (1997); De Sá et al. (2014); La Marca et al. (2015).

Leptodactylus mystaceus (Spix 1824)

Lectotype: ZSM 2504/0.

Type locality: Restricted to “Solimões,” Brazil, by lectotype designation.

Distribution: Regions 4, 5. Widely distributed in Amazon Basin and northern portion of the Atlantic Forest in Brazil, Colombia, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, widespread south of Orinoco River. Localities north of Orinoco must be reviewed, probably a new species.

Remarks: In *Leptodactylus fuscus* species group of De Sá et al. (2014).

Selected references: Ginés (1959); Rivero (1961, 1964b, 1968e); Roze (1964); Heatwole et al. (1965); Bogart (1974); Heyer (1978, 1983); Rivero et al. (1986); La Marca (1992); Duellman (1997); Gorzula and Señaris (1998); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus pentadactylus (Laurenti 1768)

Neotype: RMNH 29559.

Type locality: “Suriname, Marowijne, Lelygebergte, Suralcokamp.”

Distribution: Region 4, 5. Widespread in Amazon Region of Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil, Guyana, Suriname, and French Guiana. In Venezuela, in lowland forest south of Orinoco River.

Remarks: Vouchers absent from Venezuelan museums; all *pentadactylus*-like frogs from southern Venezuela identified as *Leptodactylus knudseni*. Heyer’s (2005) review of the *pentadactylus* species group does not mention any voucher from Venezuela. Removed from previous lists by Barrio-Amorós (2009) without

explanation. De Sá et al. (2014) show four Venezuelan localities in a distribution map, but without vouchers. In *Leptodactylus pentadactylus* species group of De Sá et al. (2014). May be distinguished from *L. knudseni* by absence of chest spines in reproductive males of *L. pentadactylus* (present in *L. knudseni*).

Selected references: Rivero (1964b,d, 1969a); Heatwole et al. (1965); Bogart (1974); Muedeking and Heyer (1976); Heyer (1979, 2005); Hero and Galatti (1990); Duellman (1997); Gorzula and Señaris (1998); De Sá et al. (2014).

Leptodactylus petersii (Steindachner 1864)

Holotype: Lost; formerly in the NMW.

Type locality: “Marabitanas,” Amazonas, Brazil.

Distribution: Regions 4, 5. Widely distributed in Amazon Region (Venezuela, Colombia, Peru, Bolivia, Brazil, Guyana, Suriname, and French Guiana) south to the Cerrado in central Brazil. Two recent confirmed records for Venezuelan southern part of Amazonas State and eastern border of Bolívar State.

Remarks: In *Leptodactylus melanonotus* species group *sensu* De Sá et al. (2014). Sister taxon of *L. leptodactyloides*. Records of specimens in Venezuelan museum indicates widespread in lowlands of almost all the country, but many specimens could be other species of *Leptodactylus melanonotus* group; species identification in this group is very challenging. The map in De Sá et al. (2014) is misplaced with that of *Leptodactylus pascoensis* and only shows two localities in southern Venezuela.

Selected references: Ginés (1959); Rivero (1963c, 1964a-d, 1971b); Heatwole et al. (1965); Heyer (1994); Duellman (1997); Tárano (2010); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus poecilochilus (Cope 1862)

Syntype: USNM 4347.

Type locality: “Near Turbo,” Antioquía, Colombia.

Distribution: Regions 2, 3, 6. From Pacific lowlands of northwestern Costa Rica through Panama and northern Colombia to northwestern Venezuela.

Remarks: In *Leptodactylus fuscus* species group of De Sá et al. (2014).

Selected references: Rivero (1961, 1963a,c, 1964a, 1971a); Rivero and Esteves (1969); Heyer (1978); La Marca (1992); Yústiz (1996); De Sá et al. (2014).

Leptodactylus rhodomystax Boulenger, 1884

Lectotype: BMNH 1947.12.17.81.

Type locality: “Yurimaguas, Huallaga River, (Loreto) Northern Peru.”

Distribution: Region 5. Amazonian Region of Colombia, Ecuador, Peru, Bolivia, Guyana, Suriname, French Guiana, and Brazil. In Venezuela, only La Escalera,



201. *Leptodactylus mystaceus*. Lower Caura river basin, Bolívar. Photo: Fernando Rojas-Runjaic.



202. *Leptodactylus pentadactylus*. Yasuni, Ecuador. Photo: César Barrio-Amorós.



203A. *Leptodactylus petersii*. Male. Parque Los Caobos, Caracas. Photo: César Barrio-Amorós.



203B. *Leptodactylus petersii*. Female. Parque Los Caobos, Caracas. Photo: César Barrio-Amorós.



204. *Leptodactylus poecilochilus*. Riecito Maché, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



205A. *Leptodactylus rhodomystax*. Juvenile. Las Lajas, Canaima National Park, Bolívar. Photo: Edward Camargo.



205B. *Leptodactylus rhodomystax*. Juvenile. Ecuador. Photo: Luis Coloma.



206A. *Leptodactylus riveroi*. Capihuara, Casiquiare, Amazonas. Photo: César Barrio-Amorós.

Bolívar State (Camargo et al. 2014).

Remarks: First mention in Venezuela is by Rivero (1961), who was not sure if it was a new species (Rivero 1968e), but decided to use this name. Later Heyer and Pyburn (1983) described the taxon referred by Rivero (1968e) as a new species (*Leptodactylus riveroi*). Gorzula and Señaris (1998) confused a large specimen of *L. guianensis* (as *L. bolivianus*) with *L. rhodomystax*. De Sá et al. (2014) indicate a locality in Venezuela, but no voucher or locality data are mentioned. Camargo et al. (2014) provide the first voucher for the country. In *Leptodactylus pentadactylus* species group of De Sá et al. (2014).

Selected references: Rivero (1968e); Heyer (1979, 2005); Heyer and Pyburn (1983); Gorzula and Señaris (1998); Camargo et al. (2014); De Sá et al. (2014).

Leptodactylus riveroi Heyer and Pyburn, 1983

Holotype: USNM 232400.

Type locality: “Colombia, Vaupés, Timbó, 01°06’S, 70°01’W, elevation 170 m.”

Distribution: Region 4. Colombia, Venezuela, and northern Brazil. In Venezuela, riverine lowlands of Amazonas State.

Remarks: *Leptodactylus rhodomystax* was erroneously reported from Venezuela (Rivero 1961, 1968e) based on specimens of *L. riveroi*. In *Leptodactylus melanonotus* species group of De Sá et al. (2014).

Selected references: Rivero (1968e); Heyer and Pyburn (1983); Lima (1992); Gorzula and Señaris (1998); Lynch and Vargas-Ramírez (2000); Barrio-Amorós and Brewer-Carías (2008); De Sá et al. (2014).

Leptodactylus rugosus Noble, 1923

Holotype: AMNH 1169.

Type locality: “near Kaieteur Falls, British Guiana.”

Distribution: Region 5. Venezuela and Guyana. In Venezuela, in lowlands and uplands of eastern Guiana shield (Bolívar State) including summits of some tepuis.

Remarks: In *Leptodactylus pentadactylus* species group of De Sá et al. (2014).

Selected references: Ginés (1959); Rivero (1961, 1964b,d, 1968d); Heatwole et al. (1965); Heyer (1979, 1995); Hoogmoed and Gorzula (1979); Donnelly and Myers (1991); Magdefrau et al. (1991); Duellman (1997); Gorzula and Señaris (1998); Heyer and Thompson (2000); Barrio-Amorós and Duellman (2009); Heyer and Barrio-Amorós (2009); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus sabanensis Heyer, 1994*

Holotype: KU 166559.

Type locality: “Venezuela; Bolívar; km 127, El Dorado-Santa Elena de Uairen road, 1,250 m, 6°00’N, 61°30’W.”

Distribution: Region 5. Gran Sabana in eastern Venezuela and adjacent Lavrado in Roraima, Brazil.

Remarks: In the *Leptodactylus melanonotus* species group of De Sá et al. (2014).

Selected references: Heyer (1994); Duellman (1997); Gorzula and Señaris (1998); De Sá et al. (2014); Señaris et al. (2014).

Leptodactylus turimiquensis Heyer, 2005

Holotype: AMNH 70667

Type locality: “Caripito, Monagas, Venezuela, ~ 100 m, 10°08’N, 63°06’W.”

Distribution: Region 2. Endemic from northeastern Venezuela, from Macizo de Turimiquire (Anzoátegui, Monagas and Sucre States) to Península de Paria.

Remarks: Heyer (2005) described this species based on a population previously assigned to *Leptodactylus labyrinthicus*. In *pentadactylus* species group of De Sá et al. (2014).

Selected references: Spix (1824); Günther (1858); Heyer (1979); Péfaur and Sierra (1995); Gorzula and Señaris (1998).

Leptodactylus validus Garman, 1888

Lectotype: MCZ A-71920.

Type locality: “Kingston, St. Vincent,” Lesser Antilles.

Distribution: Regions, 2, 3, 4, 5, 6. Lesser Antilles, Trinidad and Tobago, Venezuela, Guyana, Suriname, and French Guiana. Widely distributed in lowland Venezuela, north and south of Orinoco River.

Remarks: Includes all previous references for *Leptodactylus podicipinus*, *L. wagneri*, and *L. pallidirostris* from Venezuela. Synonymy by Yanek et al. (2006). In *melanonotus* species group of De Sá et al. (2014).

Selected references: Ginés (1959); Rivero (1961, 1963c, 1964a-d, 1968e); Heatwole et al. (1965); Rivero and Esteves (1969); Bogart (1974); Hoogmoed and Gorzula (1979); Rivero et al. (1986); Donnelly and Myers (1991); Heyer (1994); Gorzula and Señaris (1998); Yanek et al. (2006); Camargo et al. (2009); De Sá et al. (2014).

Genus *Lithodytes* Fitzinger, 1843

Type species: *Hylodes lineatus* Duméril and Bibron, 1841 (= *Rana lineata* Schneider, 1799), by original designation.

Remarks: Frost et al. (2006) synonymized *Lithodytes* within *Leptodactylus*, but not widely followed. Pyron and Wiens (2011) and de Sá et al. (2014) recognize *Adenomera* and *Lithodytes* as valid genera.

Lithodytes lineatus (Schneider 1799)

Holotype(s): “Musei Lampiani” (= the “collection de



206B. *Leptodactylus riveroi*. Niñal, Casiquiare, Amazonas. Photo: Fernando Rojas-Runjaic.



207. *Leptodactylus rugosus*. El Playón, Caura river, Bolívar. Photo: César Barrio-Amorós.



208. *Leptodactylus sabanensis*. Chivatón, Gran Sabana. Photo: César Barrio-Amorós.



209. *Leptodactylus turimiquensis*. Las Melenas, Península de Paria, Sucre. Photo: César Barrio-Amorós.



210. *Leptodactylus validus*. Apure river, Apure. Photo: César Barrio-Amorós.



211A. *Leptodactylus* sp. 1. Lagunillas, Mérida. Photo: César Barrio-Amorós.

Lampi” according to Daudin 1802: 105, and Daudin 1803, 8: 188).

Type locality: Not stated.

Distribution: Regions 1, 4, 5, 6. East of Andes from northwestern Venezuela through Guyana, Suriname, French Guiana, Brazil, Colombia, Ecuador, and Peru to northern Bolivia. In Venezuela, disjunct populations south of Orinoco River, eastern slopes of Andes and Maracaibo Basin (west of Andes).

Remarks: Fouquet et al. (2007) found genetic divergence

in two populations of *Lithodytes* from Brazil and Peru. Disjunct populations of *Lithodytes* in Venezuela may represent undescribed species.

Selected references: Ginés (1959); Rivero (1961, 1964b); Lynch (1979b); Barrio-Amorós (1999d); Barros and Barrio (2001); Señaris et al. (2009, 2014); Barrio-Amorós et al. (2011b).

Subfamily Leiuperinae Bonaparte, 1850

Remarks: Grant et al. (2006) placed several genera into

family Leiuperidae, from a Leptodactylidae *sensu lato*. Pyron and Wiens (2011) ranked the taxon as a subfamily, which is supported by Faivovich et al. (2012).

Genus *Engystomops* Jiménez de la Espada, 1872

Type species: *Engystomops petersi* Jiménez de la Espada, 1872, by monotypy.

Engystomops pustulosus (Cope 1864)

Holotype: USNM 4339 (lost).

Type locality: “New Grenada, on the River Truando,” Colombia.

Distribution: Regions 1, 2, 3, 4, 5, 6. From Mexico through Central America to Colombia, Venezuela, Trinidad and Tobago, and Guyana in northern South America. Widespread in lowlands in northern Venezuela.

Remarks: May hide a complex of species (Wynn and Heyer 2002). At least two clear clades distinguishable, one from Southern Mexico to Costa Rica, another from Panama to northern South America (Weigt et al. 2005). Call has been studied in many localities (Ryan et al. 2007).

Selected references: Lutz (1927); Ginés (1959); Rivero (1961, 1963a, 1964a,c,d); Heatwole et al. (1965); Tello (1968); Rivero and Esteves (1969); Lynch (1970); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Cannatella and Duellman (1984); Yústiz (1996); Duellman (1997); Gorzula and Señaris (1998); Nascimento et al. (2005); Weigt et al. (2005); Ryan et al. (2007); Tárano (2010).

Genus *Physalaemus* Fitzinger, 1826

Type species: *Physalaemus cuvieri* Fitzinger, 1826, by monotypy.

Remarks: A major review of this genus in Venezuela is needed.

Physalaemus cuvieri Fitzinger, 1826

Type: Not stated.

Type locality: Brazil.

Distribution: Region 5. Venezuela, Brazil, Paraguay, and Argentina. In Venezuela, only from one locality in Bolívar State: Hato Terecay, 16 km N of El Manteco (savannah). Herein a second population is reported from Reserva Forestal Rio Grande, Sierra de Imataca, Delta Amacuro State (MHNLS 20220–20223).

Remarks: In *Physalaemus cuvieri* species group of Lourenço et al. (2015). These authors noted this name represents a complex of species. Gorzula and Señaris (1999) indicated specimens referred for Venezuela as *Physalaemus cuvieri* may be a related but undescribed species.

Selected references: Gorzula and Señaris (1999); Lourenço et al. (2015).

Physalaemus ephippifer (Steindachner 1864)

Holotype: NHMW; not traced.

Type locality: Restricted to Belém, Pará State, Brazil, by Bokerman (1966).

Distribution: Region 5. Venezuela, Guyana, Suriname, French Guiana, and northeastern Brazil. In Venezuela, only from a few localities in Bolívar State: Calceta de Perro (rainforest), Las Claritas, and Santa Elena de Uairen. Confused with *P. fischeri* and probably most references to *Physalaemus fischeri* from eastern Venezuela correspond to *P. ephippifer*.

Remarks: In *Physalaemus cuvieri* species group of Nascimento et al. (2005).

Selected references: Gorzula and Señaris (1998); Nascimento et al. (2005).

Physalaemus fischeri (Boulenger 1890)

Holotype: BMNH 1947.2.18.28.

Type locality: “Venezuela.”

Distribution: Regions 1, 2, 3, 4, 5. Llanos of Colombia and Venezuela. Widespread in Northern Venezuela (Cojedes, Guárico, Barinas, and Apure States), and scattered to south of Orinoco River (Amazonas and Bolívar States).

Remarks: *Physalaemus enesefae* Heatwole, Solano and Heatwole, 1965 is a junior synonym of *P. fischeri*. However, *P. fischeri* lacks a specific type locality and is likely a species complex (Tárano and Ryan 2002; Lourenço et al. 2015). Its complex call is well-studied (Tárano 2001, 2002, 2010; Tárano and Herrera 2003; Tárano and Ryan 2002). In *Physalaemus cuvieri* species group of Lourenço et al. (2015).

Selected references: Boulenger (1890); Parker (1927); Rivero (1961, 1967a); Heatwole et al. (1965); La Marca (1992); Duellman (1997); Gorzula and Señaris (1998); Tárano (2002, 2003, 2010); Barrio-Amorós et al. (2011b); Señaris et al. (2014).

Genus *Pleurodema* Tschudi, 1838

Type species: *Pleurodema bibroni* Tschudi, 1838, by monotypy.

Pleurodema brachyops (Cope 1869)

Syntypes: ANSP 2260–2264.

Type locality: “Magdalene River, New Grenada” (= Colombia).

Distribution: Regions 2, 3, 6. From Panama in Central America through northern Colombia, Venezuela, and Guyana to northern Brazil, plus Margarita Island and the Netherlands Antilles (Curaçao, Aruba, and Bonaire). In Venezuela, widespread in lowlands north of Orinoco River, northern Amazonas State, and eastern Bolívar State south of Orinoco.



211B. *Leptodactylus* sp. 1. El Tao, La Azulita, Mérida. Photo: César Barrio-Amorós.



212A. *Lithodytes lineatus*. Cuyuni river, Bolivar. Photo: César Barrio-Amorós.



212B. *Lithodytes lineatus*. San Isidro, Barinas. Photo: Daniel Quihua.



213. *Adelastes hylonomos*. Paratype MBUCV 6185. Cerro de la Neblina base camp. Photo: Roy McDiarmid.



214. *Chiasmocleis hudsoni*. Casiquiare, Amazonas. Photo: Fernando Rojas-Runjaic.



215. *Ctenophryne geayi*. Imataca Forestal reserve, Delta Amacuro. Photo: César Barrio-Amorós.

Selected references: Lutz (1927); Ginés (1959); Rivero (1961, 1963a,c, 1964b,d, 1969a); Roze (1964); Tello (1968); León-Ochoa and Donoso-Barros (1970); Duellman and Veloso (1977); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Ramo and Busto (1989, 1990); Barrio (1996a); Yústiz (1996); Gorzula and Señaris (1998); Molina (2004 “2002”); Tárano (2010); Ugueto and Rivas Fuenmayor (2010); Faivovich et al. (2012).

Genus *Pseudopaludicola* Miranda-Ribeiro, 1926

Type species: *Liuperus falcipes* Hensel, 1867, by

monotypy.

Pseudopaludicola boliviana Parker, 1927

Holotype: BMNH 1927.8.1.1.

Type locality: “Sta. Cruz, Bolivia.”

Distribution: Region 4. Colombia, Venezuela, Guyana, Suriname, Brazil, Bolivia, Paraguay, and Argentina. In Venezuela, south of Orinoco, but few precise localities known. Besides Castillos de Guayana, Delta Amacuro State (Gorzula and Señaris 1998), herein reported from Capihuara, Casiquiare, Amazonas State, where it was very abundant on river sand beaches in December 1998.

Remarks: This species has a disjunct distribution, widely separated by the Amazon Basin. De la Riva et al. (2000) suggested this greatly disjunct distribution likely indicates at least two distinct species. Myers and Donnelly (2001) presumed that Venezuelan populations correspond to two species. In *Pseudopaludicola pusilla* species group of Lynch (1989).

Selected references: Lynch (1989); Gorzula and Señaris (1998); Lynch and Vargas-Ramírez (2000); Myers and Donnelly (2001).

Pseudopaludicola ilanera Lynch, 1989

Holotype: ICN 13576.

Type locality: “Puerto Gaitán, Departamento Meta, Colombia.”

Distribution: Region 4. Northeastern Colombia and southern Venezuela (Amazonas and Bolívar States); eastern slopes of Andes in Mérida State.

Remarks: In *Pseudopaludicola pusilla* species group of Lynch (1989).

Selected references: Lynch (1989); Gorzula and Señaris (1998); Lynch and Vargas-Ramírez (2000); Myers and Donnelly (2001); Barrio and Chacón (2002).

Pseudopaludicola pusilla (Ruthven 1916)

Holotype: UMMZ 48305.

Type locality: “Fundación, (Sierra de Santa Marta), Colombia.”

Distribution: Region 6. Magdalena River Valley and Caribbean lowlands of Colombia, and Maracaibo Lake Basin in Venezuela.

Remarks: In *Pseudopaludicola pusilla* species group of Lynch (1989).

Selected references: Ginés (1959); Rivero (1961, 1963a, 1964b,d); Lynch (1989).

Family Microhylidae Günther, 1858

Remarks: Two recent phylogenetic systematics papers on Microhylidae (De Sá et al. 2012; Peloso et al. 2016) resulted in substantial changes in the taxonomy of the group, both at subfamily and generic ranks. Both authors found well resolved Gastrophryinae and Otophryinae; the latter erected a new subfamily (Adelastinae). Most generic changes proposed by De Sá et al. (2012) were corroborated by later authors, except for the arrangement of *Syncope* and *Chiasmocleis*. De Sá et al. (2012) transferred several species of *Chiasmocleis* to *Syncope*, whereas Peloso et al. (2014) placed *Syncope* in synonymy of *Chiasmocleis*.

Subfamily Adelastinae Peloso, Frost, Richards, Rodrigues, Donnellan, Matsui, Raxworthy, Biju, Lemmon, Lemmon and Wheeler, 2016

Genus *Adelastes* Zweifel, 1986

Type species: *Adelastes hylonomos* Zweifel, 1986, by original designation.

Adelastes hylonomos Zweifel, 1986

Holotype: AMNH 123696.

Type locality: “Near the Neblina Base Camp on the Rio Baria, 140 m elevation, 00°49’50”N, 66°09’40”W, Rio Negro Department, Amazonas Federal Territory, Venezuela.”

Distribution: Region 4. Venezuela, Brazil, and Guyana. Known from type locality at the southern border of Venezuelan Amazonas, from the proximity of Rio Darahá, tributary of the Rio Negro, municipality of Santa Isabel do Rio Negro, State of Amazonas, northern Brazil (0°23’57.58”S, 064°47’12.98”W), and from Guyana, at plateau above Meamu River.

Remarks: Peloso et al. (2016) place *Adelastes* in its own subfamily Adelastinae. However, we believe it should be relegated as part of Otophryinae, being clustered basally with this last subfamily (Peloso et al. 2016: 136). Call was recently described by De Almeida et al. (2014) based on a single male.

Selected references: Zweifel (1986); McDiarmid and Paolillo (1988); De Almeida et al. (2014); Peloso et al. (2016).

Subfamily Gastrophryinae Fitzinger, 1843

Genus *Chiasmocleis* Méhely, 1904

Type species: *Engystoma albopunctatum* Boettger, 1885, by monotypy.

Chiasmocleis hudsoni Parker, 1940

Type: BMNH 1939.1.1.3.

Type locality: “New River, British Guiana (750 feet).”

Distribution: Region 4. Colombia, Brazil, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, southern half of Amazonas State.

Remarks: Briefly transferred to *Syncope* by de Sá et al. (2012) but again transferred to *Chiasmocleis* by Peloso et al. (2014).

Selected references: Zweifel (1986); Barrio-Amorós and Schargel (2003); De Sá et al. (2012); Peloso et al. (2014, 2016).

Genus *Ctenophryne* Mocquard, 1904

Type species: *Glossostoma aterrimum* Günther, 1900, by monotypy.



216A. *Elachistocleis ovalis*. Male calling. Chururú, Táchira. Photo: César Barrio-Amorós.



216B. *Elachistocleis ovalis*. Chururú, Táchira. Photo: César Barrio-Amorós.



216C. *Elachistocleis* aff. *ovalis*. San Diego de Cabrutica, Anzoátegui. Photo: César Barrio-Amorós.



216D. *Elachistocleis* aff. *ovalis*. San Diego de Cabrutica, Anzoátegui. Photo: César Barrio-Amorós.



216E. *Elachistocleis* aff. *ovalis*. Barinitas, Barinas. Photo: César Barrio-Amorós.



217. *Elachistocleis pearsei*. Perijá, Zulia. Photo: Fernando Rojas-Runjaic.

Ctenophryne geayi Mocquard, 1904

Holotype: MNHNP 1903.84.

Type locality: “La rivière Sarare en Colombie.”

Distribution: Region 4. Northern South America, to east of Andes, in Colombia, Ecuador, Peru, Brazil, Venezuela, Guyana, and Suriname. In Venezuela, two localities in eastern Venezuela: km 13 Cuyuni, Bolívar State (Duellman 1997), and Sierra de Imataca, Delta Amacuro State (MHNLS 20230, reported herein).

Remarks: The type locality is “Rivière Sarare en Colombie” (= Sarare River, Colombia). This river is born in eastern side of Cordillera Oriental de Colombia and flows through cloud forest and foothill rainforest with Amazonian elements to Los Llanos Region. Though Mocquard did not establish exact locality, current authors

estimate it must be in immediate forested foothills of the Andes, where many Amazonian elements are known, both in Colombia and Venezuela. However, it is strange that no additional specimens have been reported from that area in Venezuela and Colombia (in Colombia mostly because of public order problems in the upper Llanos). Lynch (2006) mentions its occurrence from Villavicencio area in Colombia, but without voucher specimens.

Selected references: Carvalho (1954); Zweifel and Myers (1989); Duellman (1997); Lynch (2006).

Genus *Elachistocleis* Parker, 1927

Type species: Not clearly stated: either *Rana gibbosa* Linnaeus, by original designation, or *Rana ovalis* Schneider, 1799, by subsequent designation of Duméril

and Bibron, 1841 (*sensu* Frost 2019).

Remarks: Review of the genus is needed to clarify chaotic taxonomic status of several populations throughout its distribution. Duellman (1997) assigned to *Elachistocleis bicolor* all forms with an immaculate venter, whereas Lavilla et al. (2003) restricted *E. bicolor* to southern South America. Similarly, *E. ovalis* is not the species with spotted venter, as Schneider (1799) clearly states, but one with “*inferne flavidus*” (yellow belly). De Sá et al. (2012) placed *Relictivomer* into *Elachistocleis*.

Elachistocleis ovalis (Schneider 1799)

Type: Unknown.

Type locality: Not assigned.

Distribution: Regions 2, 3. Name *Elachistocleis ovalis* historically applied to populations from Panama, Brazil, Colombia, Venezuela, Ecuador, Peru, and Bolivia. In Venezuela, present north of the Orinoco in open lowlands.

Remarks: Name *Elachistocleis ovalis* long-applied to the *Elachistocleis* with a uniform yellow or orange ventral pattern in northern Venezuela. Caramaschi (2010) considered this name a *nomen dubium* (name of unknown or doubtful application), and *species inquirenda* (species of doubtful identity needing further investigation). Current authors agree that a complex of species is hidden under that name, and even knowing that the nomen *ovalis* is not valid, but must be used while awaiting a definitive solution and new available names for this long-standing taxonomic conundrum.

Selected references: Lutz (1927); Carvalho (1954); Ginés (1959); Rivero (1961, 1964b-d); Bogart and Nelson (1976); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rada (1981a); Gremone et al. (1986); Ramo and Busto (1989, 1990); Yústiz (1996); Gorzula and Señaris (1998); Barrio and Durant (2000); Lavilla et al. (2003); Caramaschi (2010); Tárano (2010).

Elachistocleis pearsei (Ruthven 1914)

Holotype: UMMZ 45571.

Type locality: “Vicinity of Fundación, (Sierra de Santa Marta), Colombia.”

Distribution: Panamá, northern Colombia, and Maracaibo Lake Basin in Venezuela, in open areas.

Remarks: Previously in monotypic genus *Relictivomer* Carvalho, 1954, which was synonymized with *Elachistocleis* by De Sá et al. (2012) based on its phylogenetic position.

Selected references: Lutz (1927); Carvalho (1954); Ginés (1959); Rivero (1961, 1964b-d); Bogart and Nelson (1976); Staton and Dixon (1977); Hoogmoed and Gorzula (1979); Rada (1981a); Gremone et al. (1986); Ramo and Busto (1989, 1990); Yústiz (1996); Gorzula and Señaris (1998); Barrio and Durant (2000); Lavilla et al. (2003); Infante-Rivero et al. (2006b); De Sá et al. (2012).

Elachistocleis surinamensis (Daudin 1802)

Type: Unknown.

Type locality: “Surinam.”

Distribution: Regions 4, 5. Venezuela, Trinidad, Guyana, Suriname, and French Guiana. In Venezuela, present south of Orinoco River, including Orinoco Delta, usually in open areas.

Remarks: All populations of *Elachistocleis* in Venezuela with a gray venter, and orange or yellow spots, are assigned to this species, although it must be a species complex (Lavilla et al. 2003). A comprehensive review of the genus and populations currently assigned to *E. surinamensis* is needed to clarify taxonomic status of Venezuelan populations.

Selected references: Rivero et al. (1986); Gorzula and Señaris (1999); Señaris et al. (2014).

Genus *Hamptophryne* Carvalho, 1954

Type species: *Chiasmocleis boliviana* Parker, 1927, by original designation.

Hamptophryne boliviana (Parker 1927)

Type: BMNH 1927.8.1.1.

Type locality: “Buena Vista, Santa Cruz, Bolivia.”

Distribution: Region 5. North and western portions of Amazon Basin, in Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil, Guyana, Suriname, and French Guiana. Known to date from single locality in Venezuela: Reserva Forestal Río Grande, between Río Grande and El Palmar, Estado Bolívar (Paolillo 1986).

Remarks: Barrio-Amorós (2004) confirmed the identity of the only voucher of this species from Venezuela (at Berkeley, US). Image 219 shows a second specimen from a nearby locality: Imataca, Delta Amacuro.

Selected references: Carvalho (1954); Bogart and Nelson (1976); Paolillo (1986).

Subfamily *Otophryinae*
Wassersug and Pyburn, 1987

Remarks: Status of subfamily discussed in Wild (1995). De Sá et al. (2012) and Peloso et al. (2016) reviewed the taxonomy of Microhylidae and both recognize a monophyletic Otophryinae containing *Otophryne* and *Synapturanus*. De Sá et al. (2012) found Otophryinae well embedded into the family whereas Peloso et al. (2016) found support for a sister taxon relationship of Otophryinae, Gastrophryinae, and Adelastinae, thus providing evidence for the monophyly of New World microhylids. Current authors believe *Adelastes* (currently in Adelastinae) should be considered as in Otophryinae.

Genus *Otophryne* Boulenger, 1900



218A. *Elachistocleis surinamensis*. Kavanayen, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



218B. *Elachistocleis surinamensis*. Tobogán de la Selva, near Puerto Ayacucho, Amazonas. Photo: Zelimir Cernelic.



219. *Hamptophryne boliviana*. Imataca Forestal Reserve, Bolívar-Delta Amacuro border. Photo: Luis Merlo.



220. *Otophryne robusta*. La Escalera, Sierra de Lema, Bolívar. Photo: Hinrich Kaiser.



221. *Otophryne steyermarki*. Ayanganna tepui, Guyana. Photo: Amy Lathrop-Ross MacCulloch.



222. *Synapturanus mirandaribeiroi*. Piedra de la Virgen, northern slopes of La Escalera, Sierra de Lema, Bolívar. Photo: Eric Smith.

Type species: *Otophryne robusta* Boulenger, 1900, by original designation.

Otophryne pyburni Campbell and Clarke, 1998

Holotype: UTA-A3814.

Type locality: “Rainforest at 213 m elevation at Wacará, Vaupés, Colombia (...) 01°09’N, 69°55’W.”

Distribution: Region 4. Guiana Shield Region. Records from Brazil, French Guiana, Guyana, Suriname, and Venezuela. In Venezuela, at least three localities in Amazonas state.

Selected references: Rivero (1967a); Nelson (1971); Campbell and Clarke (1998); Barrio (1999e).

Otophryne robusta Boulenger, 1900

Type: BMNH 1899.3.25.18.

Type locality: “Foot on Mt. Roraima, 3,500 ft,” Guyana.

Distribution: Region 5. Gran Sabana, Bolívar State, in eastern Venezuela, as well as Western Guyana.

Remarks: Boulenger (1900) stated specimens he described from Roraima collected by Quelch and Macconnell, were implicitly from Guyana. See further comments on same type locality under accounts of *Oreophrynella macconnelli* and *Pristimantis marmoratus*. Could be in Venezuela, according to Kok et al. (2018).

Selected references: Boulenger (1900); Carvalho

(1954); Ginés (1959); Rivero (1961, 1964b, 1967a,b); Nelson (1971); Bogart et al. (1976); Gorzula (1985b, 1992); Gremone et al. (1986); Wassersug and Pyburn (1987); Campbell and Clarke (1998); Gorzula and Señaris (1998); MacCulloch et al. (2008); Cole et al. (2013); Señaris et al. (2014).

Otophryne steyermarki Rivero, 1967

Holotype: FMNH 74031.

Type locality: “Forest along río Tirica..., 5,900 ft, falls below summit camp, Chimantá tepui massif, Venezuela.”

Distribution: Region 5. Known from three different tepuis in Venezuela: Chimantá, Roraima, and Jaua (Bolívar State), and Mount Ayanganna in Guyana.

Remarks: Previously considered endemic of the Chimantá massif in the Venezuelan Guayana. Barrio (1999f) and Gorzula and Señaris (1999) reported additional localities in Venezuela, whereas MacCulloch et al. (2008) provided records from Guyana, suggesting a wider distribution. See redescription and data on morphological variation in MacCulloch et al. (2008).

Selected references: Rivero (1967b); Gorzula (1985b, 1992); Campbell and Clarke (1998); Gorzula and Señaris (1998); Barrio (1999f); MacCulloch et al. (2008); Señaris et al. (2014).

Genus *Synapturanus* Carvalho, 1954

Type species: *Synapturanus mirandaribeiroi* Nelson and Lescure, 1975

Synapturanus mirandaribeiroi

Nelson and Lescure, 1975

Holotype: MZUSP 49981.

Type locality: “Kanashen (a Waiwai Indian village and mission) in the Upper Essiquibo River, Rupununi District, Guayana.”

Distribution: Region 5. Colombia, Venezuela, Guyana, Suriname, French Guiana, and Brazil. Only two localities in Venezuela: Eastern slopes of Cerro Santa Rosa, Serranía del Supamo (Barrio and Brewer-Carías 1999) and Piedra de la Virgen, northern slopes of La Escalera, Sierra de Lema, Bolívar (Image 222).

Selected references: Nelson and Lescure (1975); Pyburn (1975); Barrio and Brewer-Carías (1999); Barrio-Amorós et al. (2011b).

Synapturanus salseri Pyburn, 1975

Holotype: UTA A–4011.

Type locality: “Timbó, Vaupés,” Colombia.

Distribution: Regions 4, 5. Colombia, Venezuela, Guyana, and Brazil. In Venezuela, only two localities at northern and southern parts of Amazonas State.

Selected references: Pyburn (1975); Zweifel (1986);

McDiarmid and Paolillo (1988); Señaris et al. (2003, 2014).

Family Phyllomedusidae Günther, 1859 “1858”

Remarks: Recently elevated from subfamily to family level by Duellman et al. (2016).

Genus *Agalychnis* Cope, 1864

Type species: *Agalychnis callidryas* Cope, 1862, by original designation.

Remarks: Faivovich et al. (2005) passed the *Phyllomedusa buckleyi* group *sensu* Cannatella (1980) to *Hylomantis*, until Faivovich et al. (2010) extended the definition of *Agalychnis* in order to include *Hylomantis* + *Pachymedusa*.

Agalychnis medinae (Funkhouser 1962)*

Holotype: EBRG 37.

Type locality: “The biological station ‘Henri Pittier’,” Estado Aragua, Venezuela.

Distribution: Region 2. Endemic to Venezuela. Known only from four localities (Rancho Grande in Aragua, near Bejuma in Carabobo, Cerro Zapatero, and Sierra de Aroa in Yaracuy) in the Coastal Range of Venezuela, but apparently extinct from type locality.

Remarks: Named *medinae* (as in original description) but later emended to *medinai* (since described after a masculine patronym, and thereafter ended in -i). However, article 31.1.1 of the Code admit a genitive ending in -ae even for masculine names if they end in -a (as Medina). Considered as Endangered by the current Venezuelan Red Book (Rojas-Runjaic and Señaris 2015f). See distribution map in Rojas-Runjaic et al. (2014).

Selected references: Funkhouser (1962); Rivero (1967c); Duellman (1968, 1969, 1979b); Cannatella (1980); Manzanilla et al. (1995); Proy (2000); Barrio-Amorós (2001c, 2006c, 2009b, 2013); Lotzkat et al. (2007); Barrio-Amorós and Torres (2010); Rojas-Runjaic et al. (2014); Rojas-Runjaic and Señaris (2015f).

Genus *Callimedusa*

Duellman, Marion and Hedges, 2016

Type species: *Phyllomedusa perinesos* Duellman, 1973.

Remarks: Genus created by Duellman et al. (2016) to accommodate the former *Phyllomedusa perinesos* group plus *P. atelopoides* and *P. tomopterna*.

Callimedusa tomopterna (Cope 1868)

Syntypes: USNM 6651 (two specimens; lost).

Type locality: “Rio Napo, or Upper Amazon, below the mouth of the former,” Departamento Loreto, Perú.

Distribution: Regions 4, 5. Colombia, Ecuador, Peru,



223. *Synapturanus salseri*. Cuao, Amazonas. Photo: César Barrio-Amorós.



224A. *Agalychnis medinae*. El Silencio, Sierra de Aroa, Yaracuy. Photo: Fernando Rojas-Runjaic.



224B. *Agalychnis medinae*. Amplexus. Cerro Zapatero, Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



225. *Callimedusa tomopterna*. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.



226. *Pithecopus hypochondrialis*. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.



227. *Phyllomedusa bicolor*. Surroundings of Puerto Ayacucho, Amazonas. Photo: César Barrio-Amorós.

Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, south of Orinoco River, in states of Amazonas, Bolívar, and Delta Amacuro. See list of localities and distribution map in Barrio-Amorós (2009b).

Remarks: Divergence among samples of this species from the upper Amazon and Guianas suggest at least two species may be hidden within the name *Callimedusa tomopterna* (Faivovich et al. 2010), but a thorough revision is needed to assess this hypothesis.

Selected references: Funkhouser (1957); Duellman

(1968, 1974b, 1997); Cannatella (1980); Barrio and Rivero (1999a); Barrio-Amorós (2009b); Faivovich et al. (2010).

Genus *Pithecopus* Cope, 1866

Type species: *Phyllomedusa azurea* Cope, 1862, by original designation.

Remarks: Genus recently resurrected of the synonymy of *Phyllomedusa* by Duellman et al. (2016) to content the old *Phyllomedusa hypochondrialis* group.

Pithecopus hypochondrialis (Daudin 1800)

Holotype: Unknown (but see Frost 2015).

Type locality: “Surinam.”

Distribution: Regions 3, 4, 5. Colombia, Brazil, Venezuela, Guyana, Suriname, and French Guiana. Widespread in lowland Venezuela in open areas, north and south of Orinoco River. See list of localities and distribution map in Barrio-Amorós (2009b).

Remarks: In *Phyllomedusa hypochondrialis* group of Faivovich et al. (2010).

Selected references: Funkhouser (1957); Rivero (1961, 1964b); Heatwole et al. (1965); Duellman (1968, 1974b, 1997); Pyburn and Glidewell (1971); Hoogmoed and Gorzula (1979); Rivero-Blanco and Dixon (1979); Ramo and Busto (1989, 1990); Gorzula and Señaris (1998); Rivas and Manzanilla (1999); Barrio-Amorós (2009b); Barrio-Amorós et al. (2010, 2011b); Faivovich et al. (2010); Señaris et al. (2014).

Genus *Phyllomedusa* Wagler, 1830

Type species: *Rana bicolor* Boddaert, 1772 by monotypy.

Phyllomedusa bicolor (Boddaert 1772)

Holotype: Unknown.

Type locality: “Surinam” (*vide* Funkhouser, 1957).

Distribution: Regions 4, 5. Colombia, Peru, Bolivia, Brazil, Venezuela, Guyana, Suriname, and French Guiana. Widespread in southern Venezuela, Amazonas and Bolívar States. See list of localities and distribution map in Barrio-Amorós (2009b).

Remarks: Not assigned to any phylogenetic or phenetic group by Faivovich et al. (2010).

Selected references: Funkhouser (1957); Ginés (1959); Rohl (1959); Rivero (1961, 1964b); Heatwole et al. (1965); Duellman (1968, 1974b, 1997); Gorzula and Señaris (1998); Barrio-Amorós (2009b); Barrio-Amorós et al. (2010, 2011b); Faivovich et al. (2010).

Phyllomedusa neildi Barrio-Amorós, 2006*

Holotype: MBUCV 6684.

Type locality: “Vicinity of Murucusa, Municipio Petit (11°02'N, 69°35'W), 550 m asl., spurs of Sierra de San Luís, Estado Falcón, Venezuela.”

Distribution: Region 2. NW Venezuela in Falcón and Lara States.

Remarks: *Phyllomedusa neildi* appears as a sister species to *P. trinitatis* in Faivovich et al. (2010), suggesting it could be conspecific, despite striking morphological differences in size and call structure (Barrio-Amorós 2006b). This can be due to a clinal variation or adaptation to xeric situations. However, direct comparison of continental and Trinidadian populations of *P. trinitatis* must be done (in progress by CBA and collaborators).

Selected references: Barrio-Amorós (2006b, 2009b); Faivovich et al. (2010).

Phyllomedusa tarsius (Cope 1868)

Holotype: USNM 6652; lost.

Type locality: “Rio Napo, or Upper Amazon, below the mouth of the former” (Loreto, Perú).

Distribution: Regions 1, 3. Widely distributed in Amazon Basin, in southwestern Colombia, Ecuador, Peru, Brazil, with isolated populations in Cordillera Oriental of Colombia and Venezuela. The Guyanan *Phyllomedusa tarsius* (Forlani et al. 2012) must be compared with *P. trinitatis* (see discussion in Barrio-Amorós 2009b). In Venezuela, known only from a few localities in eastern foothills of the Andes. See list of localities and distribution map in Barrio-Amorós (2009b).

Remarks: We really doubt presence of *Phyllomedusa tarsius sensu stricto* in Venezuela. Previous reports from southeastern Venezuela were meant to be *P. trinitatis* (Barrio-Amorós 2009b) or are very distinct from *P. tarsius sensu stricto*, as individuals from the Andean piedmont reported by La Marca (1996) and Markezich (1998) are much smaller and the iris pattern is much less reticulated than on Ecuadorian (near type locality) specimens (Image 229b). This could indicate a putative new species of the *tarsius* group in western Venezuela.

Selected references: Funkhouser (1957); Duellman (1968, 1974b, 1997); La Marca (1996b); Barrio-Amorós (2006b, 2009b); Señaris et al. (2014).

Phyllomedusa trinitatis Mertens, 1926

Holotype: SMF 2633.

Type locality: “Port of Spain,” Trinidad.

Distribution: Region 2. Trinidad and Venezuela. In Venezuela, distributed across north of the country, to the east of Falcón State. Not known from Los Llanos.

Remarks: Barrio-Amorós (2009b) compared those populations called *Phyllomedusa tarsius* from the Venezuelan Guayana (reported by Duellman and Trueb 1986) with *P. trinitatis*, and found no significant morphological differences. Thus, the Guianan populations are referred as *P. trinitatis* (see contrary view in Señaris et al. 2014), pending more investigation of the Andean piedmont populations named *tarsius*. Recently reported *P. tarsius* from Guyana (Forlani et al. 2012) must be compared to *P. trinitatis*. See comments under *P. neildi* and *P. tarsius*. See list of localities and distribution map in Barrio-Amorós (2009b).

Selected references: Mertens (1926); Funkhouser (1957, 1962); Ginés (1959); Rivero (1961, 1964a, 1969c); Heatwole et al. (1965); Kenny (1966, 1969); Duellman (1968, 1974b); Tello (1968); Mijares-Urrutia and Arends (1993); Manzanilla et al. (1995); Barrio-Amorós (2006b,c, 2009b); Faivovich et al. (2010); Forlani et al. (2012); Señaris et al. (2014).



228. *Phyllomedusa neildi*. Murucusa, Falcón. Photo: César Barrio-Amorós.



229A. *Phyllomedusa tarsius*. Caparo Forestal Reserve, Barinas. Photo: César Barrio-Amorós.



229B. *Phyllomedusa tarsius*. Yasuni National Park, Ecuador. Photo: Martin Bustamante.



230A. *Phyllomedusa trinitatis*. Cerro el Volcán, Caracas, Miranda. Photo: César Barrio-Amorós.



230B. *Phyllomedusa trinitatis*. Cerro el Volcán, Caracas, Miranda. Photo: Charles Brewer-Carías.



230C. *Phyllomedusa trinitatis*. Imataca Forestal Reserve, Delta Amacuro. Photo: César Barrio-Amorós.

Phyllomedusa vaillanti Boulenger, 1882

Holotype: BM 1947.2.22.34.

Type locality: “Santarem, Brasil.”

Distribution: Region 4. Amazon Basin (Brazil, Colombia, Ecuador, Peru, Bolivia, Venezuela) and Guianas (Guyana, Suriname, and French Guiana). In Venezuela, only reported from one locality (base of Cerro La Neblina) in extreme southern Amazonas State.

Remarks: Unassigned to any species group.

Selected references: Funkhouser (1957); Duellman (1968, 1974b); McDiarmid and Paolillo (1988); Barrio-Amorós (2009b).

Phyllomedusa venusta Duellman and Trueb, 1967

Holotype: KU 96150.

Type locality: One km west-southwest of the junction of the Río Mono and the Rio Tuira, Darien Province, Panama, 130 m.

Distribution: Region 6. Southern Panama, and Caribbean lowlands of Colombia, entering the Magdalena River Valley; in Venezuela, known from the Maracaibo Lake Basin.

Remarks: Species in the *Phyllomedusa tarsius* group (*sensu* Barrio-Amorós 2006 and Faivovich et al. 2010) are very difficult to distinguish among them. Barrio-

Amorós (2009b) comment on the possibility that *P. venusta* is conspecific with *P. trinitatis*, as the only reliable character to differentiate them is the length of the parotoid glands, a variable character influenced by reproductive or hormonal condition.

Selected References: Duellman and Trueb (1967); Barrio-Amorós (2006b, 2009b); Infante-Rivero et al. (2006a); Faivovich et al. (2010).

Family Pipidae Gray, 1825

Remarks: Pyron and Wiens (2011) and Blackburn and Wake (2011) refrain from using subfamilies within Pipidae.

Genus *Pipa* Laurenti, 1768

Type species: *Pipa Americana* Laurenti, 1768 (= *Rana pipa* Linnaeus, 1758), by monotypy.

Pipa arrabali Izecksohn, 1976

Holotype: EI 5311 (destroyed by fungus, Peixoto and Gomes 2007).

Type locality: “Vila Amazônia, Município de Parintins, Estado do Amazonas, Brasil.”

Distribution: Venezuela, Guyana, Suriname, and Brazil. In Venezuela, known only from a few localities in eastern Bolívar State.

Remarks: Specimens referred previously as *Pipa aspera* by La Marca (1992) are in fact *P. arrabali* (Trueb and Cannatella 1986). Both species very similar, differing only by narrow or wide separation of the nostrils *sensu* Trueb and Cannatella (1986). Both taxa are mostly sympatric, so validity of *P. arrabali* is doubtful, it could be a junior synonym of *P. aspera* despite the morphological support offered by Trueb and Masserin (2001).

Selected references: Trueb and Cannatella (1986); Duellman (1997); Peixoto and Gomes (2007); Barrio-Amorós and Duellman (2009); Barrio-Amorós et al. (2011b); Señaris et al. (2014).

Pipa parva Ruthven and Gaige, 1923

Holotype: UMMZ 57443.

Type locality: “Sabana de Mendoza (Trujillo State), Venezuela.”

Distribution: Northeastern Colombia and Northeastern Venezuela. In Venezuela, natural populations restricted to Maracaibo Lake Basin; introduced population established in Lago de Valencia, Carabobo State (Royero and Hernández 1996).

Selected references: Barbour (1923); Ruthven and Gaige (1923); Lutz (1927); Ginés (1958); Rivero (1961); Trueb (1984); Trueb and Cannatella (1986); Barrio (1996a); Royero and Hernández (1996); Barrio and Fuentes (2000b).

Pipa pipa (Linnaeus 1758)

Syntypes: Specimens figured in Seba, 1734 (see <http://linnaeus.nrm.se/zool/herp/madamph.html.en>)

Type locality: “Surinam.”

Distribution: Amazonian Region, in Colombia, Ecuador, Peru, Bolivia, Brazil, Venezuela, Trinidad, Guyana, Suriname, and French Guiana. In Venezuela, widespread in Orinoco Basin, from eastern foothills of the Andes at Barinas State, Llanos of Monagas, Delta Amacuro, Bolívar, and Amazonas.

Selected references: Dunn (1948); Ginés (1958); Röhl (1959); Rivero (1961); Trueb and Cannatella (1986); Péfaur and Díaz De Pascual (1987); La Marca (1992); Gorzula and Señaris (1998).

Family Ranidae Rafinesque-Schmaltz, 1814

Subfamily Raninae Rafinesque-Schmaltz, 1814

Genus *Lithobates* Fitzinger, 1843

Type species: *Rana palmipes* Fitzinger, 1843 (= *Rana palmipes* Spix, 1824), by designation.

Lithobates catesbeianus (Shaw 1802)

Holotype: Illustrated by Shaw (1802: 106, plate 33).

Type locality: “Many parts of North America... Carolina, Virginia.” Attempts to restrict type locality are not accepted by Fouquette and Dubois (2014).

Distribution: Southern Canada, eastern North America, and northern Mexico. Introduced in numerous countries of Americas (southern and western Mexico, Colombia, Ecuador, Venezuela, Guyana, Brazil, Paraguay, Argentina, Chile) several Caribbean islands (Cuba, Puerto Rico, Jamaica, Hispaniola), Europe (Netherlands, France, Belgium, Italy, Spain, Greece), and Asia (Malaysia, Indonesia, Japan, Thailand, Korea, and Taiwan). In Venezuela, known introduced population in the surroundings of La Carbonera, Mérida State.

Remarks: Since its introduction, species was the subject of a population control program by ULA (Universidad de los Andes), IVIC (Instituto Venezolano de Investigaciones Científicas), and MARN (Ministerio del Ambiente y los Recursos Naturales), without continuation or much success.

Selected references: Barrio-Amorós (2001c); Hanselmann et al. (2004); Lampo et al. (2004); Barrio-Amorós et al. (2011).

Lithobates palmipes (Spix 1824)

Syntypes: ZSM, including ZSM 963/0, lost.

Type locality: “In aquis stagnantibus fluminis Amazonum” (= stagnant waters of the Amazon River), Brazil.



231. *Phyllomedusa vaillanti*. Yasuní, Ecuador. Photo: César Barrio-Amorós.



232. *Phyllomedusa venusta*. La Orchila, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



233. *Pipa arrabali*. La Laja, Sierra de Lema, Bolívar. Photo: César Barrio-Amorós.



234. *Pipa parva*. Female. El Vigía, Mérida. Photo: César Barrio-Amorós.



235A. *Pipa pipa*. Capihuara, Casiquiare, Amazonas. Photo: César Barrio-Amorós.



235B. *Pipa pipa*. Caño Morichal Largo, Monagas. Photo: Eduardo Asens.

Distribution: Northern South America, including Colombia, Venezuela, Guyana, Suriname, Brazil, Ecuador, Peru, and Bolivia. Widespread in Venezuela except in Los Llanos.

Remarks: Venezuelan specimens (from Cerro de la Neblina, the southernmost point of the country) used in a phylogeny by Hillis and Wilcox (2005) stand out from *Lithobates palmipes*. The geographically closest available name for such populations is *Ranula gollmeri* Peters, 1859 (Hillis and Wilcox 2005). However, *Lithobates palmipes* must be a species complex, so more intensive

sampling would be desired to apply that name, given that *L. gollmeri* is from Caracas, and few species are proven to inhabit both far north and far south Venezuela, in very different habitats. On the other hand, *Lithobates vaillanti* (Brocchi 1877) is known to occur on the Colombian side of Serranía de Perijá, and Venezuelan specimens from western Zulia State could be mistaken for it.

Selected references: Spix (1824); Lutz (1927); Ginés (1959); Röhl (1959); Rivero (1961, 1964a,b, 1967a, 1971a); Heatwole et al. (1965); Tello (1968); Hoogmoed and Gorzula (1979); Gremone et al. (1986); Rivero et

al. (1986); Hillis and De Sá (1988); Duellman (1997); Gorzula and Señaris (1998); Barrio-Amorós and Brewer-Carías (2008); Barrio-Amorós et al. (2011b); Señaris et al. (2014).

Family Strabomantidae
Hedges, Duellman and Heinicke, 2008

Incertae sedis:

Genus *Dischidodactylus* Lynch, 1979

Type species: *Elosia duidensis* Rivero, 1968, by original designation.

Remarks: Hedges et al. (2008) tentatively placed *Dischidodactylus* into Strabomantidae: Strabomantinae, due to only one morphological character (possession of expanded terminal disks with circumferential grooves). Because of external similarities with *Ceuthomantis*, Padial et al. (2014) placed *Dischidodactylus* in the subfamily Ceuthomantinae. However, the phylogenetic position of genus *Dischidodactylus* has never been evaluated using molecular data, and it differs greatly from *Ceuthomantis* and all other Terraranae in external morphology. Further research should clarify relationships. Meanwhile, this genus is left as *incertae sedis* into a comprehensive Strabomantidae.

Dischidodactylus colonnelloi Ayarzagüena, 1985*

Holotype: MHNLS 9378.

Type locality: “Cima del Tepui Marahuaca (Marahuaca-tepui), Estado Amazonas, Venezuela. 2,550 m.”

Distribution: Region 5. Endemic to the summit of Cerro Marahuaca, a tepui in Amazonas State, southern Venezuela.

Selected references: Ayarzagüena (1985).

Dischidodactylus duidensis (Rivero 1968)*

Holotype: AMNH 23190.

Type locality: “Summit at Vegas Falls, 4,600 feet (1,400 m), Mt. Duida, Venezuela.”

Distribution: Region 5. Endemic to Cerro Duida, a tepui in Amazonas State, southern Venezuela.

Selected references: Rivero (1968a, 1971b); Lynch (1979a); McDiarmid and Donnelly (2005).

Subfamily Pristimantinae Ohler and Dubois, 2012

Genus *Pristimantis* Jiménez de la Espada, 1870

Type species: *Pristimantis galdi* Jiménez de la Espada, 1870, by monotypy.

Remarks: Heinicke et al. (2007) split long-established genus *Eleutherodactylus*, formerly in family Leptodactylidae (Lynch 1971, 1981; Frost 1985;

Duellman 1993; Lynch and Duellman 1997) and placed afterwards in family Brachycephalidae by Frost et al. (2006) containing three major genera: *Eleutherodactylus* for mainly Caribbean species, *Craugastor* Cope, 1862 for mainly Central American species, and *Pristimantis* for almost all South American (and some Central American) species. Hedges et al. (2008) offered a more comprehensive view of the so-called “eleutherodactylines” and erected the new unranked taxon Terrarana (emended as Terraranae by Heinicke et al. 2018) for four families (Brachycephalidae, Craugastoridae, Eleutherodactylidae, and Strabomantidae). As of this writing, the phylogenetic arrangement remains in flux. Most South American species formerly in *Eleutherodactylus* are now members of *Pristimantis*, within Craugastoridae (after Padial et al. 2014). The most recent approach (Heinicke et al. 2018) recovers *Tachiramantis* as part of Craugastoridae, and *Pristimantis* into Strabomantidae. *Mucubatrachus* La Marca, 2007 and *Paramophrynella* La Marca, 2007 are considered synonyms of *Pristimantis sensu* (Hedges et al. 2008; Barrio-Amorós et al. 2013; Padial et al. 2014).

Selected references: Lutz (1927); Lynch (1976); La Marca (1992); Barrio-Amorós (1998, 2004, 2009); Heinicke et al. (2007); Hedges et al. (2008); Barrio-Amorós et al. (2013); Padial et al. (2014).

Pristimantis abakapa

Rojas-Runjaic, Salerno, Señaris and Pauly, 2013*

Holotype: MHNLS 20544.

Type locality: Abakapá-tepui, Macizo de Chimantá, Parque Nacional Canaima, Gran Sabana municipality, Bolívar State, Venezuela (5°11'31.2"N, 62°18'56.6"W; elevation 2,245 m).

Distribution: Region 5. Endemic to Abakapá-tepui in the Chimantá massif, Venezuelan Guayana Region.

Remarks: In non-monophyletic *Pristimantis unistrigatus* species group *sensu* Rojas-Runjaic et al. (2013). Not assigned to any species group by Padial et al. (2014).

Selected references: Rojas-Runjaic et al. (2013); Señaris et al. (2014).

Pristimantis ameliae Barrio-Amorós, 2011*

Holotype: CVULA 7118.

Type locality: San Javier del Valle, 8°56'43"N, 70°25'54"W, elevation 2,500 m, Mérida State, Venezuela.

Distribution: Region 1. Endemic to eastern versant of Sierra de la Culata of the Venezuelan Andes.

Remarks: Not assigned to any species group (Padial et al. 2014).

Selected references: Barrio-Amorós (2011).

Pristimantis anolirex (Lynch 1983)

Holotype: KU 168626.

Type locality: “18.5 km (by road) S Chitajá,



236. *Lithobates catesbeianus*. La Carbonera, Mérida. Photo: César Barrio-Amorós.



237. *Lithobates palmipes*. Arassari Rafting Camp, Acequias, Barinas. Photo: César Barrio-Amorós.



238. *Dischidodactylus colonnelloi*. Holotype MHNLS 9378, detail of the right side, inside right hand from below. Photo: César Barrio-Amorós.



239. *Pristimantis abakapa*. Abakapá-tepui, Chimantá massif, Gran Sabana, Bolívar. Photo: Fernando Rojas-Runjaic.



240. *Pristimantis* cf. *ameliae*. Way to Páramo Los Conejos, 2500 m. Photo: Daniel Quihua.



241. *Pristimantis anolirex*. Páramo Tamá, Norte de Santander, Colombia. Photo: Aldemar A. Acevedo.

Departamento de Norte de Santander, Colombia, 2,850 m.”

Distribution: Region 1. Cordillera Oriental of the Colombian Andes and Páramo de Tamá, páramos in SW Táchira State in the Venezuelan Andes.

Remarks: La Marca (1995d) reported this species from Venezuela. In non-monophyletic *Pristimantis unistrigatus* species group *sensu* Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014).

Selected references: Lynch (1983); La Marca (1995d).

Pristimantis anotis (Walker and Test 1955)*

Holotype: UMMZ 109876.

Type locality: Rancho Grande, 1,090 m, Aragua State, Venezuela.

Distribution: Region 2. Endemic to Venezuela. Apparently restricted to surroundings of type locality.

Remarks: A severe decline in this species is presumed, as not seen since 1974 (Barrio-Amorós 2006c). In non-monophyletic *Pristimantis unistrigatus* species group *sensu* Lynch and Duellman (1997) and Hedges et al. (2008); not assigned to any species group by Padial et al. (2014).

Selected references: Walker and Test (1955); Ginés (1959); Rivero (1961, 1964a); Manzanilla et al. (1995);

Barrio-Amorós (2006c); Kaiser et al. (2015).

Pristimantis aureoventris

Kok, Means and Bossuyt, 2011

Holotype: IRSNB 4152.

Type locality: Summit of Wei-Assiput-tepui, Cuyuni-Mazaruni District, Guyana (5°13'05"N, 60°42'15"W, 2,210 m).

Distribution: Region 5. Guyana Shield, in western Guyana and eastern Venezuela. In Venezuela, known from Kukenán-tepui (Jablonski et al. 2017) and here reported from summit of Mt. Roraima, Bolívar State.

Remarks: Listed by Señaris et al. (2014), who anticipated its presence in Venezuela (Canaima National Park) but without any voucher specimen. Jablonski et al. (2017) reports it for first time in Venezuela from the summit of Kukenán-tepui, in the eastern chain of tepuis, Bolívar State. Two vouchers are added here from the summit of Mt. Roraima (MCNC 7196 and EBRG 200), at 2,800 m. Detailed comparison fails to distinguish them from the original description of *Pristimantis aureoventris*, from a nearby tepui (Wei-Assipu-tepui) in Guyana, and the Guyanan side of Mt. Roraima. The photographs by R.W. McDiarmid and Thomas Marent (Images 243A and 243B) are almost identical to those of Kok et al. (2011; see Fig. 4C, E). Not assigned to any species group (Padial et al. 2014).

Selected references: Kok et al. (2011); Señaris et al. (2014); Jablonski et al. (2017).

Pristimantis auricarens (Myers and Donnelly 2008)*

Holotype: EBRG 2725.

Type locality: Summit of Auyan-tepui, AMNH-TERRAMAR Camp 2, 1,750 m, Bolívar State, Venezuela (5°54'N, 62°29'W).

Distribution: Region 5. Apparently endemic to Auyan-tepui in Venezuelan Guyana Shield.

Remarks: In *Pristimantis unistrigatus* species group according to original description (Myers and Donnelly 2008); not assigned to any species group by Padial et al. (2014).

Selected references: Myers and Donnelly (2008); Señaris et al. (2014).

Pristimantis avius (Myers and Donnelly 1997)*

Holotype: AMNH 131481.

Type locality: "North base of Pico Tamacuari, 1,160–1,200 m elevation. Sierra Tapirapécó, Amazonas, Venezuela (1°13'N, 64°42'W)."

Distribution: Region 5. Endemic to Sierra Tapirapécó, Venezuelan Amazonas. Possibly present in Brazilian side of Tapirapécó.

Remarks: In non-monophyletic *Pristimantis unistrigatus* species group according to Myers and Donnelly (1997) and Hedges et al. (2008); not assigned to any species

group by Padial et al. (2014).

Selected references: Myers and Donnelly (1997).

Pristimantis bicumulus (Peters 1863)*

Syntypes: ZMB 4899 (two specimens).

Type locality: Caracas, Venezuela.

Distribution: Region 2. Cordillera de la Costa, Venezuela.

Remarks: Not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: Lutz (1927); Ginés (1959); Rivero (1961, 1964a); Tello (1968); Lynch and La Marca (1993); Manzanilla et al. (1995); Barrio-Amorós (2006c); Señaris and Rojas-Runjaic (2015c).

Pristimantis boconoensis (Rivero and Mayorga 1973)*

Type: UPRM 4932.

Type locality: "Páramo Guaramacal, Boconó, Estado Trujillo, Venezuela, 9,400 feet" (2,865 m).

Distribution: Region 1. *Subpáramo* and *páramo* habitats in Trujillo State, Venezuelan Andes.

Remarks: Not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: Rivero and Mayorga (1973); Lynch (1976); Duellman (1979b); Rivero (1982b); La Marca (2007).

Pristimantis briceni (Boulenger 1903)*

Syntypes: MCZ 3888 and 7601, NHMW 22871 (3 specimens); UMMZ 46471.

Type locality: "Merida (Mérida), Venezuela, at an altitude (elevation) of 1,600 metres." Elevation may be in error, as it is known from 2,600 to 3,400 m; 1,600 m is the elevation of Merida, from where the specimens were shipped.

Distribution: Region 1. Sierra de la Culata in *subpáramo* and *páramo* habitats in Venezuelan Andes of Mérida State.

Remarks: Considered type species of genus *Mucubatrachus* La Marca, 2007. Barrio-Amorós et al. (2013) show this species is phylogenetically embedded in *Pristimantis*. Not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: Boulenger (1903); Lutz (1927); Ginés (1959); Rivero (1961, 1982c, 1983); Lynch (1976); La Marca (2007); Barrio-Amorós et al. (2013).

Pristimantis cantitans (Myers and Donnelly 1996)*

Holotype: EBRG 3005.

Type locality: "Summit of Cerro Yaví, 2,150 m, Amazonas, Venezuela."

Distribution: Region 5. Endemic to Cerros Yaví and Yutajé, two tepuis in northern Amazonas State.

Remarks: In non-monophyletic *Pristimantis unistrigatus* species group according to Lynch and Duellman (1997),



242. *Pristimantis anotis*. Rancho Grande, Henri Pittier National Park. Photo: William E. Duellman.



243A. *Pristimantis aureoventris*. Summit of Roraima, Venezuela. Photo: Roy McDiarmid.



243B. *Pristimantis aureoventris*. Summit of Roraima, Venezuela. Photo: Thomas Marent.



243C. *Pristimantis aureoventris*. Slopes of northern Roraima, Guyana. Photo: Bruce Means.



244A. *Pristimantis bicumulus*. Rancho Grande, Henri Pittier National Park. Photo: Javier Mesa.



244B. *Pristimantis bicumulus*. Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.

Myers and Donnelly (2001), and Hedges et al. (2008) not assigned to any species group by Padial et al. (2014).

Selected references: Myers and Donnelly (1996, 2001).

Pristimantis colostichos (La Marca and Smith 1982)*

Holotype: UMMZ 173044.

Type locality: “Páramo de los Conejos at the intersection of Quebrada Las Gonzales with the trail Manzano Alto-Las Gonzales, 2.5 hours on foot from the water pipeline

known as “Las Canalejas,” Serranía del Norte, Estado Mérida, Venezuela.”

Distribution: Region 1. Known only from type locality in Sierra de la Culata, Mérida State, Venezuelan Andes.

Remarks: In non-monophyletic *Pristimantis unistrigatus* species group according to Hedges et al. (2008); not assigned to any species group by Padial et al. (2014).

Selected references: La Marca and Smith (1982).

Pristimantis culatensis (La Marca 2007)*

Holotype: ULABG 912.

Type locality: “Páramo La Culata, 2,870 m (8°44’33”N, 71°04’20”W), Municipio Libertador, Estado Mérida,” Venezuela.

Distribution: Region 1. Known only from type locality in Sierra de la Culata, Mérida, Venezuelan Andes.

Remarks: Described without comparison to its apparently closest relatives from the same area, *Pristimantis briceni* and *P. colostichos*. Not assigned to any species group (La Marca 2007; Hedges et al. 2008; Padial et al. 2014).

Selected references: La Marca (2007).

Pristimantis conservatio

Barrio-Amorós, Heinicke and Hedges, 2013*

Holotype: CVULA 7174.

Type locality: Cloud forest immediately above hamlet of Los Alcaravanes at Aguas Blancas, 1,640 m, 8°56’43”N, 70°25’54”W; Ramal de Calderas, Barinas State, Venezuela.

Distribution: Region 1. Endemic from cloud forests in Venezuelan Andes. Known only from eastern versant of Cordillera de Mérida in Barinas State. Probably also present in continuous cloud forest in Trujillo State.

Remarks: Not assigned to any species group Padial et al. (2014).

Selected references: Barrio-Amorós (2010a); Barrio-Amorós et al. (2013).

Pristimantis fasciatus

Barrio-Amorós, Rojas-Runjaic and Infante, 2007*

Holotype: MHNLS 18466.

Type locality: Kunana, cuenca del río Negro, Sierra de Perijá, Municipio Machiques de Perijá, Zulia State, Venezuela (10°02’N, 72°47’W; 1,094 m).

Distribution: Region 1. Only known from three localities at eastern versant of Sierra de Perijá, at 800–1,200 m.

Remarks: Considered Endangered according to Venezuelan Red Book (Rojas-Runjaic and Señaris 2015g). In nonmonophyletic *Pristimantis unistrigatus* group according to original description (Barrio-Amorós et al. 2007), but not assigned to any species group by Padial et al. (2014).

Selected references: Barrio-Amorós et al. (2007); Rojas-Runjaic and Señaris (2015g).

Pristimantis flabellidiscus (La Marca 2007)*

Holotype: ULABG 2883.

Type locality: Los Aranguren, 2,860 m, (ca. 8°35’59”N, 70°55’28”W), southern versant of Sierra Nevada National Park, Rangel Municipality, Merida State, Venezuela.

Distribution: Region 1. Known only from type locality.

Remarks: Not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: La Marca (2007).

Pristimantis geminus Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*

Holotype: USNM unnumbered (field number CMD 341).

Type locality: Southern slopes of Cerro Humo (10.7073°N, 62.6284°W), elevation 750 m, Sucre State, Venezuela.

Distribution: Region 2. Apparently restricted to Península de Paria.

Remarks: In nonmonophyletic *Pristimantis unistrigatus* species group according to the original description (Kaiser et al. 2015).

Selected references: Kaiser et al. (2015).

Pristimantis ginesi (Rivero 1964)*

Holotype: MHNLS 250, *sensu* Frost (1985) and La Marca (1992).

Type locality: Laguna Mucubají, Rangel Municipality, Mérida State, Venezuela.

Distribution: Region 1. *Páramos* of the Sierra Nevada, Mérida State.

Remarks: Considered type species of genus *Paramophrynella* by La Marca (2007). Using molecular data, Barrio-Amorós et al. (2013) demonstrated this species is phylogenetically embedded in *Pristimantis*.

Selected references: Rivero (1964d, 1967c, 1982b, 1983); Rivero and Mayorga (1973); Lynch (1976); La Marca (1991b “1994,” 2007); Barrio-Amorós et al. (2013).

Pristimantis gryllus

Barrio-Amorós, Guayasamin and Hedges, 2012

Holotype: CVULA 8343.

Type locality: “Cloud forest along the road from Estanques to Paramo la Tosta, 8.4333N, 71.5000W, 1,320 m, Estado Merida, Venezuela.”

Distribution: Region 1. Cloud forest and perianthropic situations in Andes of Táchira and Merida States in Venezuela, recently reported for Norte de Santander in Colombia (Acevedo-Rincón et al. 2014).

Remarks: In *Pristimantis unistrigatus* species group according to original description (Barrio-Amorós et al. 2012), but not assigned to any species group by Padial et al. (2014).

Selected references: Barrio-Amorós et al. (2012); Acevedo-Rincón et al. (2014).

Pristimantis guaiquinimensis

(Schlüter and Rödder 2007)*

Holotype: SMNS 8004.1.

Type locality: Guaiquinima tepui, Bolívar State, Venezuela (5°44’N, 63°38’W, elevation 980 m).

Distribution: Region 5. Endemic to Guaiquinima, a



245. *Pristimantis boconoensis*. Guaramacal massif, Portuguesa. Photo: Juan E. García.



246. *Pristimantis briceni*. Cabaña del Cura, Sierra de la Culata, Mérida. Photo: César Barrio-Amorós.



247. *Pristimantis colostichos*. Páramo Los Conejos, 3,000 m asl. Photo: Daniel Quihua.



248. *Pristimantis conservatio*. Female holotype CVULA 7174. Los Alcaravanes, Calderas, Barinas. Photo: César Barrio-Amorós.



249. *Pristimantis fasciatus*. Male paratype MHNLS 18470. Kunana, Río Negro basin, Serranía de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.



250. *Pristimantis geminus*. Paratype CVULA 7443. Las Melenas, southern slope of Cerro El Humo, Península de Paria, Sucre. Photo: César Barrio-Amorós.

tepui in Bolívar State, Venezuelan Guayana.

Remarks: In *Pristimantis unistrigatus* species group according to original description (Schlüter and Rödder 2007) and Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014). *Eleutherodactylus tepuiensis* Schlüter and Rödder, 2007 is a junior synonym

(Kok and Barrio-Amorós 2013).

Selected references: Schlüter and Rödder (2007); Kok and Barrio-Amorós (2013).

Pristimantis hoogmoedi Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*

Holotype: CVULA 7433.

Type locality: “Southern slopes of Cerro Humo (10.7073°N, 62.6284°W), elevation 750 m, Estado Sucre, Venezuela.”

Distribution: Region 2. Apparently endemic to southern versant of Península de Paria in northeastern Venezuela.

Remarks: Most similar to *Pristimantis anotis*. Not assigned to any species group according to original description (Kaiser et al. 2015). Apparently suffering some decline (G. Rivas, pers. comm.).

Selected references: Kaiser et al. (2015).

Pristimantis imthurni Kok, 2013*

Holotype: IRSNB 4165.

Type locality: Summit of Ptari-tepui, Bolívar State, 5°46'09"N, 61°49'02"W, 2,471 m elevation.

Distribution: Region 5. Endemic to Ptari, a tepui in Bolívar State, Venezuela.

Remarks: Not assigned to any species group (Padial et al. 2014).

Selected references: Kok (2013); Señaris et al. (2014).

Pristimantis incertus (Lutz 1927)*

Holotype: AL-MNRJ 1190.

Type locality: Mamo, near La Guaira, Vargas State, Venezuela.

Distribution: Region 2. Restricted to central Cordillera de la Costa in Aragua, Carabobo, Distrito Capital, Miranda, and Vargas States, and western Cordillera de la Costa in Nirgua massif, Yaracuy State, 20–1,500 m asl.

Remarks: *Hylodes anonymus* was first mentioned by Lutz (1927: 40) as a new species, but description lacked designation of a type specimen. Later in same paper, two illustrations appear on Plate 13 (Image 256A) but associated text refers to *Hylodes incertus*, here assumed to be a lapsus and unjustified emendation for *H. anonymus*. These names appear alternatively in recent checklists (La Marca 1992; Barrio-Amorós 1998, 2004, 2009), but none are identified with identifiable specimens or vouchers. *Hylodes anonymus* is therefore a *nomen nudum* under Article 12 of the Code (ICZN 1999), whereby names without illustration or diagnosis coined prior to 1931 are not valid for the purposes of nomenclature. The case of *Hylodes incertus* is different. Since Adolpho Lutz's material was stored at Museum of the Universidade Federal do Rio de Janeiro, Brazil (MNRJ), the current number assigned to the holotype of *H. incertus* is AL-MNRJ 1190. Having received photos of the specimen thanks to Dr. José Pombal and, despite the complete fading of the color (Image 256B), it clearly belongs to a member of the *Pristimantis conspicillatus* species group. Members of this group are easily distinguished by finger I being equal or longer than finger II, clearly visible in Image 256C. *Pristimantis terraebolivaris* (Rivero 1961) is the only species in Cordillera de la Costa in the *P.*

conspicillatus species group and is abundant in the central sector of the Cordillera de la Costa in Aragua, Carabobo, Miranda, and Yaracuy States and Distrito Capital. Mamo, near La Guaira (Vargas State), the type locality of *H. incertus*, is at 85 m asl. The previously known altitudinal range of *P. terraebolivaris* was 800–1,500 m (Barrio-Amorós 2004); at MHNLS specimens are from 20–1,500 m. Comparing the photos and illustration of *Hylodes incertus* with specimens and the description of *Pristimantis terraebolivaris* (Rivero 1961) indicate those are conspecific and *Hylodes incertus* Lutz, 1927 is a senior synonym of *Eleutherodactylus terraebolivaris* Rivero, 1961; the color pattern of *H. incertus* holotype corresponds with the striped morph recognized by Barrio-Amorós (2006c). Despite the poor conservation status of the *H. incertus* holotype, it does match with *Pristimantis terraebolivaris* in having the head longer than wide; long snout (longer than eye diameter), acuminate in dorsal view; canthus rostralis straight and transversely angular; loreal region vertical, finger I equal to finger II, fingers and toes with lateral keels; tip of toe III not reaching the middle subarticular tubercle of toe IV, and tip of toe V just passing the middle subarticular tubercle of toe IV. No other *Pristimantis* species in the Cordillera de la Costa matches with this combination of characters. Thus, all previous references to *Pristimantis terraebolivaris* must be now attributed to *Pristimantis incertus*. In *Pristimantis conspicillatus* species group (Hedges et al. 2008; Padial et al. 2014). Barrio-Amorós (2006c) showed some chromatic variation of the species. **Selected references:** All references mentioning *Eleutherodactylus* or *Pristimantis terraebolivaris*. Lutz (1927); Rivero (1961, 1964a,d); Heatwole (1963a); Tello (1968); Lynch (1976, 1979b); Barrio-Amorós (1996a, 2006c); Lotzkat (2007).

Pristimantis jabonensis (La Marca 2007)*

Holotype: ULABG 2813.

Type locality: “Páramo El Jabón, 3,100 m, Municipio Carache, Estado Trujillo, Venezuela.”

Distribution: Region 1. Known only from type locality.

Remarks: Not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: La Marca (2007).

Pristimantis kareliae (La Marca 2005)*

Holotype: ULABG 3376.

Type locality: “Quebrada la Corcovada, aproximadamente 8 km de Laguna Mucubají, en vía Apartaderos-Santo Domingo, 3,000 m snm., 8°48'42"N, 70°47'46"W, Municipio Cardenal Quintero, Estado Mérida, Venezuela.”

Distribution: Region 1. Apparently restricted to surroundings of type locality.

Remarks: Material assigned to this name must be



251. *Pristimantis ginesi*. Páramo Mucubají, Mérida. Photo: César Barrio-Amorós.



252A. *Pristimantis gryllus*. Female holotype CVULA 8343. Road from Estanques to Páramo La Tosta, Mérida. Photo: César Barrio-Amorós.



252B. *Pristimantis gryllus*. Male. Matamula, Táchira. Photo: César Barrio-Amorós.



253. *Pristimantis guaiquinimensis*. Holotype SMNS 8004.1, dorsal view. Guaiquinima-tepui, Bolívar. Photo: Dennis Rödder.



254. *Pristimantis hoogmoedi*. Female, paratype CVULA 7434. Las Melenas, southern slope of Cerro El Humo, Península de Paria, Sucre. Photo: César Barrio-Amorós.



255. *Pristimantis imthurmi*. Ptari tepui, Bolívar. Photo: Philippe Kok.

compared with *Pristimantis paramerus*, a very similar microsympatric species, as original description makes no mention of any possible similarity. In *Pristimantis unistrigatus* species group according to Hedges et al. (2008); not assigned to any species group by Padial et al. (2014).

Selected references: La Marca (2005).

Pristimantis jamescameroni Kok, 2013*

Holotype: IRSNB 4160.

Type locality: Summit of Aprada-tepui, Bolívar State, 5°24'42"N, 62°27'00"W, 2,570 m elevation.

Distribution: Region 5. Endemic to Aprada, a tepui in Bolívar State, Venezuela.

Remarks: Not assigned to any species group (Padial et al. 2014).

Selected references: Kok (2013); Señaris et al. (2014).

Pristimantis lancinii (Donoso-Barros 1965)*

Holotype: USNM 165604.

Type locality: “Apartaderos, Estado Mérida,” Venezuela.

Distribution: Region 1. *Páramos* in Sierra Nevada, Mérida State.

Remarks: Described briefly by Donoso-Barros (1965) stating type locality as: “Venezuela ... de las altas montañas de Mérida;” type locality restricted later by Donoso-Barros (1968). Frost (2019) erroneously states the species was originally described as *Eupsophus* (see Barrio-Amorós and Ortiz 2015). Not assigned to any species group by Hedges et al. (2008) or Padial et al. (2014).

Selected references: Donoso-Barros (1965, 1968); Rivero (1967c, 1982b); Rivero and Mayorga (1973); Lynch (1976); Duellman (1979b); La Marca and Smith (1982); La Marca (1991b “1994,” 2007); Barrio-Amorós et al. (2013); Barrio-Amorós and Ortiz (2015).

Pristimantis lassoalcalai

Barrio-Amorós, Rojas-Runjaic and Barros, 2010*

Holotype: MHNLS 18898.

Type locality: “Cerro Las Antenas, elevation 1,827 m, 10°19'40.0"N, 72°35'27.0"W, Sierra de Perijá, Municipio Rosario de Perijá, Estado Zulia, Venezuela.”

Distribution: Region 1. Known only from type locality on Venezuelan side of Sierra de Perijá, at 1,827–1,950 m asl. Probably also present on Colombian side of Sierra de Perijá.

Remarks: Considered Vulnerable (VU) according to Venezuelan Red Book (Rojas-Runjaic and Señaris 2015g). In *Pristimantis unistrigatus* species group according to original description (Barrio-Amorós et al. 2010), but not assigned to any species group by Padial et al. (2014).

Selected references: Barrio-Amorós et al. (2010i); Rojas-Runjaic and Señaris (2015g).

Pristimantis longicarpus Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*

Holotype: CVULA 7444.

Type locality: “Southern slopes of Cerro Humo (10.7073°N, 62.6284°W), elevation 750 m, Estado Sucre, Venezuela.”

Distribution: Region 2. Known only from type locality in Peninsula de Paria, northeastern Venezuela.

Remarks: In *Pristimantis unistrigatus* species group according to original description (Kaiser et al. 2015).

Selected references: Kaiser et al. (2015).

Pristimantis marahuaka

(Fuentes and Barrio-Amorós 2004)*

Holotype: MBUCV 6637.

Type locality: Summit of Cerro Marahuaka (03°55'N, 65°27'W), ca. 2,450 m asl, Amazonas State, Venezuela.

Distribution: Region 5. Known only from type locality

in Venezuelan Pantepui.

Remarks: In *Pristimantis unistrigatus* species group according to original description (Fuentes and Barrio-Amorós 2004) and Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014).

Selected references: Fuentes and Barrio-Amorós (2004).

Pristimantis marmoratus (Boulenger 1900)

Holotype: BMNH 1947.2.16.92.

Type locality: “Foot of Mt. Roraima, 3,500 feet (1,066 m),” Guyana.

Distribution: Region 5. Lowlands and uplands in Guayana Shield in Venezuela, Guyana, Suriname, and French Guiana. In Venezuela, restricted to Gran Sabana in eastern Bolívar State, 600–1,800 m asl.

Remarks: Type locality (same as for *Oreophrynella macconnelli*; see its account) is not clear and subject of debate. Kok et al. (2018) suggest it is in Venezuela, contrary to the opinion herein (see Remarks on *O. macconnelli*), and provide a thorough morphological description, vocalization, natural history, and phylogenetic relationships. Probably a species complex. In *Pristimantis unistrigatus* species group according to Hedges et al. (2008) and Kok et al. (2018), but not assigned to any species group by Padial et al. (2014).

Selected references: Boulenger (1900); Ginés (1959); Rivero (1961, 1964b); Lynch (1976, 1980); Señaris et al. (2014); Kok et al. (2018).

Pristimantis melanoproctus (Rivero 1984)

Holotype: UPR-M 4407.

Type locality: From km 15 Delicias a Rubio, elevation 1,800 m, Táchira State, Venezuela.

Distribution: Region 1. Venezuela and Colombia. In Venezuela, known only from Andean cloud forests in Táchira State.

Remarks: Not easily differentiated from *Pristimantis mondolfii*, and original author was unable to discriminate between them unequivocally. Acevedo et al. (2014) provided new insights to differentiate them. Not assigned to any species group by Hedges et al. (2008) or Padial et al. (2014). By its close resemblance to *Tachiramantis lentiginosus*, might be a member of genus *Tachiramantis* (Heinicke et al. 2015).

Selected references: Rivero (1982c); Acevedo et al. (2014).

Pristimantis memorans (Myers and Donnelly 1997)

Holotype: AMNH 131466.

Type locality: “Ridge N Pico Tamacuari, 1,270 m elevation, Sierra Tapirapecó, Amazonas, Venezuela (1°13'N, 64°42'W).”

Distribution: Region 5. Known from type locality and one additional locality, a distance of 350 m on Brazilian



256A. *Pristimantis incertus*. Holotype of *Hylodes incertus*, Original drawing in Lutz (1927).



256B. *Pristimantis incertus*. Dorsal view of the holotype of *Hylodes incertus*, AL-MNRJ 1190.



256C. *Pristimantis incertus*. Left hand of the holotype of *Hylodes incertus*, AL-MNRJ 1190.



256D. *Pristimantis incertus*. Male. Plain phase, Cerro El Volcán, Miranda. Photo: César Barrio-Amorós.



256E. *Pristimantis incertus*. Patterned phase. Cerro Zapatero, Yaracuy. Photo: Sebastian Lotzkat.



256F. *Pristimantis incertus*. Stripped phase. Cerro Zapatero, Yaracuy. Photo: Sebastian Lotzkat.

side of Tapirapecó (Caramaschi and Niemeyer 2005c).

Remarks: In *Pristimantis unistrigatus* species group according to original publication (Myers and Donnelly 1997) and by Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014).

Selected references: Myers and Donnelly (1997); Caramaschi and Niemeyer (2005d).

Pristimantis mondolfii (Rivero 1984)

Holotype: UPR-M 6082.

Type locality: Matamula, Municipio Delicias, elevation 1,120 m, Táchira State, Venezuela.

Distribution: Region 1. Colombia and Venezuela. In Venezuela, known only from the Andes of Táchira State.

Remarks: Acevedo et al. (2014) found it in Colombia and provided new morphological traits to differentiate it from *Pristimantis melanoproctus*. In *Pristimantis unistrigatus* species group according to original publication (Rivero 1984) and Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014). By its close resemblance to *Tachiramantis lentiginosus*, might be a

member of genus *Tachiramantis* (Heinicke et al. 2015).
Selected references: Rivero (1982c); Acevedo et al. (2014).

Pristimantis muchimuk Barrio-Amorós, Mesa, Brewer-Carías and McDiarmid, 2010*

Holotype: MHNLS 19652.

Type locality: Northern face of Churi-tepui, 5°16'45"N, 62°00'56"W, 2,325 m asl, Bolívar State, Venezuela.

Distribution: Region 5. Apparently endemic on Churi-tepui since not observed on nearby tepuis such as Abakapá (Rojas-Runjaic et al. 2013).

Remarks: Described by Barrio-Amorós et al. (2010f) from a single specimen. Variation and an augmented diagnosis given by Rojas-Runjaic et al. (2013). Not assigned to any species group by Padial et al. (2014).

Selected references: McDiarmid and Donnelly (2005); Barrio-Amorós et al. (2010f); Rojas-Runjaic et al. (2013); Señaris et al. (2014).

Pristimantis nicefori (Cochran and Goin 1970)

Holotype: USNM 147012.

Type locality: "Páramo del Almorzadero, Santander, Colombia."

Distribution: Region 1. Colombian and Venezuelan Andes. In Venezuela, known only from Páramo de Tamá, Táchira State.

Remarks: Lynch (1994) rediagnosed it and related it to *Phrynopus sensu lato*. In *Pristimantis unistrigatus* species group according to Lynch and Duellman (1997) and Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014).

Selected references: Lynch (1981, 1994); La Marca (1992).

Pristimantis nubisilva Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*

Holotype: CVULA 7430.

Type locality: "Southern slopes of Cerro Humo, Península de Paria, Estado Sucre, Venezuela (10.7073°N, 62.6284°W), elevation ca. 750 m."

Distribution: Region 2. Endemic to Península de Paria in northeastern Venezuela.

Remarks: In *Pristimantis unistrigatus* species group according to original publication (Kaiser et al. 2015).

Selected references: Kaiser et al. (2015).

Pristimantis paramerus (Rivero 1984)*

Holotype: UPR-M 2926.

Type locality: "Páramo de Santo Domingo, región de Mucuchíes, Edo. Mérida, Venezuela, 3,330 m."

Distribution: Region 1. Restricted to *páramos* in Sierra

Nevada (Mucubají, Sai Sai, Los Granates), Mérida State.

Remarks: In *Pristimantis unistrigatus* species group according to original publication (Rivero 1984), but not assigned to any species group by Hedges et al. (2008) or Padial et al. (2014).

Selected references: Rivero (1982b); La Marca (2005).

Pristimantis pariagnomus Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*

Holotype: MHNLS 14456.

Type locality: "Southern slopes of Cerro Humo (10.7073°N, 62.6284°W), elevation 780 m, Estado Sucre, Venezuela."

Distribution: Region 2. Only known from type locality in Península de Paria, Sucre State, northeastern Venezuela.

Remarks: Described based on a single specimen; no other specimens known to date as vouchers; however, individual in photograph (Image 269) is a second individual of the species, and additional specimens have been observed (G. Rivas, pers. comm.). In *Pristimantis unistrigatus* species group according to original publication (Kaiser et al. 2015).

Selected references: Kaiser et al. (2015).

Pristimantis pedimontanus (La Marca 2004)*

Holotype: ULABG 3221.

Type locality: Parque Nacional Chorro del Indio, 16.5 km in road San Cristóbal-Macanilla, approx. 8 km SE of San Cristóbal, San Cristóbal municipality, Táchira State, Venezuela.

Distribution: Region 1. Eastern slopes of Cordillera de Mérida, Andes of Venezuela.

Remarks: Assigned to *Pristimantis conspicillatus* species group in original publication (La Marca 2004) and maintained in this group by Hedges et al. (2008). More recently, removed from *P. conspicillatus* species group and left unassigned to any species group by Padial et al. (2014).

Selected references: La Marca (2004).

Pristimantis pleurostriatus (Rivero 1984)*

Holotype: UPR-M 4971.

Type locality: San Eusebio, La Carbonera, 2,316 m, Mérida State, Venezuela.

Distribution: Region 1. Endemic to Venezuelan Cordillera de Mérida. Apparently restricted to surroundings of type locality.

Remarks: Barrio-Amorós et al. (2013) redescribed this previously poorly-known species using fresh material and placed it into a phylogenetic context. In *Pristimantis unistrigatus* species group according to original publication (Rivero 1984), but not assigned to any species group by Hedges et al. (2008) or Padial et



257. *Pristimantis jamescameroni*. Aprada tepui, Bolívar. Photo: Philippe Kok.



258. *Pristimantis lancinii*. Páramo Los Granates, Mérida. Photo: César Barrio-Amorós.



259. *Pristimantis lassoalcalai*. Female paratype MHNLS 18877. Cerro Las Antenas, Sierra de Perijá, Zulia. Photo: PabloVELOZO.



260. *Pristimantis longicarpus*. Male holotype CVULA 7444. Southern slopes of Cerro Humo, Península de Paria, Sucre, Venezuela. Photo: César Barrio-Amorós.



261. *Pristimantis marahuaka*. Cerro Marahuaka (tepuí) Summit, Amazonas. Photo: Charles Brewer-Carías.



262A. *Pristimantis* aff. *marmoratus*. El Peñón, Auyan-tepuí, Bolívar. Photo: César Barrio-Amorós.

al. (2014).

Selected references: Rivero (1982c, 1983); Barrio-Amorós et al. (2013).

Pristimantis pruinatus (Myers and Donnelly 1996)*

Holotype: EBRG 3006.

Type locality: “Summit of cerro Yaví, 2,150 m, Amazonas, Venezuela.”

Distribution: Region 5. Endemic to Cerro Yaví, a tepui in northern Amazonas State.

Remarks: In subgenus *Pristimantis* but not assigned

to any species group (Hedges et al. 2008; Myers and Donnelly 1996; Padial et al. 2014).

Selected references: Myers and Donnelly (1996).

Pristimantis pulvinatus (Rivero 1968)*

Holotype: MCZ 64741.

Type locality: “Paso del Danto, región of La Escalera around 1,400 m above San Isidro, road from El Dorado to Sta. Elena de Uairén, Estado Bolívar, Venezuela.”

Distribution: Region 5. Venezuela and Guyana. In Venezuela, in surroundings of La Escalera and Gran



262B. *Pristimantis marmoratus*. Chivatón, Gran Sabana, Bolívar. Photo: César Barrio-Amorós.



263. *Pristimantis melanoproctus*. Tamá National Park, Norte de Santander, Colombia. Photo: Aldemar A. Acevedo.



264A. *Pristimantis* cf. *mondolfii*. Matamula, Táchira. Photo: César Barrio-Amorós.



264B. *Pristimantis mondolfii*. Tamá National Park, Norte de Santander, Colombia. Photo: Aldemar A. Acevedo.



265A. *Pristimantis muchimuk*. Female holotype MHNLS 19652. Churi-tepui, Chimantá massif, Bolívar. Photo: Javier Mesa.



265B. *Pristimantis muchimuk*. Churi-tepui, Chimantá massif, Bolívar. Photo: Fernando Rojas-Runjaic.

Sabana, eastern Bolívar State. Has been confused with *P. marmoratus* (Kok et al. 2018).

Remarks: In subgenus *Pristimantis* but not assigned to any species group (Hedges et al. 2008; Padial et al. 2014). Probably a species complex (P. Kok and CBA, in prep.).

Selected references: Rivero (1968c); Lynch (1976); Duellman (1997); Myers and Donnelly (1997); Gorzula and Señaris (1998); Barrio-Amorós and Duellman (2009); Señaris et al. (2014); Kok et al. (2018).

Pristimantis reticulatus (Walker and Test 1955)*

Holotype: UMMZ 109872.

Type locality: “Slope of Pico Periquito +/- 1,275 m, Rancho Grande, Estado Aragua, Venezuela.”

Distribution: Only known from type locality and surroundings at elevations over 1,000 m in central Cordillera de la Costa of Aragua State.

Remarks: Region 2. Apparently, specimens last collected in 1971. In subgenus *Pristimantis* but not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).



266. *Pristimantis nicefori*. Páramo Tamá, Tamá National Park, Norte de Santander, Colombia. Photo: Aldemar A. Acevedo.



267. *Pristimantis nubisilva*. Amplexus. Southern slopes of Cerro Humo, Península de Paria, Sucre. Photo: César Barrio-Amorós.



268A. *Pristimantis paramerus*. Quebrada del Padre, way to páramo Los Granates, Mérida. Photo: César Barrio-Amorós.



268B. *Pristimantis paramerus*. Quebrada del Padre, way to páramo Los Granates, Mérida. Photo: César Barrio-Amorós.



269. *Pristimantis pariagnomus*. Cerro el Humo, Peninsula de Paria, Sucre. Photo: Mayke de Freitas.



270A. *Pristimantis pleurostriatus*. Calling male. Estancia La Bravera, way from Mérida to La Azulita, 2,200 m asl, Mérida. Photo: César Barrio-Amorós.

Selected references: Walker and Test (1955); Ginés (1959); Rivero (1961, 1964a); Lynch (1976); Lynch and La Marca (1993); Barrio-Amorós (2006c).

Pristimantis rhigophilus (La Marca 2007)*

Holotype: ULABG 1915.

Type locality: “Páramo de Guaramacal, 3,100 m (9°13'53.9"N, 70°11'8.7"W), en la vía Laguna de los Cedros-Guaramacal, Municipio Boconó, Estado Trujillo, Venezuela.”

Distribution: Known only from type locality in Venezuelan Andes.

Remarks: In subgenus *Pristimantis* but not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: La Marca (2007).

Pristimantis rivasi

Barrio-Amorós, Rojas-Runjaic and Barros, 2010

Holotype: MHNLS 18445.

Type locality: “Cerro Las Antenas, elevation 1,670 m,

10°20'N, 72°35'W, Sierra de Perijá, Municipio Rosario de Perijá, Estado Zulia, Venezuela.”

Distribution: Region 1. Known only from eastern (Venezuelan) versant of Sierra de Perijá, in cloud forest at 1,438–1,933 m asl. Recently reported from Colombian side of Perijá (Meza-Joya 2016).

Remarks: In *Pristimantis unistrigatus* species group according to original publication (Barrio-Amorós et al. 2010), but not assigned to any species group by Padial et al. (2014).

Selected references: Barrio-Amorós et al. (2010i); Meza-Joya (2016).

Pristimantis riveroi (Lynch and La Marca 1993)*

Holotype: AMNH 70599.

Type locality: “Rancho Grande, Estado Aragua, Venezuela.”

Distribution: Region 2. Known only from type locality in central Cordillera de la Costa in Aragua State.

Remarks: In *Pristimantis unistrigatus* species group according to Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014).

Selected references: Lynch and La Marca (1993); Barrio-Amorós (2006c).

Pristimantis rozei (Rivero 1961)*

Holotype: MBUCV 2018.

Type locality: “Curucuruma, Estado Aragua, Venezuela.”

Distribution: Region 2. Known only from surroundings of type locality in central Cordillera de la Costa, Aragua State.

Remarks: Perhaps conspecific with *Pristimantis reticulatus*, according to Lynch and La Marca (1993). In *P. unistrigatus* species group according to Hedges et al. (2008), but not assigned to any species group by Padial et al. (2014). Reported *P. rozei* from Nirgua Massif in Yaracuy State by Lotzkat (2007) considered here to be *P. cf. stenodiscus*, due to characteristic shape of finger disks (Image 274).

Selected references: Rivero (1961, 1964a); Lynch (1976, 1979b); La Marca (1992); Lynch and La Marca (1993); Lotzkat (2007).

Pristimantis sarisarinama

Barrio-Amorós and Brewer-Carías, 2008*

Holotype: EBRG 4668.

Type locality: “Sima Mayor, Sarisariñama-tepui, Estado Bolívar, Venezuela (4°41'N, 64°13'W), elevation 1,100 m.”

Distribution: Region 5. Apparently endemic to Sarisariñama, a tepui in Bolívar State, southern Venezuela.

Remarks: In *Pristimantis unistrigatus* species group

according to original publication (Barrio-Amorós and Brewer-Carías 2008), but not assigned to any species group by Padial et al. (2014).

Selected references: Barrio-Amorós and Brewer-Carías (2008).

Pristimantis stenodiscus (Walker and Test 1955)*

Holotype: UMMZ 109866.

Type locality: “Pico Periquito, Rancho Grande, Estado Aragua, Venezuela.”

Distribution: Region 2. Only known from vicinity of type locality in central Cordillera de la Costa. Records from Nirgua Massif, Yaracuy State, must be confirmed.

Remarks: There is no recent information about the species. In subgenus *Pristimantis* but not assigned to any species group (Hedges et al. 2008; Padial et al. 2014). Sebastian Lotzkat sent photos taken in Nirgua Massif, Yaracuy (Lotzkat 2007), and the reported *P. rozei* in that thesis is herein considered to be *P. cf. stenodiscus*, due to characteristic shape of finger disks (Image 276), but should be better confirmed with voucher specimens.

Selected references: Walker and Test (1955); Ginés (1959); Rivero (1961); Lynch (1976); Barrio-Amorós (2006c); Lotzkat (2007).

Pristimantis telefericus (La Marca 2005)*

Holotype: ULABG 2232.

Type locality: From path between third and fourth stations of Teleférico de Mérida, 3,500 m, Libertador Municipality, Mérida State, Venezuela.

Distribution: Region 1. Apparently microendemic around type locality in Sierra Nevada de Mérida, in páramo habitat at 3,400–3,500 m asl.

Remarks: Appears to have suffered a decline, as intensive search by CBA in March–April 2012 (nearly 20 hours) resulted in no positive observations. In *Pristimantis unistrigatus* species group according to Hedges et al. (2008) but not assigned to any species group by Padial et al. (2014).

References: La Marca (2005).

Pristimantis thyellus (La Marca 2007)*

Holotype: ULABG 2137.

Type locality: “Páramo El Batallón, 3,125 m (aprox. 8°10'48"N, 71°54'08"W), Parque Nacional Juan Pablo Peñaloza, Municipio Guaraque, Estado Mérida, cerca del límite con el Estado Táchira, Venezuela.”

Distribution: Region 1. Apparently restricted to páramo El Batallón, 2,900–3,800 m asl. Expected in Táchira State due to continuous habitat.

Remarks: In subgenus *Pristimantis* but not assigned to any species group (Hedges et al. 2008; Padial et al. 2014).

Selected references: La Marca (2007).



270B. *Pristimantis pleurostriatus*. Juvenile. Estancia La Bravera, way from Mérida to La Azulita, 2,200 m asl, Mérida. Photo: César Barrio-Amorós.



271A. *Pristimantis pulvinatus*. Paso del Danto, La Escalera región, Bolívar. Photo: César Barrio-Amorós.



271B. *Pristimantis* cf. *pulvinatus*. Male. La Laja, Sierra de Lema, Bolívar. Photo: Alan Highton.



271C. *Pristimantis* cf. *pulvinatus*. Female. La Laja, Sierra de Lema, Bolívar. Photo: Alan Highton.



272A. *Pristimantis rivasi*. Female holotype MHNLS 18445. Cerro Las Antenas, Sierra de Perijá, Zulia. Photo: Tito Barros.



272B. *Pristimantis rivasi*. Male. Cerro Las Antenas, Sierra de Perijá, Zulia. Photo: Fernando Rojas-Runjaic.

Pristimantis tubernasus* (Rivero 1984)

Holotype: UPR-M 4349.

Type locality: “Boca de Monte, Camino a Pregonero, 2,393 m, Edo. Mérida, Venezuela.”

Distribution: Region 1. Colombia and Venezuela. In Venezuela, distributed in the Andes of Táchira, Barinas, and Mérida States.

Remarks: *Eleutherodactylus pulidoi* Rivero, 1984 was considered a junior synonym of *P. tubernasus* by Lynch (2003). In *P. unistrigatus* species group of Hedges et al. (2008) but not assigned to any species group by Padiál et al. (2014).

Selected references: Rivero (1982c); Ruíz-Carranza et al. (1996); Lynch (2003).

Pristimantis turik

Barrio-Amorós, Rojas-Runjaic and Infante, 2007*

Holotype: MBLUZ 155.

Type locality: Cueva del Agua (lower gallery in the Northern Wall cave), Mesa Turik, Rosario de Perijá Municipality, Sierra de Perijá, Zulia State, Venezuela (10°24'N, 72°42'W; 1,700 m asl).

Distribution: Region 1. Only known from type locality; could be present on Colombian side of Sierra de Perijá.



273A. *Pristimantis riveroi*. Male. Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



273B. *Pristimantis riveroi*. Amplexus. Rancho Grande, Henri Pittier National Park, Aragua. Photo: Andrés González.



274. *Pristimantis rozei*. Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



275. *Pristimantis sarisarinama*. Paratopotype EBRG 4674. Sima Mayor Sarisariñama-tepui, Bolívar. Photo: César Barrio-Amorós.



276. *Pristimantis* cf. *stenodiscus*. Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



277. *Pristimantis thyellus*. Páramo Batallón y la Negra, Táchira. Photo: Liz del Valle.



278. *Pristimantis tubernasus*. San Isidro, Barinas. Photo: César Barrio-Amorós.



279A. *Pristimantis vanadisae*. Female, pattern plain. Estancia La Bravera, way from Mérida to La Azulita, 2,200 m asl, Mérida. Photo: César Barrio-Amorós.



279B. *Pristimantis vanadisae*. Pattern plain. Estancia La Bravera, way from Mérida to La Azulita, 2,200 m asl, Mérida. Photo: César Barrio-Amorós.



279C. *Pristimantis vanadisae*. Female, pattern dorsoconcolor. Estancia La Bravera, way from Mérida to La Azulita, 2,200 m asl, Mérida. Photo: César Barrio-Amorós.



279D. *Pristimantis vanadisae*. Juvenile, spotted pattern. Estancia La Bravera, way from Mérida to La Azulita, 2,200 m asl, Mérida. Photo: César Barrio-Amorós.



280A. *Pristimantis vilarsi*. Male. Tobogán de la Selva, near Puerto Ayacucho, Amazonas. Photo: César Barrio-Amorós.



280B. *Pristimantis vilarsi*. Female. Tobogán de la Selva, near Puerto Ayacucho, Amazonas. Photo: Zelimir Cernelic.



281. *Pristimantis yukpa*. Female. Cerro Las Antenas. Photo: Fernando Rojas-Runjaic.

Remarks: Known only from single specimen. In *Pristimantis unistrigatus* species group according to original publication (Barrio-Amorós et al. 2007) but not assigned to any species group by Padial et al. (2014).
Selected references: Barrio-Amorós et al. (2007).

Pristimantis turumiquirensis (Rivero 1961)*

Holotype: AMNH 22557.
Type locality: La Trinidad, Mount Turumiquire, in cave at approximate elevation of 1,830 m, between Sucre and Monagas States, Venezuela.
Distribution: Region 2. Apparently endemic to

Turimiquire, a massif in eastern part of Coastal Range, northwestern Venezuela.
Remarks: Considered Endangered (EN) by Venezuelan Red Book (Señaris and Rojas-Runjaic 2015d). In *Pristimantis unistrigatus* species group of Hedges et al. (2008) but not assigned to any species group by Padial et al. (2014).
Selected references: Rivero (1961, 1964a); La Marca (1992); Señaris and Rojas-Runjaic (2015d).

Pristimantis vanadise (La Marca 1984)*

Holotype: CVULA 2805.

Type locality: “Stream in cloud forest above Truchicultura La Mucuy, 2,350 m, Sierra Nevada de Mérida, Estado Mérida, Venezuela.”

Distribution: Region 1. In Andes of Mérida State.

Remarks: Barrio-Amorós et al. (2013) described four chromotypes, placed it in a phylogenetic context, and made an unjustified amendment, spelling species name as *vanadisae*. In *Pristimantis unistrigatus* species group according to original publication (La Marca 1984) and Hedges et al. (2008); not assigned to any species group by Padial et al. (2014).

Selected references: Rivero (1982c); La Marca (1984b, 1985a, 1991b “1994”); Barrio-Amorós et al. (2013).

Pristimantis vilarsi (Melin 1941)

Syntypes: NHMG 491 (two specimens).

Type locality: Taracuá, Rio Uaupés, (Amazonas State), Brazil.

Distribution: Regions 4, 5. Upper Amazonian Region of Brazil, Peru, Colombia, and Venezuela. In Venezuela, widespread south of Orinoco River.

Remarks: A redescription of the species and map of its distribution appeared in Barrio-Amorós and Molina (2006). Heyer and Barrio-Amorós (2009) described the call. *Eleutherodactylus stegolepis* Schlüter and Rödder, 2007 is a junior synonym (Kok and Barrio-Amorós 2013). In *Pristimantis conspicillatus* species group of Hedges et al. (2008) and Padial et al. (2014).

Selected references: Melin (1941); Rivero (1961, 1964b, 1967a); Lynch (1975a, 1976, 1979b, 1980); Rivero et al. (1986); La Marca (1992); Barrio (1996a); Gorzula and Señaris (1998); Barrio-Amorós and Molina (2006); Schlüter and Rödder (2007); Heyer and Barrio-Amorós (2009); Barrio-Amorós et al. (2011b); Kok and Barrio-Amorós (2013).

Pristimantis yaviensis (Myers and Donnelly 1996)*

Holotype: EBRG 3017.

Type locality: “Summit of Cerro Yaví, 2,150 m, Amazonas, Venezuela.”

Distribution: Region 5. Only known from Cerro Yaví and Cerro Yutajé, two tepuis in northern Amazonas State.

Remarks: In *Pristimantis unistrigatus* species group according to original publication (Myers and Donnelly 1996) and Hedges et al. (2008).

Selected references: Myers and Donnelly (1996, 2001); Gorzula and Señaris (1998).

Pristimantis yukpa

Barrio-Amorós, Rojas-Runjaic and Infante, 2007*

Holotype: MHNLS 18525.

Type locality: Kiriponsa, an indigenous Yukpa community along the Tokuko River, Machiques de Perijá

Municipality, Sierra de Perijá, Zulia State, Venezuela (09°51'N, 72°53'W; 1,005 m asl).

Distribution: Region 1. Widely distributed along eastern (Venezuelan) versant of Sierra de Perijá, 600–1,200 m asl. Recently reported from Colombian side of Perijá (Meza-Joya 2016).

Remarks: Barrio-Amorós et al. (2012) show *P. gryllus* as vicariant species of *P. yukpa* in Cordilleras Oriental and de Mérida. Both species are members of *unistrigatus* species group *sensu stricto* (nested with *P. unistrigatus*); Padial et al. (2014) did not assign it to any species group.

Selected references: Barrio-Amorós et al. (2007, 2012); Meza-Joya (2016).

Pristimantis yuruaniensis Rödder and Jungfer, 2008*

Holotype: ZFMK 87278.

Type locality: Yuruani-tepui, Gran Sabana Municipality, Bolívar State, Venezuela (5°19'31"N, 60°50'40"W; elevation 2,300 m).

Distribution: Region 5. Restricted to summit of Yuruani, a tepui in southeastern Bolívar State.

Remarks: Considered Vulnerable (VU) according to Venezuelan Red Book (Señaris and Rojas-Runjaic 2015b). Not assigned to any species group by Padial et al. (2014) or Rödder and Jungfer (2008), but considered in “*unistrigatus*” species group by Kok et al. (2018).

Selected references: Rödder and Jungfer (2008); Señaris et al. (2014); Señaris and Rojas-Runjaic (2015b).

Pristimantis yustizi

(Barrio-Amorós and Chacón 2004)*

Holotype: CVULA 2150.

Type locality: Cerro Alto, La Soledad, Barinas State, Venezuela, elevation 1,500 m.

Distribution: Region 1. Eastern slopes of Andes of Táchira, Barinas, Lara, and Portuguesa States.

Remarks: In *Pristimantis unistrigatus* species group of Hedges et al. (2008) but not assigned to any species group by Padial et al. (2014). Most likely actually a member of *P. conspicillatus* group (B.S. Hedges and CBA, in prep.).

Selected references: Barrio-Amorós and Chacón 2004; Barrio-Amorós 2010a.

Pristimantis zeuctotylus (Lynch and Hoogmoed 1977)

Holotype: RMNH 17701.

Type locality: “West slope, Vier Gebroeders Mountain, Sipaliwini, Nickerie District, Suriname.”

Distribution: Region 4. Widely distributed in Amazonia, from southern Colombia through Venezuela, Brazil, Guyana, and Suriname to French Guiana. In Venezuela, only known from a few localities in southern Amazonas State.

Remarks: Barrio-Amorós and Molina (2006) doubted



282. *Pristimantis yuruaniensis*. Female. Summit of Yuruani-tepui, Bolívar. Photo: César Barrio-Amorós.



283. *Pristimantis yustizi*. Female. Calderas, Barinas. Photo: César Barrio-Amorós.



284. *Pristimantis zeuctotylus*. Camp Angouleme, French Guiana. Photo: P.J.R. Kok.



285. *Pristimantis* sp. 1. Páramo Los Granates, Mérida. Photo: César Barrio-Amorós.



286. *Pristimantis* sp. 2. Sub páramo La Motus, Mérida. Photo: César Barrio-Amorós.



287. *Pristimantis* sp. 3. Páramo Piñango, Mérida. Photo: César Barrio-Amorós.

the validity of this taxon, which is distinguished from *Pristimantis vilarsi* only by absence of tarsal fold (present on *P. vilarsi*) and rounded palmar tubercle (variable in *P. vilarsi*). Araujo de Oliveira et al. (2017) show a maximum likelihood tree in which *P. zeuctotylus* from Suriname is presented as sister to *P. vilarsi* from Colombia; this should be confirmed with specimens from type localities of both species. In *Pristimantis conspicillatus* species group of Hedges et al. (2008) and Padial et al. (2014).
Selected references: Lynch and Hoogmoed (1977); Lynch (1980); Barrio-Amorós and Molina (2006).

**Subfamily Strabomantinae
Hedges, Duellman and Heinicke, 2008**

Genus *Strabomantis* Cope, 1862

Type species: *Strabomantis biporcatus* Peters, 1863, by monotypy.

Strabomantis biporcatus Peters, 1863*

Lectotype: ZMB 3330B, assigned by Savage and Myers (2002).

Type locality: “Veragua,” in error for “northern Venezuela.”

Distribution: Region 2. Distributed throughout Cordillera de la Costa (Fig. 1 in Barrio-Amorós and Kaiser 2008).

Remarks: Long-known as *Eleutherodactylus cornutus*

maussi (Rivero 1961) or *Eleutherodactylus maussi* (La Marca 1882; Barrio-Amorós 1998). Reviewed by Savage and Myers (2002), who determined the name *biporcatus* (originally stated from Veragua, Panama) applied to four specimens collected in Northern Venezuela, then *Eleutherodactylus biporcatus*. Crawford and Smith (2005) transferred *E. biporcatus* to genus *Craugastor*. Hedges et al. (2008) subsequently recovered *Strabomantis* and included *biporcatus* as its type species. Barrio-Amorós and Kaiser (2008) commented on phenotypic variation and distribution. In *Strabomantis biporcatus* species group of Hedges et al. (2008) and Padial et al. (2014).

Selected references: Boettger (1893); Lutz (1927); Ginés (1959); Rivero (1961, 1964a, d); Heatwole (1962); Mertens (1967); Lynch (1975, 1976); La Marca (1992); Manzanilla et al. (1996); Savage and Myers (2002); Rivero and Mijares (2004); Barrio-Amorós (2006c); Barrio-Amorós and Kaiser (2008).

Order Urodela Duméril, 1805

Remarks: Herein follows Dubois and Raffaelli (2012) in the rationale for using the taxon nomina *Urodela* Duméril, 1805 instead of *Caudata* Fischer von Waldheim, 1813.

Family Plethodontidae Gray, 1850

Subfamily Hemidactyliinae Hallowell, 1856

Remarks: Herein follows most comprehensive and symmetric taxonomy by Vieites et al. (2011).

Genus *Bolitoglossa* Dumeril, Bibron and Dumeril, 1854

Type species: *Salamandra platydactylus* Gray, 1831, by monotypy.

Remarks: All members of Venezuelan *Bolitoglossa* pertain to subgenus *Eladinea* Miranda Ribeiro, 1937 (Parra-Olea et al. 2004).

Bolitoglossa borburata Trapido, 1942*

Holotype: USNM 115509.

Type locality: “Valle del Río Borburata, Estado Carabobo, Venezuela, 1,200 m.”

Distribution: Region 2. Endemic from Venezuela. Restricted to Cordillera de la Costa (Carabobo, Aragua, and Yaracuy States).

Remarks: Probably a complex of species; specimens from Yaracuy assigned tentatively to *Bolitoglossa borburata* by Barrio and Fuentes (1999b) can represent a different taxon. Unfortunately, seems to have vanished, at least from central Cordillera de la Costa. In *Bolitoglossa adspersa* species group of Parra-Olea et al. (2004).

Selected references: Trapido (1942); Röhl (1959); Brame and Wake (1963); Hanken and Wake (1982);

Manzanilla et al. (1995); Rodríguez and Rojas-Suárez (1995); Barrio (1999a); Barrio and Fuentes (1999b); Barrio-Amorós (2006c).

Bolitoglossa guaramacalensis

Schargel, García-Pérez and Smith, 2002*

Holotype: MCNG-A 2121.

Type locality: “Boconó-Guaramacal road, Quebrada el Pollo (9°13'N, 70°10'W), south slope of the Macizo de Guaramacal, 2,400 m, Trujillo, Venezuela.”

Distribution: Region 1. Endemic to Venezuela. Apparently restricted to Guaramacal massif (Trujillo State), in eastern versant of Venezuelan Andes.

Remarks: In *Bolitoglossa adspersa* species group according to original publication (Schargel et al. 2002) and by Parra-Olea et al. (2004).

Selected references: Schargel et al. (2002).

Bolitoglossa leandrae Acevedo, Wake, Márquez, Silva, Franco and Amézquita, 2013

Holotype: MCNUP 62.

Type locality: “San Antonio, Parque Nacional Natural Tamá (PNNT) (7.153092, -72.227306) 600 m elevation, Departamento de Norte de Santander, Colombia.”

Distribution: Region 1. Endemic from foothills of Tamá massif between Colombia and Venezuela. Reported from Venezuelan side by Barrio-Amorós et al. (2015).

Selected references: Acevedo et al. (2013); Barrio-Amorós et al. (2015).

Bolitoglossa mucuyensis García-Gutiérrez, Escalona, Mora, Díaz de Pascual and Fermín, 2013*

Holotype: ULABG 1772.

Type locality: “Parque Nacional Sierra Nevada, La Mucuy, 2,225 m, Santos Marquina municipality, Mérida State, Venezuela.”

Distribution: Region 1. Endemic from Venezuela. Only known from type locality, La Mucuy, 1,800–2,250 m. Probably more extended through cloud forests of western versant of Sierra Nevada de Mérida.

Selected references: García-Gutiérrez et al. (2013).

Bolitoglossa orestes Brame and Wake, 1962*

Holotype: BMNH 1905.5.31.103.

Type locality: “Culata, 9,810 feet (3,000 meters) Cordillera de Mérida, Estado de Mérida, Venezuela.” 9,810 feet corresponds to 2,990 m.

Distribution: Region 1. Sierra de la Culata in Mérida State, Venezuela. Type locality and distribution referred to *Bolitoglossa spongai* is summed for *B. orestes*. Locality “La Mucuy” in Sierra Nevada de Mérida, given in Barrio-Amorós and Fuentes Ramos (1999: 16) for *B. spongai* was an editorial error; currently *B. orestes* is only known



288A. *Strabomantis biporcatus*. Female. Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



288B. *Strabomantis biporcatus*. Female. southern slopes Cerro Humo, Península de Paria, Sucre. Photo: Hinrich Kaiser.



289. *Bolitoglossa* cf. *altamazonica*. Doradas river valley. Photo: César Barrio-Amorós.



290. *Bolitoglossa borburata*. Nirgua Massif, Yaracuy. Photo: Sebastian Lotzkat.



291. *Bolitoglossa guaramacalensis*. Guaramacal National Park. Photo: Juan E. García-Pérez.



292. *Bolitoglossa leandrae*. Female. Río Frío, Táchira. Photo: César Barrio-Amorós.

from Sierra de la Culata, separated from *B. mucuyensis* by the deep valley of Chama River. Populations from La Mucuy later described as *B. mucuyensis* (García-Gutiérrez et al. 2013).

Remarks: Fermín et al. (2012) recently passed *Bolitoglossa spongai* Barrio-Amorós and Fuentes-Ramos, 1999 to synonymy of *B. orestes*, based on genetic and morphological data. Therefore, all data in literature for *B. spongai* (Rodríguez and Rojas-Suárez 2008; Barrio-Amorós et al. 2010e) refers now to *B. orestes*.

Two works on natural history and ecological traits of *B. orestes*: Cadenas et al. (2009) based on a population at Monte Zerpa, north of Mérida, and Barrio-Amorós et al. (2010e) under name *B. spongai*, about a population from cloud forests around Páramo El Tambor, Mérida State. The Venezuelan Red Book considers it Vulnerable (VU) [Barrio-Amorós and Rivas 2015].

Selected references: Brame and Wake (1962, 1963); Péfaur and Díaz de Pascual (1982); Rodríguez and Rojas-Suárez (1995, 2008); Barrio-Amorós (1998, 2004); Barrio-Amorós and Fuentes-Ramos (1999, 2004);

Cadenas et al. (2009); Barrio-Amorós et al. (2010e); Fermín et al. (2012); Barrio-Amorós and Rivas (2015).

Bolitoglossa tamaense Acevedo, Wake, Márquez, Silva, Franco and Amézquita, 2013

Holotype: MCNUP 50.

Terra typica: “La Asiria de Belén, Parque Nacional Natural Tamá (PNNT) (7.319278, -72.374778) at 2,700 m elevation, Departamento de Norte de Santander, Colombia.”

Distribution: Region 1. Endemic from cloud forest of Tamá massif between Colombia and Venezuela. Reported from Venezuelan side by Barrio-Amorós et al. (2015).

Selected references: Acevedo et al. (2013); Barrio-Amorós et al. (2015).

Order GYMNOPIHONA Müller, 1832

Family Caeciliidae Rafinesque, 1814

Genus *Caecilia* Linnaeus, 1758

Type species: *Caecilia tentaculata* Linnaeus, 1758, by subsequent designation of Dunn, 1942.

Caecilia flavopunctata Roze and Solano, 1963*

Holotype: MBUCV 5358.

Type locality: “Albarico, Yaracuy, Venezuela.”

Distribution: Region 2. Endemic to Venezuela. Known only from surroundings of type locality.

Selected references: Roze and Solano (1963); Taylor (1968); Nussbaum and Wilkinson (1989); Rivas (2009).

Caecilia subnigricans Dunn, 1942

Holotype: ANSP 4921 (not 4821 as given in description, *sensu* Taylor, 1968).

Type locality: “Magdalena River, Colombia.”

Distribution: Regions 1, 2. Magdalena Valley in Colombia, Andes of Venezuela (Táchira and Barinas), and Falcón State.

Selected references: Dunn (1942); Ginés (1959); Taylor (1968); Péfaur and Díaz de Pascual (1987); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Lynch (2000).

Caecilia tentaculata Linnaeus, 1758

Type: NHRM (lost).

Type locality: “America.”

Distribution: Regions 1, 2, 4. South America east of Andes, in Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil, Ecuador, and Peru. Apparently widespread in lowland Venezuela, known from Estados Amazonas, Táchira, and Yaracuy (Barrio-Amorós 1998).

Selected references: Dunn (1942); Taylor (1968); Péfaur

et al. (1987, 1992); Nussbaum and Wilkinson (1989); Maciel and Hoogmoed (2011).

Family Rhinatrematidae Nussbaum, 1977

Genus *Epicrionops* Boulenger, 1883

Type species: *Epicrionops bicolor* Boulenger, 1883, by monotypy.

Epicrionops niger (Dunn 1942)

Neotype: MBUCV 5360.

Type locality: “Arundabara, British Guiana, elevation 2,200 feet;” locality of neotype is “El Dorado, Bolívar, Venezuela.”

Distribution: Region 5. South-central Guayana and Southeastern Venezuela. In Venezuela, a few localities in Bolívar State (Barrio-Amorós 1998).

Selected references: Dunn (1942); Taylor (1968); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Señaris et al. (2014).

Family Shiphonopidae Bonaparte, 1850

Genus *Microcaecilia* Taylor, 1968

Type species: *Dermophis albiceps* Boulenger, 1882, by original designation.

Microcaecilia rabei (Roze and Solano 1963)

Holotype: MBUCV 5126.

Type locality: “Al pie de Cerro Lema, Río Chicanán, Bolívar, Venezuela.”

Distribution: Region 5. Venezuela and Suriname. In Venezuela, a few localities in Bolívar State and Delta Amacuro, south of Orinoco River.

Selected references: Roze and Solano (1963); Taylor (1968); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Maciel and Hoogmoed (2011b); Señaris et al. (2014).

Genus *Siphonops* Wagler, 1828

Type species: *Caecilia annulata* Mikan, 1820, by monotypy.

Siphonops annulatus (Mikan 1820)

Lectotype: RMNH 2419.

Type locality: “Sebastianopolis (Rio de Janeiro), Brasil.”

Distribution: Region 1. Widely distributed east of Andes in Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, and French Guiana. In Venezuela, eastern slopes of the Andes in Barinas and Portuguesa States.

Selected references: Dunn (1942); Ginés (1959); Röhl



293. *Bolitoglossa mucuyensis*. La Mucuy, Mérida. Photo: Ariel Espinosa-Blanco.



294A. *Bolitoglossa orestes*. Sierra de la Culata, Mérida. Photo: César Barrio-Amorós.



294B. *Bolitoglossa orestes*. La Bravera, way from Mérida to La Azulita, Mérida, near type locality of the synonym *B. spongai*. Photo: César Barrio-Amorós.



294C. *Bolitoglossa orestes*. La Bravera, way from Mérida to La Azulita, Mérida. Photo: César Barrio-Amorós.



295. *Bolitoglossa tamaense*. Matamula, Táchira. Photo: Andrés Chacón.



296. *Epicrionops niger*. Brazil. Photo: Pedro Henrique Bernardo.

(1959); Taylor (1968); Péfaur and Díaz de Pascual (1982); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Lynch (1999); Maciel and Hoogmoed (2011a).

Family Tiplonectidae Taylor, 1968

Genus *Nectocaecilia* Taylor, 1968

Type species: *Chthonerpeton petersii* Boulenger, 1882, by original designation.

Nectocaecilia petersii (Boulenger 1882)

Holotype: BMNH 1946.9.5.68.

Type locality: “Upper Amazon.”

Distribution: Region 4. Colombia, Venezuela, and Brazil. In Venezuela, southern half of Amazonas State.

Selected references: Dunn (1942); Taylor (1968); Nussbaum (1977); Nussbaum and Wilkinson (1989); Gorzula and Señaris (1998); Maciel and Hoogmoed (2011).

Genus *Potomotyphlus* Taylor, 1968

Type species: *Caecilia kaupii* Berthold, 1859, by original designation.



297. *Microcaecilia rabei*. Imataca Forestal Reserve, Bolívar-Delta Amacuro boundary. Photo: Fernando Rojas-Runjaic.



298. *Siphonops annulatus*. Barinitas, Barinas. Photo: César Barrio-Amorós.



299. *Potomotyphlus kaupii*. Caroni river, Bolívar. Photo: Fernando Rojas-Runjaic.



300A. *Typhlonectes natans*. Puerto Concha, Zulia. Photo: César Barrio-Amorós.



300B. *Typhlonectes natans*. Puerto Concha, Zulia. Photo: Alan Highton.

Potomotyphlus kaupii (Berthold 1859)

Holotype: ZFMK 27684.

Type locality: “Angostura,” Ciudad Bolívar, Venezuela.

Distribution: Regions 3, 4, 5. Orinoco and Amazon Basins, in Venezuela, Colombia, Ecuador, Peru, Brazil, and French Guiana. In Venezuela, northern Amazonas and Bolívar States, and Delta of the Orinoco (Delta Amacuro).

Remarks: CBA saw a photo of a fisherman in San Vicente, Río Apure (a major tributary of the Orinoco) which obtained one specimen fishing and used it as bait.

Selected references: Taylor (1968); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Maciel and Hoogmoed (2011a).

Genus *Typhlonectes* Peters, 1880

Type species: *Caecilia compressicauda* Duméril and Bibron, 1841, by subsequent designation of Dunn (1942).

Typhlonectes compressicauda Duméril et Bibron, 1841

Lectotype: MNHNP 4269.

Type locality: “Cayenne,” French Guiana.

Distribution: Region 4. Amazon Region, in Colombia, Venezuela, Guyana, French Guiana, Brazil, and Ecuador. In Venezuela, only Puerto Ayacucho (Gorzula and Cerda, 1979; Barrio-Amorós 1998).

Selected references: Roze (1963); Roze and Solano (1963); Taylor (1968); Gorzula and Cerda (1979); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Wilkinson (1996a, 1996b); Lynch (1999); Maciel and Hoogmoed (2011a).

Typhlonectes natans (Fischer 1880)

Syntypes: ZMB 9522–23 (two specimens).

Type locality: “Cauca, Nebenfluss des Magdalenenstroms in Neu-Granada” = Cauca River, tributary of Magdalena River, Colombia.

Distribution: Region 6. Western and northern Colombia, and Maracaibo Lake Basin in northwestern Venezuela.

Remarks: *Typhlonectes venezuelensis* Fuhrmann, 1914 and *Chthonerpeton haydeeeae* Roze, 1963 are junior synonyms of this species.

Selected references: Roze (1963); Roze and Solano (1963); Taylor (1968); Lancini (1969); Nussbaum and Wilkinson (1989); Péfaur et al. (1992); Wilkinson (1996a,b); Lynch (1999).

Species which may occur in Venezuela

Five of the species predicted to be in the country from Barrio-Amorós (1998) first approach to the Venezuelan amphibian fauna were posteriorly reported to occur in Venezuela: *Rhaebo glaberrimus*, *Leptodactylus colombiensis*, *Phytotriades auratus*, *Elachistocleis pearsei*, and one species of *Cryptobatrachus*, *C. remotus* (Chacón-Ortiz et al. 2001; Barrio-Amorós and Chacón-Ortiz 2001; Infante-Rivero et al. 2006b, 2009; Rivas and De Freitas 2015). Some taxa predicted later by Barrio-Amorós (2004) have lasted in recent reports, like *Tepuihyla exophthalma*, *Amazophrynella minuta*, and *Phyllomedusa venusta* (Barrio-Amorós et al. 2010; Rojas-Runjaic et al. 2013; Infante-Rivero et al. 2006a). Many more predicted species have either failed detection, or do not truly occur in Venezuela. Below are some taxa which so far remain only as “predicted” or “expected” for the Venezuelan fauna, especially those known from close localities in Guyana, Brazil, and Colombia.

The Andes. Biogeographically, some taxa known from nearby Colombia are expected in the Venezuelan Andes, in the Cordillera de Mérida, the Tamá massif, or the Serranía de Perijá. *Pristimantis cuentasi* Lynch, 2003 and *P. reclusus* Lynch, 2003 are known from páramo over 3,000 m in shared habitat with Venezuela (Serranía de Perijá), but not yet reported from the country. *Allobates ignotus* Anganoy-Criollo, 2012 is an arobatine also likely to be found on the Venezuelan side of Perijá. *Strabomantis ingeri* (Cochran and Goin 1963) has been observed in Colombia very close to the Venezuelan border in the Cordillera Oriental (Ramírez-Pinilla 2004). *Pristimantis douglasi* Lynch, 1996 could be present in the Tamá cloud forests or even in Sierra de Perijá. *Pristimantis frater* (Werner 1899) has been recently reported from the Colombian side of the Tama massif (Acevedo et al. 2014). Another species which maybe present on the Venezuelan side of Tamá is *Cryptobatrachus conditus* Lynch, 2008. *Hyloscirtus callipeza* Duellman, 1989 is known from extreme NE

Cordillera Oriental in Colombia, and could also be present on its Venezuelan side or in Perijá. Another high Andean species is *Niceforonia nana* (Goin and Cochran 1963), known to occur on the western versant of The Cordillera Oriental in Departamento Norte de Santander (<http://www.batrachia.com/orden-anura/craugastoridae/niceforonia-nana/>); it could occur as well on the Venezuelan side of Tamá or Perijá. Populations of *Lithobates palmipes* from the Maracaibo Lake Basin could prove to represent *L. vaillanti* (Brocchi 1877), as these species are practically indistinguishable. Moreno-Arias et al. (2010) mention *Bolitoglossa biseriata* Tanner, 1962 from La Jagua de Ibirico, Departamento Cesar at 1,450 m in Serranía de Perijá, Colombia. A. Acosta identifies it as *B. lozanoi* Acosta and Restrepo, 2001 (<http://www.batrachia.com/orden-caudata/bolitoglossa/bolitoglossa-biseriata/>) so this species could be present on the Venezuelan side as well. Moreno-Arias et al. (2010) also mention *Pristimantis taeniatus* Boulenger, 1912 and *P. viejas* Lynch et Rueda-Almonacid, 2000 as present on the Colombian side of Perijá, but this statement is not followed or corroborated by A. Acosta (<http://www.batrachia.com>).

The Guiana Shield. In Guyana, even on the other side of Roraima tepui, several described species have not yet reported from Venezuela. Among them are *Myersohyla kanaima* (Duellman and Hoogmoed 1992), *Tepuihyla warreni* (Duellman and Hoogmoed 1992), *Trachycephalus hadroceps* (Duellman and Hoogmoed 1992), *Stefania evansi* (Boulenger 1904), *S. roraima* Duellman and Hoogmoed, 1984, and *S. woodleyi* Rivero, 1968. The recently described *Boana diabolica* (Fouquet, Martínez, Zeidler, Curtois, Gauchier, Blanc, Dias-Lima, Marques-Souza, Rodrigues and Kok 2016) could also be present in southeastern Venezuela. *Adenomera lutzi* Heyer, 1975 is present along the Pakaraima mountains in Guyana, which are continuous with eastern Gran Sabana of Venezuela (Kok et al. 2007). *Chiasmocleis shudikarensis* Dunn, 1949 was described from the Upper Essequibo River, and is widely distributed in the Guianas and northern Amazonia. Other Guiana shield inhabitants that may be present in Venezuela include:

Rhinella martyi

Fouquet, Gaucher, Blanc and Vélez-Rodríguez, 2007

Fouquet et al. (2007) and Reynolds and MacCulloch (2012) show a locality in western Guyana (Baramita) near the Venezuelan border. As the *R. margaritifera* group requires further study, the presence of many described and undescribed species under this name would not be surprising. Avila-Pires et al. (2010) synonymized this name into *R. margaritifera*, which does not resolve the parphyly that this name hides. Lavilla et al. (2013) considered this action premature, and Frost (2018) still counted it as valid.

Ameerega hahneli (Boulenger 1884)

Reported on different occasions from Venezuela (Löfters et al. 2007) with no vouchers or photos to sustain the claims; however, it could be present in the southern and easternmost parts of the country. Reynolds and MacCulloch (2012) report it from Baramita, Guyana, very near the Venezuelan border. Specimens from Baramita, however, should be compared with *Ameerega picta* (*guayanensis*).

Dendrobates nubeculosus Jungfer and Böhme, 2004

Only known from its type locality, on the Essequibo River, Guyana. May be an arboreal inhabitant that has been completely overlooked. As many colleagues have commented (see Guayasamin et al. 2006 for a resumé), the next realm for exciting discoveries is the exploration of the rainforest high canopy.

Adelophryne patamona MacCulloch, Lathrop, Kok, Minter, Khan and Barrio-Amorós, 2008

This recently described minute species has been confused with *Adelophryne gutturosa*, a common species in Venezuela, but is only known from a few specimens and localities due to the difficulty of its collection in leaf litter.

Leptodactylus myersi Heyer, 1995

Reported from rocky outcrops in French Guiana, Suriname, Guyana, and the neighboring Brazilian state of Roraima, this species seems not to be present in Venezuela, probably due to niche competition with *L. rugosus*, a similar-sized inhabitant of the same habitat from eastern Venezuela.

Dendropsophus counani Fouquet, Del Orrico, Ernst, Blanc, Martínez, Vacher, Rodrigues, Ouboter, Jairam and Ron, 2015

This recently described species of the *D. parviceps* group is known from the lowlands of the Guiana Shield, including localities in Guyana approximately 100 km from the eastern Venezuelan border, and could be present in the lowlands of the Cuyuni River Basin.

Boana liliae (Kok 2006)

Reported only from Kaieteur National Park in Guyana. However, as many other species known until recently from that area of Guyana, it could also be present in Sierra de Lema or other parts of the Gran Sabana in Venezuela.

Osteocephalus oophagus Jungfer and Schiesari, 1995

Known from nearby Colombia in Departamento de Guanía (Lynch and Vargas-Ramírez 2000) and Guyana (Kok and Kalamandeen 2008; Jungfer et al. 2013). It is similar to *Osteocephalus taurinus* in shape and iris coloration, but is much smaller. Examining *O. taurinus* or *O. lepreurii* samples in Venezuelan collections may lead to the recognition of this species in Venezuela.

Elachistocleis surumu Caramaschi, 2010

Recently Caramaschi (2010) described from Pacaraima in Brazil, very close to Santa Elena de Uairén and the Gran Sabana. Perhaps those *Elachistocleis* sp. mentioned by Duellman (1997) could represent this species.

Lysapsus laevis (Parker 1935)

An aquatic hyliid that could be present in the southeastern region of Venezuela, close to Brazil and Guyana (Cole et al. 2013).

Furthermore, many different species of caecilians have been described and are known from Guyana (*Caecilia gracilis* Shaw, 1802, *Caecilia pressula* Taylor, 1968, *Oscacaecilia zweifeli* Taylor, 1968, *Rhinatrema shiv Gower*, Wilkinson, Sherratt and Kok, 2010, *Caecilita iwokramaie* Wake and Donnelly, 2010, *Microcaecilia iyob* Wilkinson and Kok, 2010) (see Cole et al. 2013 and references therein). Caecilians are poorly studied amphibians and a much larger diversity could be present in Venezuela.

The Amazon. The Amazonian Region, is one of the less explored areas in Venezuela. Several widespread Amazonian species are expected to occur inside Venezuelan borders, as recently discovered with *Amazophrynella minuta* (Rojas-Runjaic et al. 2013). Other such species include *Teratohyla midas* (Lynch et Duellman 1973), which is distributed throughout the upper, middle, and lower Amazon from 1,000 m in the eastern piedmont of Ecuador to French Guiana. Such distribution, paralleled by *Hyalinobatrachium iaspidiense* and *H. mondolfi*, make its presence likely in the southern or southeasternmost corners of Venezuela. *Pipa snethlageae* Müller, 1914 has been mentioned from nearby Colombia at Departamento de Guainía by Lynch and Vargas-Ramírez (2000).

The Maracaibo Basin. Zulia state in Northwestern Venezuela is connected with northern Colombia through the adjacent lowlands and foothills of the Serranía de Perijá. Several species known from the neighboring country could be present in the Venezuelan side as well. *Scinax boulengeri* (Cope 1887) extends from Central America to the Colombian Caribbean. It should be examined if the reported *S. rostratus* from the Maracaibo Lake Basin does not correspond to this

species. Similarly, its presence would not be a surprise in the area of *Craugastor raniformis* (Boulenger 1896), *Scinax elaeochrous* (Cope 1876), *Dendropsophus ebraccatus* Cope, 1874, or *Dendropsophus phlebodes* Stejneger, 1906. The complex of *Rhinella granulosa* has been a difficult group of bufonids to assess (Gallardo 1965; Narvaes and Rodrigues 2009; Pereyra et al. 2015). The recently described Central American (Panamanian) populations as *R. centralis* Narvaes and Rodrigues, 2009 can be more widely expanded through open habitats in northern Colombia and NW Venezuela. Specimens from Zulia State recognized as *R. beebei* should be closely compared with *R. centralis*. *Dendrobates truncatus* (Cope 1861) is known from localities in the Magdalena River Valley close to the western versant of Serranía de Perijá, and may be present in its Venezuelan counterpart. *Elachistocleis panamensis* (Dunn, Trapido and Evans 1948) is distributed along the Magdalena River Valley, extending to the dry areas of La Guajira, and thus could also be present in Venezuelan territory.

Conservation

Amphibians are facing an extinction crisis. Globally at least 32% of all described species are currently threatened with extinction (IUCN 2016), a number that may be underestimated because amphibian faunas are poorly-known in many regions. This percentage of threatened amphibians is noticeably higher than other vertebrate groups that have been comprehensively assessed, specifically mammals (23%) and birds (12%) [Baillie et al. 2004; IUCN 2016]. The factors driving the global amphibian population declines are diverse, but are predominantly anthropogenic and intrinsically linked to human population growth (Gascon et al. 2007). Habitat loss is the number one threat to amphibians, followed by pollution. The emerging disease chytridiomycosis, caused by *Batrachochytrium dendrobatidis* (*Bd*), and climate change are also important threats, and have been linked to rapid enigmatic amphibian declines, especially in relatively cool, wet, diverse habitats in alpine, temperate, and tropical areas (Hof et al. 2011; Catenazzi 2015; Berger et al. 2016).

There have been several attempts to assess the extinction risk for Venezuelan amphibians, direct or indirectly (Vial and Saylor 1993; La Marca 1995; Rodríguez and Rojas-Suarez 1995, 1999, 2008; Barrio-Amorós 2001; Young et al. 2004; Molina et al. 2009; Barrio-Amorós and Torres 2010). More recently, Rodríguez et al. (2015) re-assessment of the extinction risk of Venezuelan fauna mentioned that 12% of the amphibian species are threatened. About half of the species of amphibians (47%) in this assessment are reported as Least Concern, 13% as Near Threatened, 12% as threatened (Vulnerable, Endangered, or Critically Endangered), and 23% as Data Deficient. Only one species is considered extinct, the harlequin toad *Atelopus*

vogli, and about 5% of the Venezuelan amphibian fauna is still under evaluation.

Based on these results, the most threatened group of amphibians are the harlequin toads, *Atelopus*, followed by the aromobatines of the genera “*Prostherapis*,” *Aromobates*, and *Mannophryne*, and the land frogs of the genus *Pristimantis*. Additionally, some of the species of these groups are Near Threatened or In Evaluation, thus they will possibly become categorized as threatened in the future. Also, the high proportions of species in the Data Deficient category (23%) can significantly mask the real number of amphibians in risk, and this is especially noticeable in the families Craugastoridae, Dendrobatidae, and some Hylidae. All of these threatened amphibians are Venezuelan endemics, and in most cases, they have a small geographic distribution range in medium elevation or highlands of the Andes, Coastal Ranges, or the Pantepui.

Acknowledgements.—The present work is based on preceding versions which tried to give a glimpse of the Venezuelan amphibian fauna (Barrio-Amorós 1998, 2004) and all people acknowledged in those lists must be recognized here again. Herein we produced a more comprehensive annotated list, including images of all possible amphibians present in Venezuela. Such an enormous task was not possible without continuous conversations with colleagues, constructive discussions, and help in obtaining difficult papers and photographs.

We herein thank the following people, in alphabetical order (by first name): Alan Highton, Aldemar A. Acevedo, Allan Markezich, Amelia Díaz de Pascual, Amy Lathrop, Andreas Schluter, Andrés Chacón, Andrés González, Andrés Orellana, Antoine Fouquet, Ariel Espinosa, Arlene Cardozo, Blair Hedges, Brad Wilson, Brice Noonan, Bruce Means, Carmen Ferreira, César Molina†, Charles Brewer-Carías, Daniel Calcaño, Daniel Cuentas, Daniel Quihua, Danté Fenolio, David Blackburn, Denis Torres, Dennis Rödder, Diego A. Flores, Eduard Filella, Eduardo Asens, Edward Camargo, Edwin Infante-Rivero, Eliécer Gutiérrez, Eric Smith, Erik Arrieta†, Esteban Lavilla, Francisco López, Franklin Rojas-Suárez, Gabriel Ugueto, Gilson Rivas, Hinrich Kaiser, Jaime Bautista, Jaime Péfaur, Javier García, Javier Mesa, Jesús Salas, Joan García-Porta, John D. Lynch, Jorge Bravo, Jose Luis Vieira, Jose Manuel Padiá, Jose Pombal, José Rosado, Juan Carlos Ortíz, Juan Carlos Santos, Juan David Jiménez, Juan E. García-Pérez, Juan M. Guayasamín, Juan M. Renjifo; Juan Pablo Diasparra, Juan S. Mendoza, Julián Faivovich, Liz del Valle, Luis Coloma, Luis Merlo, Luis Scott†, Manuel González, Margarita Lampo, Mark Moffett, Matthew Heinicke, Mayke de Freitas, Mercedes Salazar, Miguel Molinari, Moisés Escalona, Oscar Lasso-Alcalá, Oswaldo Fuentes, Pablo Velozo, Patricia Salerno, Pau Cardellach, Paúl Gutiérrez-Cardenas, Philippe Kok, Rafael Morillo, Rainer Schulte, Ramón Rivero, Roger Manrique, Ross MacCulloch, Roy McDiarmid, Salvador

Carranza, Santiago Castroviejo-Fisher, Saúl Gutiérrez†, Sebastian Lotzkat, Stefan Lötters, Tito R. Barros, Tom Evenue, Ulisses Caramashi, Walter Schargel, William E. Duellman, Zaida Tárano, and Zelimir Cernelic, who contributed in some way with the final publication of this work. Miguel A. Alonso-Zarazaga responded some concerns about nomenclature.

We are finally deeply grateful for four anonymous and five known reviewers which made great contributions by improving the English, making points about the content, and editing the whole text. Among them are Hinrich Kaiser, Pedro Peloso, Philippe Kok, Ted Kahn, and Ross MacCulloch. Thanks also to Craig Hassapakis who encompassed the whole project for more than three years and to Tyson Terry and Michael Grieneisen, the managing editors of this particular paper, for their patience and good nature.

Literature Cited

- Acevedo AA, Franco-Pallares R, Silva-Pérez KL. 2014. Nuevos registros de especies del género *Pristimantis* (Anura: Craugastoridae) para el nororiente de Colombia. *Revista de Biodiversidad Neotropical* 4: 162–169.
- Acevedo AA, Silva KL, Franco R, Lizcano DJ. 2011. Distribución, historia natural y conservación de una rana marsupial poco conocida, *Gastrotheca helenae* (Anura: Hemiphractidae) en el Parque Nacional Natural Tamá, Colombia. *Boletín Científico Museo de Historia Natural* 15: 68–74.
- Acevedo AA, Wake DB, Márquez R, Silva K, Franco R, Amézquita A. 2013. Two new species of salamanders, genus *Bolitoglossa* (Amphibia: Plethodontidae), from the eastern Colombian Andes. *Zootaxa* 3609: 69–84.
- Acevedo AA, Armesto O, Martínez Cuesta M. 2018. *Aromobates cannatellai* (Cannatella frog). Predation. *Herpetological Review* 49: 728–729.
- Acevedo, AA, Armesto O, Meza-Joya FL. 2019. First record and conservation status of *Allobates algorei* (Anura: Aromobatidae) in Colombia. *Zootaxa* 4608: 183–186.
- Aguiar O, Cacci M Jr, Lima AP, Rossa-Feres DC, Haddad CFB, Recco-Pimentel SM. 2007. Phylogenetic relationships of *Pseudis* and *Lysapsus* (Anura, Hylidae, Hylinae) inferred from mitochondrial and nuclear gene sequences. *Cladistics* 23: 455–463.
- Alemán C. 1952. Apuntes sobre reptiles y anfibios de la región Baruta- El Hatillo. *Memoria de la Sociedad de Ciencias Naturales La Salle* 12: 11–30.
- Alemán C. 1953. Contribución al estudio de los reptiles y batracios de la Sierra de Perijá. *Memoria de la Sociedad de Ciencias Naturales La Salle* 13: 205–225.
- Amézquita A, Hödl W. 2004. How, when and where to perform visual displays: the case of the Amazonian frog *Hyla parviceps*. *Herpetologica* 60: 420–429.
- Anganoy-Criollo M. 2012 A new species of *Allobates* (Anura, Dendrobatidae) from the western flank of the Serranía de Perijá, Colombia. *Zootaxa* 3308: 49–62.
- Araujo de Oliveira E, Rodrigues LR, Kaefer IL, Cavalcante Pinto K, Hernández-Ruz EJ. 2017. A new species of *Pristimantis* from Eastern Brazilian Amazonia (Anura, Craugastoridae). *Zookeys* 687: 101–129.
- Armesto O, Quilique E, Rojas-Runjaic FJM. 2015. New locality records and geographic Distribution map of *Dendropsophus meridensis* (Rivero, 1961) in the Andes of Venezuela. *Check List* 11: 1–5.
- Arrington A, Arrington JL. 2000. Natural history (Anura): *Hyla boans*. *Herpetological Review* 31: 170.
- Aubrecht R, Barrio-Amorós CL, Breure ASH, Brewer-Carías C, Derka T, Fuentes-Ramos OA., Gregor M, Kodada J, Kováčik L, Lánzos T, et al. 2012. *Venezuelan Tepuis, Their Caves and Biota*. Acta Geologica Slovaca Monograph. Comenius University, Bratislava, Slovakia. 168 p.
- Ávila-Pires TCS, Hoogmoed MS, Alves da Rocha W. 2010. Notes on the vertebrates of northern Pará, Brazil: a forgotten part of the Guianan region, 1. Herpetofauna. *Boletim do Museu Paraense Emílio Goeldi. Ciências Naturais* 5: 13–112.
- Ayarzagüena J. 1983 “1985”. Una nueva especie de *Dischidodactylus* Lynch (Amphibia, Leptodactylidae) en la cumbre del Tepui Marahuaca, Territorio Federal Amazonas, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 43: 215–220.
- Ayarzagüena J. 1992. Los centrolénidos de la Guayana Venezolana. *Publicaciones de la Asociación Amigos de Doñana* 1: 1–48.
- Ayarzagüena J, Diego-Aransay A. 1985. Primer reporte para Venezuela de *Adelophryne gutturosa* (Leptodactylidae) y datos sobre su biología. *Memoria de la Sociedad de Ciencias Naturales La Salle* 14: 159–161.
- Ayarzagüena J, Señaris JC. 1994. Dos nuevas especies de *Hyla* (Anura, Hylidae) para las cumbres tepuyananas del estado Amazonas, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 53: 127–146.
- Ayarzagüena J, Señaris JC. 1996. Dos nuevas especies de *Cochranella* (Anura; Centrolenidae) para Venezuela. *Publicaciones de la Asociación Amigos de Doñana* 8: 1–16.
- Ayarzagüena J, Señaris JC, Gorzula S. 1992a. El grupo *Osteocephalus rodriguezi* de las tierras altas de la Guayana venezolana: descripción de cinco nuevas especies. *Memoria de la Sociedad de Ciencias Naturales La Salle* 52: 113–142.
- Ayarzagüena J, Señaris JC, Gorzula S. 1992b. Un nuevo género para las especies del “grupo *Osteocephalus rodriguezi*” (Anura: Hylidae). *Memoria de la Sociedad de Ciencias Naturales La Salle* 52: 213–221.
- Azevedo-Ramos C. 1995. Defense behaviors of the Neotropical treefrog *Hyla geographica* (Anura:

- Hylidae). *Revista Brasileira de Biologia* 55: 45–47.
- Barbour T. 1923. A new *Pipa*, Pl. 2, f. 3 (*Pipa parva* Ruthven & Gaige). *Proceedings of the New England Zoological Club* 9: 3–5.
- Barrio CL. 1996a. Anfibios de Venezuela: visión aproximativa. *Reptilia* 6: 24–32.
- Barrio CL. 1996b. *Atelopus*, ¿sólo un recuerdo? *Reptilia* 8: 26–28.
- Barrio CL. 1998. Sistemática y biogeografía de los anfibios (Amphibia) de Venezuela. *Acta Biológica Venezuelica* 18: 1–93.
- Barrio CL. 1999a. Geographic distribution (Caudata): *Bolitoglossa borburata*. *Herpetological Review* 30: 105.
- Barrio CL. 1999b. Geographic distribution (Anura): *Gastrotheca ovifera*. *Herpetological Review* 30: 106.
- Barrio CL. 1999c. Geographic distribution (Anura): *Gastrotheca walkeri*. *Herpetological Review* 30: 106.
- Barrio CL. 1999d. Geographic distribution (Anura): *Lithodytes lineatus*. *Herpetological Review* 30: 50.
- Barrio CL. 1999e. Geographic distribution (Anura): *Otophryne pyburni*. *Herpetological Review* 30: 173.
- Barrio CL. 1999f. Geographic distribution (Anura): *Otophryne steyermarki*. *Herpetological Review* 30: 173.
- Barrio CL, Brewer-Carias C. 1999. Geographic distribution (Anura): *Synapturanus mirandaribeiroi*. *Herpetological Review* 30: 51.
- Barrio CL, Fuentes O. 1998. Distribución de *Dendrobates leucomelas* (Anura: Dendrobatidae) en Venezuela. *Acta Biológica Venezuelica* 18: 35–41.
- Barrio CL, Fuentes O. 1999. Sinopsis de la familia Dendrobatidae (Amphibia: Anura) de Venezuela. *Acta Biológica Venezuelica* 19: 1–10.
- Barrio CL, Rivero R. 1999a. Geographic distribution (Anura): *Phyllomedusa tomopterna*. *Herpetological Review* 30: 231.
- Barrio CL, Rivero R. 1999b. Geographic distribution (Anura): *Sphaenorhynchus lacteus*. *Herpetological Review* 30: 232.
- Barrio CL, Durant P. 2000. Geographic distribution: Anura: *Elachistocleis ovalis*. *Herpetological Review* 31: 50.
- Barrio CL, Fuentes O. 2000a. Geographic distribution (Anura): *Osteocephalus ayarzaguenai*. *Herpetological Review* 31: 182.
- Barrio CL, Fuentes O. 2000b. Geographic distribution (Anura): *Pipa parva*. *Herpetological Review* 31: 183.
- Barrio CL, Fuentes O. 2003. Geographic distribution: Anura: *Scinax wandae*. *Herpetological Review* 34: 163.
- Barrio CL, Rivero R, Manrique R. 2000. Geographic distribution: *Hyla punctata*. *Herpetological Review* 3: 50.
- Barrio CL, Barros T, Páez JC. 2001. Geographic distribution: Anura: *Bufo guttatus*. *Herpetological Review* 32: 112.
- Barrio-Amorós CL. 1999. Geographic distribution (Anura): *Hyla boans*. *Herpetological Review* 30: 230.
- Barrio-Amorós CL. 2001a. Geographic distribution (Anura): *Hyla boans*. *Herpetological Review* 32: 113–114.
- Barrio-Amorós CL. 2001b. Geographic distribution (Anura): *Bufo haematiticus*. *Herpetological Review* 32: 189.
- Barrio-Amorós CL. 2001c. State of knowledge on the declination of amphibians in Venezuela. *Froglog* 47: 2–4.
- Barrio-Amorós CL. 2001d. Some aspects of Dendrobatids in Venezuela: declines and nomenclature. *British Dendrobatid Group Newsletter* 44: 1–5.
- Barrio-Amorós CL. 2004. Amphibians of Venezuela, systematic list, distribution and references; an update. *Revista Ecología Latino Americana* 9 (3): 1–48.
- Barrio-Amorós CL. 2006a. A new dendrobatid frog (Anura: Dendrobatidae: *Colostethus*) from Aprada tepui, southern Venezuela. *Zootaxa* 1110: 59–68.
- Barrio-Amorós CL. 2006b. A new species of *Phyllomedusa* (Anura: Hylidae: Phyllomedusinae) from northwestern Venezuela. *Zootaxa* 1309: 55–68.
- Barrio-Amorós CL. 2006c. *Anfibios y Reptiles de Rancho Grande, Parque Nacional Henri Pittier, Venezuela*. Serie Informes Técnicos N° 2. Fundación AndígenA, Mérida, Mérida, Venezuela. 27 p.
- Barrio-Amorós CL. 2006d. Geographic distribution: *Hyalinobatrachium ibama*. *Herpetological Review* 37: 238.
- Barrio-Amorós CL. 2009a. Evaluación poblacional y de salud del sapito arlequín de Mucubaji (*Atelopus mucubajensis*) en el Parque Nacional Sierra Nevada, estado Mérida. Pp. 177 In: *Una Mano a la Naturaleza. Conservando las Especies Amenazadas Venezolanas*. Editors, Giraldo D, Rojas-Suárez F, Romero V. Provita y Shell Venezuela, Caracas, Miranda, Venezuela. 220 p.
- Barrio-Amorós CL. 2009b. Distribución y aspectos de la historia natural de las ranas lémur (Hylidae: Phyllomedusinae) en Venezuela. *Memoria de la Fundación La Salle de Ciencias Naturales* 171: 19–46.
- Barrio-Amorós CL. 2009c. Riqueza y endemismo. Pp 25–39. In: *Anfibios de Venezuela. Estado del Conocimiento y Recomendaciones para su Conservación*. Editors, Molina C, Señaris JC, Lampo M, Rial A. Conservación Internacional, Instituto Venezolano de Investigaciones Científicas, Universidad Central de Venezuela, Fundación La Salle, Caracas, Distrito Capital, Venezuela. 130 p.
- Barrio-Amorós CL. 2010a. Catálogo ilustrado de los anfibios y reptiles del ramal de Calderas, Andes de Venezuela. Pp.141–156. In: *Evaluación Rápida de la Biodiversidad y Aspectos Socioecosistémicos del Ramal de Calderas. Andes de Venezuela*. Editors, Rial A, Señaris JC, Lasso CA, Flores A. RAP Bulletin of

- Biological Assessment 56. Conservation International, Arlington, Virginia, USA. 183 p.
- Barrio-Amorós CL. 2010b. A suggestion about common nomenclature for dendrobatids. Available: <http://www.dendrobates.org/2010/03/a-suggestion-about-common-nomenclature-for-dendrobatids/> [Accessed: 04 June 2017]
- Barrio-Amorós CL. 2010c. A new *Ceuthomantis* (Anura: Terrarana: Ceuthomantidae) from Sarisariñama Tepui, southern Venezuela. *Herpetologica* 66: 172–181.
- Barrio-Amorós CL. 2011. A new *Pristimantis* Jimenez de la Espada, 1870 (Anura: Strabomantidae) from the cloud forest in the Venezuelan Andes. *Anartia* 23: 17–26.
- Barrio-Amorós CL. 2013. Status of amphibian conservation and decline in Venezuela. Chapter 8. Pp. 197–226. In: *Status of Decline of Amphibians: Western Hemisphere. Part 3. Venezuela, Guyana, Suriname, and French Guiana*. Editors, Heatwole H, Barrio-Amorós CL, Wilkinson J. Amphibian Biology, Volume 9. Surrey Beatty & Sons, Baulkham Hills, New South Wales, Australia. 100 p.
- Barrio-Amorós CL. 2016. An overview of the Dendrobatid frogs of Venezuela. *Herp Nation* 20: 74–85.
- Barrio-Amorós CL, Brewer-Carías C. 2008. Herpetological report of the 2002 Expedition to Sarisariñama, a tepui in Venezuelan Guayana, with description of five new species. *Zootaxa* 1942: 1–68.
- Barrio-Amorós CL, Castroviejo-Fischer S. 2008a. The taxonomic status of *Rhaebo anderssoni* (Melin, 1941) (Anura, Bufonidae). *Salamandra* 44: 59–62.
- Barrio-Amorós CL, Castroviejo-Fischer S. 2008b. Comments on the distribution, taxonomy and advertisement call of the Guyanan glass frog *Hyalinobatrachium igniocolus* [sic!] (Anura: Centrolenidae). *Salamandra* 44: 235–240.
- Barrio-Amorós CL, Chacón A. 2001. Geographic distribution: Anura. *Leptodactylus colombiensis*. *Herpetological Review* 32: 55.
- Barrio-Amorós CL, Chacón-Ortiz A. 2002. Geographic distribution. *Pseudopaludicola llanera*. *Herpetological Review* 33: 222.
- Barrio-Amorós CL, Chacón A. 2003. Un nuevo *Eleutherodactylus* (Anura: Leptodactylidae) de la Cordillera de Mérida, Andes de Venezuela. *Graellsia* 60: 3–11.
- Barrio-Amorós CL, Chacón A. 2004. Geographic Distribution; Anura: *Scinax wandae*. *Herpetological Review* 35: 185.
- Barrio-Amorós CL, Díaz de Pascual A. 2008. Notes on geographic distribution: Reptilia: Boidae: *Epicrates cenchria cenchria*: Distribution extension. *Check List* 4: 243–247.
- Barrio-Amorós CL, Duellman WE. 2009. Herpetofauna de la Sierra de Lema, estado Bolívar, Venezuela. Pp. 137–155. In: *Evaluación Rápida de la Biodiversidad de los Ecosistemas Acuáticos de la Cuenca Alta del Río Cuyuní, Guayana Venezolana*. Editors, Lasso CA, Señaris JC, Rial A, Flores AL. RAP Bulletin of Biological Assessment 55. Conservation International, Arlington, Virginia, USA. 235 p.
- Barrio-Amorós CL, Fuentes O. 1999. *Bolitoglossa spongai*. Una nueva especie de salamandra (Caudata: Plethodontidae) de los Andes venezolanos, con comentarios sobre el género en Venezuela. *Acta Biológica Venezuelica* 19: 9–19.
- Barrio-Amorós CL, Fuentes O. 2003. A new species of *Stefania* (Anura: Hylidae: Hemiphractinae) from the summit of the cerro Autana, estado Amazonas, Venezuela. *Herpetologica* 59: 506–514.
- Barrio-Amorós CL, Fuentes-Ramos O. 2004. Amphibia: Caudata: Plethodontidae: *Bolitoglossa spongai*. *Catalogue of American Amphibians and Reptiles* 781: 1–2.
- Barrio-Amorós CL, Fuentes O. 2012. The herpetofauna of the Lost World. Pp. 140–151 In: *Venezuelan Tepuis, their Caves and Biota*. Editors, Aubrecht R, Barrio-Amorós CL, Breure ASH, Brewer-Carías C, Derka T, Fuentes-Ramos OA, Gregor M, Kodada J, Kováčik L, Láncoz T, Lee NM. Acta Geologica Slovaca Monograph, Comenius University, Bratislava, Slovak Republic. 168 p.
- Barrio-Amorós CL, García-Porta J. 2003. Geographic distribution: Anura: *Colostethus humilis*. *Herpetological Review* 34: 380.
- Barrio-Amorós CL, Kaiser H. 2008. Distribution of *Strabomantis biporcatus* (Anura: Terrarana) in northern Venezuela, with comments on its phenotypic variation. *Salamandra* 44: 248–254.
- Barrio-Amorós CL, Molina CR. 2006. A new *Eleutherodactylus* (Anura: Brachycephalidae) from the Venezuelan Guayana, and redescription of *Eleutherodactylus vilarsi*. *Zootaxa* 1302: 1–20.
- Barrio-Amorós CL, Ortiz JC. 2015. Material herpetológico colectado por Roberto Donoso Barros en Venezuela (excepto geckos) en el Museo de Zoología de la Universidad de Concepción, Chile. *Gayana* 79: 68–93.
- Barrio-Amorós CL, Rojas-Runjaic FJM. 2009. A new locality for a considered extinct species (Anura: Bufonidae: *Atelopus vogli*), raises hope for survival. *Salamandra* 45: 254–256.
- Barrio-Amorós CL, Santos JC. 2009. Description of a new *Allobates* (Amphibia: Anura: Dendrobatidae) from the eastern Andean piedmont, Venezuela. *Phyllomedusa* 8: 89–104.
- Barrio-Amorós CL, Santos JC. 2010. Amphibia, Anura, Dendrobatidae, *Allobates femoralis* (Boulenger, 1884): First confirmed country records, Venezuela. *Check List* 6: 208–209.
- Barrio-Amorós CL, Santos JC. 2012. A phylogeny for *Aromobates* (Anura: Dendrobatidae) with description of three new species from the Andes of Venezuela,

- taxonomic comments on *Aromobates saltuensis*, *A. inflexus*, and notes on the conservation status of the genus. *Zootaxa* 3422: 1–31.
- Barrio-Amorós CL, Schargel W. 2003. Geographic Distribution: Anura: *Chiasmocleis hudsoni*. *Herpetological Review* 34: 380.
- Barrio-Amorós CL, Torres D. 2010. Conservation priorities for the most threatened amphibians in Venezuela, a preliminary approach. *Revista de Ecología Latinoamericana* 15: 21–31.
- Barrio-Amorós CL, Orellana A, Manrique R. 1999. Geographic Distribution (Anura): *Hyla lanciformis*. *Herpetological Review* 30: 106–107.
- Barrio-Amorós CL, Fuentes O, Rivas G. 2004. Two new species of *Colostethus* (Anura, Dendrobatidae) from Venezuelan Guayana. *Salamandra* 40: 183–200.
- Barrio-Amorós CL, Orellana A, Chacón-Ortiz A. 2004. A new species of *Scinax* (Anura: Hylidae) from the Andes of Venezuela. *Journal of Herpetology* 38: 104–111.
- Barrio-Amorós CL, Rivas G, Kaiser H. 2006a. New species of *Colostethus* (Anura: Dendrobatidae) from the Peninsula de Paria, Venezuela. *Journal of Herpetology* 40: 371–377.
- Barrio-Amorós CL, Rivas G, Molina C, Kaiser H. 2006b. *Mannophryne trinitatis* (Anura: Dendrobatidae) is a Trinidadian single-island endemic. *Herpetological Review* 37: 298–299.
- Barrio-Amorós CL, Díaz de Pascual A, Mueses-Cisneros JJ, Infante E, Chacón A. 2006c. *Hyla vigilans* Solano, 1971, a second species for the genus *Scarthyla*, redescription and distribution in Venezuela and Colombia. *Zootaxa* 1349: 1–18.
- Barrio-Amorós CL, Rojas-Runjaic FJM, Infante E. 2008 “2007.” Tres nuevos *Pristimantis* (Anura: Strabomantidae) de la sierra de Perijá, estado Zulia, Venezuela. *Revista Española de Herpetología* 21: 71–94.
- Barrio-Amorós CL, Santos JC, Jovanovic O. 2010a. A new dendrobatid frog (Anura: Dendrobatidae: *Anomaloglossus*) from the Orinoquian rainforest, southern Venezuela. *Zootaxa* 2413: 37–50.
- Barrio-Amorós CL, Santos JC, Molina CR. 2010b. An addition to the diversity of dendrobatid frogs in Venezuela: description of three new collared frogs (Anura: Dendrobatidae: *Mannophryne*). *Phyllomedusa* 9: 3–35.
- Barrio-Amorós CL, Rivas GA, Molina C, Santos JC, Kaiser H. 2010c. Intraspecific variation in the endangered frog *Mannophryne riveroi* (Anura, Dendrobatidae, Aromobatinae), with comments on coloration and natural history. *Herpetological Notes* 3: 151–160.
- Barrio-Amorós CL, Orellana A, Chacón-Ortiz A. 2010d. The taxonomic status of the Venezuelan frog names *Scinax manriquei* and *S. flavidus*. *Revista de Ecología Latinoamericana* 15: 1–7.
- Barrio-Amorós CL, García J, Fuentes-Ramos O. 2010e. Preliminary data on natural history and intraespecific variation of the endangered salamander *Bolitoglossa spongai* in the Venezuelan Andes. *Salamandra* 46: 108–113.
- Barrio-Amorós CL, Mesa J, Brewer-Carías C, McDiarmid RW. 2010f. A new *Pristimantis* (Anura, Terrarana, Strabomantidae) from the Chimanta massif, Venezuelan Guayana. *Zootaxa* 2483: 35–44.
- Barrio-Amorós CL, Romero E, Infante E. 2010g. The critically endangered Venezuelan dendrobatid frog *Aromobates meridensis* (Amphibia: Anura): redescription, natural history and conservation. *Revista de Ecología Latinoamericana* 15: 1–12.
- Barrio-Amorós CL, Salerno P, Rojas-Runjaic FJM, Noonan B. 2010h. Amphibia, Hylidae, *Osteocephalus exophthalmus* Smith and Noonan, 2001: New country record and distribution map, Venezuela. *Check List* 6: 463–464.
- Barrio-Amorós CL, Rojas-Runjaic FJM, Barros TR. 2010i. Two new *Pristimantis* (Anura: Terrarana: Strabomantidae) from the Sierra de Perijá, Venezuela. *Zootaxa* 2329: 1–21.
- Barrio-Amorós CL, Rivero R, Santos JC. 2011a. A new striking dendrobatid frog (Dendrobatidae: Aromobatinae: *Aromobates*) from the Venezuelan Andes. *Zootaxa* 3063: 39–52.
- Barrio-Amorós CL, Brewer-Carías C, Fuentes O. 2011b. Aproximación preliminar a la herpetocenosis de un bosque pluvial en la sección occidental de la Sierra de Lema, Guayana Venezolana. *Revista de Ecología Latinoamericana* 16: 1–46.
- Barrio-Amorós CL, Señaris JC, MacCulloch RD, Lathrop A, Guayasamin JM, Duellman WE. 2011c. Distribution, vocalization and taxonomic status of *Hypsiboas roraima* and *H. angelicus* (Amphibia: Anura: Hylidae). *Papéis Avulsos de Zoologia* 51: 21–28.
- Barrio-Amorós CL, Guayasamin JM, Hedges SB. 2012. A new minute Andean *Pristimantis* (Anura; Strabomantidae) from Venezuela. *Phyllomedusa* 11: 83–93.
- Barrio-Amorós CL, Heinicke M, Hedges SB. 2013. A new tuberculated *Pristimantis* (Anura, Terrarana, Strabomantidae) from the Venezuelan Andes, redescription of *Pristimantis pleurostriatus* and variation within *Pristimantis vanadisae*. *Zootaxa* 3647: 43–62.
- Barrio-Amorós CL, Chacón-Ortiz A, Rojas-Runjaic FJM. 2015. First report of the salamanders *Bolitoglossa leandrae* and *B. tamaense* (Urodela, Plethodontidae) for Venezuela. *Amphibian & Reptile Conservation* 9 (2) [General Section]: 95–99 (e101).
- Barros T, Barrio CL. 2001. Geographic Distribution: Anura: *Lithodytes lineatus*. *Herpetological Review* 32: 114–115.
- Berger L, Roberts AA, Voyles J, Longcore JE, Murray

- KA, Skerratt LF. 2016. History and recent progress on chytridiomycosis in amphibians. *Fungal Ecology* 19: 89–99.
- Blackburn DB, Wake DB. 2011. Class Amphibia Gray, 1825. In: *Animal Biodiversity: An Outline of Higher-level Classification and Survey of Taxonomic Richness*. Editor, Zhang ZQ. *Zootaxa* 3148: 39–55.
- Böttger O. 1892. *Katalog der Batrachier-Sammlung im Museum der Senckenbergischen Naturforschenden Gesellschaft*. Senckenberg Museum, Frankfurt am Main, Germany. 73 p.
- Böttger O. 1893. Reptilien und Batrachien aus Venezuela. *Bericht der Senckenbergische Naturforschende Gesellschaft* 1893: 35–42.
- Böttger O. 1896. Geschenke und Erwerbungen, Juni 1895 bis Juni 1896, Reptilien und Batrachiersammlung. *Bericht der Senckenbergische Naturforschende Gesellschaft* 1896: LIV–LV.
- Bogart JP. 1974. A karyosystematic study of frogs in the genus *Leptodactylus* (Anura: Leptodactylidae). *Copeia* 1974(3): 728–737.
- Bogart JP, Nelson CE. 1976. Evolutionary implications from karyotypic analysis of frogs of the families Microhylidae and Rhinophrynidae. *Herpetologica* 32: 199–208.
- Bogart JP, Pyburn WF, Nelson CE. 1976. The karyotype of *Otophryne robusta* (Anura: Microhylidae). *Herpetologica* 32: 208–210.
- Bokermann W. 1964. Notes on tree frogs of the *Hyla marmorata* group with description of a new species (Amphibia, Hylidae). *Senckenbergiana Biologica* 45: 243–254.
- Bonnacorso E, Guayasamín JM, Méndez D, Speare R. 2003. Chytridiomycosis as a posible cause of population declines in *Atelopus cruciger* (Anura: Bufonidae). *Herpetological Review* 34: 331–334.
- Boulenger GA. 1882. *Catalogue of the Batrachia Salientia, s. Ecaudata in the Collection of the British Museum*. 2nd Edition. British Museum, London, United Kingdom. 503 p.
- Boulenger GA. 1890. Second report on additions to the Batrachian Collection in the Natural History Museum. *Proceedings Zoological Society of London* 1890: 323–328.
- Boulenger GA. 1895a. Description of a new batrachian (*Oreophryne Quelchii*) discovered by Messrs. J. J. Quelch and F. McConnell on the summit of Mount Roraima. *Annals and Magazine of Natural History* 15: 521–522.
- Boulenger GA. 1895b. Correction to p. 521 (“Annals”, June 1895). *Annals and Magazine of Natural History* 16: 125.
- Boulenger GA. 1900. Batrachians. Pp. 55–56 In: Report on a collection made by Messrs. F. V. MacConnell and J. J. Quelch at Mount Roraima in British Guiana. Editor, Roy Lankester E. *Transactions of the Linnean Society of London, Second Series, Zoology* 8: 51–76.
- Boulenger GA. 1903. On some batrachians and reptiles from Venezuela. *Annals and Magazine of Natural History* 7: 481–484.
- Boulenger GA. 1905. Descriptions of new batrachians in the collection of the British Museum. *Annals and Magazine of Natural History* 16: 180–184.
- Boulenger GA. 1912. Descriptions of new batrachians from the Andes of South America, preserved in the British Museum. *Annals and Magazine of Natural History* 10: 185–191.
- Brame AH, Wake DB. 1962. A new plethodontid salamander (genus *Bolitoglossa*) from Venezuela with redescription of the Ecuadorian *Bolitoglossa palmata* (Werner). *Copeia* 1962: 171–177.
- Brame AH, Wake DB. 1963. The salamanders of South America. *Contributions in Science, Natural History Museum of Los Angeles County* 69: 1–72.
- Brewer-Carías C. 1988. *Cerro de la Neblina. Resultados de la expedición 1983-1987*. FUDECI, Caracas, Miranda, Venezuela. 922 p.
- Brown JL, Twomey E, Amézquita A, de Souza MB, Caldwell JP, Lötters S, Von May R, Melo-Sampaio PR, Mejía-Vargas D, Perez-Peña P, et al. 2011. A taxonomic revision of the Neotropical poison frog genus *Ranitomeya* (Amphibia: Dendrobatidae). *Zootaxa* 3083: 1–120.
- Brusquetti F, Jansen M, Barrio-Amorós C, Segalla M, Haddad CFB. 2014. Taxonomic review of *Scinax fuscomarginatus* (Lutz, 1925) and related species (Anura; Hylidae). *Zoological Journal of the Linnean Society* 171: 783–721.
- Cadenas D, Pérez-Sánchez AJ, Villa PM, de Ascencao AA. 2009. Abundancia relativa, uso del hábitat y dieta de *Bolitoglossa orestes* (Urodela: Plethodontidae) en una selva nublada andina venezolana. *Ecotropicos* 22: 99–109.
- Caldwell JP, Hoogmoed MS. 1998. Amphibia: Anura: Allophrynidae: *Allophryne ruthveni*. *Catalogue of American Amphibians and Reptiles* 666: 1–3.
- Caldwell JP, Lima AP, Keller C. 2002. Redescription of *Colostethus marchesianus* (Melin, 1941) from its type locality. *Copeia* 2002(1): 157–165.
- Camargo A, Heyer WR, de Sá RO. 2009. Phylogeography of the frog *Leptodactylus validus* (Amphibia: Anura): Patterns and timing of colonization events in the Lesser Antilles. *Molecular Phylogenetics and Evolution* 53: 571–579.
- Camargo E, Rivero R, Barrio-Amorós CL. 2014. Nuevos registros y ampliaciones de distribución de anfibios (Amphibia, Anura) para Venezuela. *Anartia* 26: 147–152.
- Campbell JA, Clarke BT. 1998. A review of frogs of the genus *Otophryne* with the description of a new species. *Herpetologica* 54: 301–317.
- Cannatella D. 1980. A review of the *Phyllomedusa buckleyi* group (Anura: Hylidae). *Occasional Papers of the Museum of Natural History, University Kansas*

- 87: 1–40.
- Cannatella D, Duellman WE. 1984. Leptodactylid frogs of the *Physalaemus pustulosus* group. *Copeia* 1984(4): 902–921.
- Cannatella D, Lamar W. 1986. Synonymy and distribution of *Centrolenella orientalis* with notes on its life history (Anura: Centrolenidae). *Journal of Herpetology* 20: 307–317.
- Caramaschi U. 2010. Notes on the taxonomic status of *Elachistocleis ovalis* (Schneider, 1799) and description of five new species of *Elachistocleis* Parker, 1827 (Amphibia, Anura, Microhylidae). *Boletim do Museu Nacional. Nova Serie, Zoologia. Rio de Janeiro* 527: 1–30.
- Caramaschi U, Niemeyer H. 2005a. Geographic distribution: *Colostethus tamacuarensis*. *Herpetological Review* 36: 73.
- Caramaschi U, Niemeyer H. 2005b. Geographic distribution: *Stefania tamacuarina*. *Herpetological Review* 36: 77.
- Caramaschi U, Niemeyer H. 2005c. Geographic distribution: *Eleutherodactylus cavernibardus*. *Herpetological Review* 36: 199.
- Caramaschi U, Niemeyer H. 2005d. Geographic distribution: *Eleutherodactylus memorans*. *Herpetological Review* 36: 74.
- Cardoso M, Pombal Jr JP. 2010. A new species of small *Scinax* Wagler, 1830 (Amphibia, Anura, Hylidae) of the *Scinax ruber* clade from Cerrado of central Brazil. *Amphibia-Reptilia* 31: 411–418.
- Carvalho AL. 1954. A preliminary synopsis of the genera of American Microhylid frogs. *Occasional Papers of the Museum of Zoology, University Michigan* 555: 1–21.
- Castroviejo-Fisher S, Ayarzagüena J, Vilà C. 2007. A new species of *Hyalinobatrachium* (Anura: Centrolenidae) from Serranía de Perijá, Venezuela. *Zootaxa* 1441: 51–62.
- Castroviejo-Fisher S, Guayasamin JM, Kok PJR. 2009. Species status of *Centrolene lema* Duellman and Señaris, 2003 (Amphibia: Centrolenidae) revealed by integrative taxonomy. *Zootaxa* 1980: 16–28.
- Castroviejo-Fisher S, Señaris JC, Ayarzagüena J, Vilà C. 2008. Resurrection of *Hyalinobatrachium orocostale* and notes on the *Hyalinobatrachium orientale* species complex (Anura: Centrolenidae). *Herpetologica* 64: 472–484.
- Castroviejo-Fisher S, Padiá JM, Chaparro JC, Aguayo R, De la Riva I. 2009. A new species of *Hyalinobatrachium* (Anura: Centrolenidae) from the Amazonian slopes of the central Andes, with comments on the diversity of the genus in the area. *Zootaxa* 2143: 22–44.
- Castroviejo-Fisher S, Vilà C, Ayarzagüena J, Blanc M, Ernst R. 2011. Species diversity of *Hyalinobatrachium* glassfrogs (Amphibia: Centrolenidae) from the Guiana Shield, with the description of two new species. *Zootaxa* 3132: 1–55.
- Castroviejo-Fisher S, Padiá JM, De la Riva I, Pombal JP, Da Silva HR, Rojas-Runjaic FJM, Medina-Méndez E, Frost DR. 2015. Phylogenetic systematics of egg-brooding frogs (Anura: Hemiphractidae) and the evolution of direct development. *Zootaxa* 4004: 1–75.
- Catenazzi A. 2015. State of the world's amphibians. *Annual Review of Environment and Resources* 40: 91–119.
- Chacón A. 2001. Estrategia reproductiva y desarrollo larval de *Hyla pugnax* “Schmidt, 1857” en una localidad del piedemonte andino de Venezuela. Licenciatura en Biología Thesis, Universidad de los Andes, Departamento de Biología, Mérida, Mérida, Venezuela. 126 p.
- Chacón A, Díaz de Pascual A, Barrio CL. 2000. Presencia de *Bufo glaberrimus* (Anura: Bufonidae) en Venezuela. *Acta Biológica Venezuelica* 20: 65–69.
- Chacón A, Díaz de Pascual A, Godoy F. 2001. Geographic Distribution (Anura): *Bufo glaberrimus*. *Herpetological Review* 32: 269.
- Chacón-Ortiz A, García C, Camacho E, Díaz de Pascual A. 2005. Geographic Distribution: *Hypsiboas rosenbergi*. *Herpetological Review* 36: 462.
- Chaparro JC, Pramuk JB, Gluesenkamp AG. 2007. A new species of arboreal *Rhinella* (Anura: Bufonidae) from cloud forest of southeastern Peru. *Herpetologica* 63: 203–212.
- Cochran D, Goin C. 1970. Frogs of Colombia. *United States National Museum Bulletin* 288: 1–655.
- Cocroft RB, McDiarmid RW, Jaslow AP, Ruiz-Carranza PM. 1990. Vocalizations of eight species of *Atelopus* (Anura: Bufonidae) with comments on communications in the genus. *Copeia* 1990(3): 631–643.
- Cole CJ, Townsend CR, Reynolds RP, MacCulloch RD, Lathrop A. 2013. Amphibians and reptiles of Guyana, South America: illustrated keys, annotated species accounts, and a biogeographic synopsis. *Proceedings of the Biological Society of Washington* 125: 317–620.
- Crawford AJ, Smith EN. 2005. Cenozoic biogeography and evolution in direct-developing frogs of Central America (Leptodactylidae: *Eleutherodactylus*) as inferred from a phylogenetic analysis of nuclear and mitochondrial genes. *Molecular Phylogenetics and Evolution* 35: 536–555.
- Crombie RI, Heyer WR. 1983. *Leptodactylus longirostris* (Anura: Leptodactylidae): advertisement call, tadpole, ecological and distributional notes. *Revista Brasileira de Biologia* 43: 291–296.
- Darst C, Cannatella D. 2004. Novel relationships among hyloid frogs inferred from 12S and 16S mitochondrial DNA sequences. *Molecular Phylogenetics and Evolution* 31: 462–475.
- Daudin FM. 1803. *Histoire naturelle des Rainettes, des Granouilles et des Crapauds*. Paris, France. An. XI. 71 p.

- De Almeida AP, de Carvalho VT, Gordo M, Rojas-Zamora RR, Menin M. 2014. First record of *Adelastes hylonomos* Zweifel, 1986 (Amphibia, Anura, Microhylidae) outside the type locality, with notes on the advertisement call. *Check List* 10: 1,226–1,228.
- De la Riva I, Köhler J, Lötters S, Reichle S. 2000. Ten years of research on Bolivian amphibians: updated checklist, distribution, taxonomic problems, literature and iconography. *Revista Española de Herpetología* 14: 19–164.
- De Sá RO, Grant T, Camargo A, Heyer WR, Ponsa ML, Stanley E. 2014. Systematics of the Neotropical genus *Leptodactylus* Fitzinger, 1826 (Anura: Leptodactylidae): Phylogeny, the relevance of non-molecular evidence, and species accounts. *South American Journal of Herpetology* 9: 1–128.
- Diego-Aransay A, Gorzula S. 1987. Una nueva especie de *Oreophrynella* (Anura: Bufonidae) de la Guayana Venezolana. *Memoria de la Sociedad de Ciencias Naturales La Salle* 47: 233–238.
- Dixon JR, Rivero-Blanco C. 1985. A new dendrobatid frog (*Colostethus*) from Venezuela with notes on its natural history and that of related species. *Journal of Herpetology* 19: 177–184.
- Dixon JR, Staton MA. 1976. Some aspects of the biology of *Leptodactylus macrosternum* Miranda-Ribeiro (Anura: Leptodactylidae) of the Venezuelan Llanos. *Herpetologica* 32: 227–232.
- Dole J, Durant P. 1972. A new species of *Colostethus* (Amphibia: Salientia) from the Mérida Andes, Venezuela. *Caribbean Journal of Science* 12: 191–193.
- Dole J, Durant P. 1974a. Movements and seasonal activity of *Atelopus oxyrhynchus* (Anura: Atelopodidae) in a Venezuelan cloud forest. *Copeia* 1974 (1): 230–235.
- Dole J, Durant P. 1974b. Courtship behavior in *Colostethus collaris* (Dendrobatidae). *Copeia* 1974 (4): 988–990.
- Donnelly MA, Myers CW. 1991. Herpetological results of the 1990 Expedition to the summit of Cerro Guaquinima, with new tepui Reptiles. *American Museum Novitates* 3017: 1–54.
- Donoso-Barros R. 1964. A new species of dendrobatid frog, *Prostherapis riveroi* from Venezuela. *Caribbean Journal of Science* 4: 485–489.
- Donoso-Barros R. 1965. Nuevos reptiles y anfibios de Venezuela. *Boletín del Museo Nacional de Historia Natural de Chile* 9: 1–8.
- Donoso-Barros R. 1966. *Hyla robersimoni*, nuevo hylidae de Venezuela. *Boletín del Museo Nacional de Historia Natural de Chile* 29: 37–43.
- Donoso-Barros R. 1968. Un nuevo anuro de los Andes de Venezuela. *Caribbean Journal of Science* 8: 31–34.
- Donoso-Barros R, León-Ochoa J. 1972. Desarrollo y evolución larval de *Hyla crepitans* (Amphibia: Salientia). *Boletín de la Sociedad Biológica de Concepción* 44: 117–127.
- Dubois A, Heyer R. 1992. *Leptodactylus labialis*, the valid name for the American white-lipped frog (Amphibia: Leptodactylidae). *Copeia* 1992 (2): 584–585.
- Dubois A, Raffaelli J. 2012. A new ergotaxonomy of the order Urodela Duméril, 1805 (Amphibia, Batrachia). *Alytes* 28: 77–161.
- Dubois A. 2017. The nomenclatural status of *Hysaplesia*, *Hylaplesia*, *Dendrobates* and related nomina (Amphibia, Anura), with general comments on zoological nomenclature and its governance, as well as on taxonomic databases and websites. *Bionomina* 11: 1–48.
- Duellman WE. 1956. The frogs of the hylid genus *Phrynohyas* Fitzinger, 1843. *Miscellaneous Publications of the Museum of Zoology, University Michigan* 96: 1–47.
- Duellman WE. 1968. The genera of Phyllomedusine frogs (Anura: Hylidae). *University of Kansas Publications, Museum of Natural History* 18: 1–10.
- Duellman WE. 1969. *Phyllomedusa buckleyi* Boulenger: Variation, distribution and synonymy. *Herpetologica* 25: 134–140.
- Duellman WE. 1970. Identity of the South American Hylid frog *Garbeana garbei*. *Copeia* 1970(3): 534–538.
- Duellman WE. 1971a. The nomenclatural status of the names *Hyla boans* (Linnaeus) and *Hyla maxima* (Laurenti) (Anura: Hylidae). *Herpetologica* 27: 397–405.
- Duellman WE. 1971b. A taxonomic review of South American Hylid frogs, genus *Phrynohyas*. *Occasional Papers of the Museum of Natural History, University of Kansas* 4: 1–21.
- Duellman WE. 1972a. A review of the Neotropical frogs of the *Hyla bogotensis* group. *Occasional Papers of the Museum of Natural History, University of Kansas* 11: 1–31.
- Duellman WE. 1972b. South American frogs of the *Hyla rostrata* group (Amphibia, Anura, Hylidae). *Zoologische Mededelingen* 47: 177–192.
- Duellman WE. 1973. Frogs of the *Hyla geographica* group. *Copeia* 1973 (3): 515–533.
- Duellman WE. 1974a. A reassessment of the taxonomic status of some Neotropical Hylid frogs. *Occasional Papers of the Museum of Natural History, University of Kansas* 27: 1–27.
- Duellman WE. 1974b. Taxonomic notes on *Phyllomedusa* (Anura: Hylidae) from the upper Amazon basin. *Herpetologica* 30: 105–112.
- Duellman WE. 1977. Liste der rezenten amphibien und reptilien: Hylidae, Centrolenidae, Pseudidae. *Das Tierreich* 95: 1–225.
- Duellman WE. 1979a. The South American herpetofauna: a panoramic view. Pp. 1–28 In: *The South American Herpetofauna: Its Origin, Evolution, and Dispersal*. Editor, Duellman WE. Museum of Natural History,

- University of Kansas Monographs 7. University of Kansas, Lawrence, Kansas, USA. 485 p.
- Duellman WE. 1979b. The herpetofauna of the Andes: patterns of distribution, origin, differentiation, and present communities. Pp. 371–459 In: *The South American Herpetofauna: Its Origin, Evolution, and Dispersal*. Editor, Duellman WE. Museum of Natural History, University of Kansas Monographs 7. University of Kansas, Lawrence, Kansas, USA. 485 p.
- Duellman WE. 1980. A new species of marsupial frog (Hylidae: *Gastrotheca*) from Venezuela. *Occasional Papers of the Museum of Zoology, University of Michigan* 690: 1–7.
- Duellman WE. 1986. Two new species of *Ololygon* (Anura: Hylidae) from the Venezuelan Guayana. *Copeia* 1986 (4): 864–870.
- Duellman WE. 1989a. New species of Hylid frogs from the Andes of Columbia and Venezuela. *Occasional Papers of the Museum of Natural History, University of Kansas* 131: 1–12.
- Duellman WE. 1989b. Lista anotada y clave de los sapos marsupiales (Anura: Hylidae: *Gastrotheca*) de Colombia. *Caldasia* 16: 105–111.
- Duellman WE. 1993. Amphibian species of the world. Additions and corrections. *University of Kansas, Museum of Natural History, Special Publications* 21: 1–372.
- Duellman WE. 1997. Amphibians of La Escalera region, Southeastern Venezuela: taxonomy, ecology and biogeography. *Scientific Papers of the Natural History Museum, University of Kansas* 2: 1–52.
- Duellman WE. 2001. *The Hylid Frogs of Middle America*. Society for the Study of Amphibians and Reptiles, Ithaca, New York, USA. 1,159 p.
- Duellman WE. 2015. *Marsupial Frogs Gastrotheca and Allied Genera*. John Hopkins University Press, Baltimore, Maryland, USA. 407 p.
- Duellman WE, Crump M. 1974. Speciation in frogs of the *Hyla parviceps* group in the upper Amazon Basin. *Occasional Papers of the Museum of Natural History, University of Kansas* 23: 1–40.
- Duellman WE, Fouquette Jr MJ. 1968. Middle American frogs of the *Hyla microcephala* group. *University of Kansas Publications, Museum of Natural History* 17: 517–557.
- Duellman WE, Gray P. 1983. Developmental biology and systematics of the egg-brooding hylid frogs, genera *Flectonotus* and *Fritziana*. *Herpetologica* 39: 333–359.
- Duellman WE, Hoogmoed MS. 1984. The taxonomy and phylogenetic relationships of the hylid frog genus *Stefania*. *University Kansas, Museum of Natural History Miscellaneous Publications* 75: 1–39.
- Duellman WE, Hoogmoed MS. 1992. Some hylid frogs from the Guiana highlands, northeastern south America: new species, distributional records, and a generic reallocation. *Occasional Papers of the Museum of Natural History, University of Kansas* 147: 1–21.
- Duellman WE, Lynch JD. 1981. Nomenclatural resolution of the identity of *Hyla aurantiaca* and *Hyla lactea*. *Journal of Herpetology* 15: 237–239.
- Duellman WE, Maness S. 1980. The reproductive behavior of some hylid marsupial frogs. *Journal of Herpetology* 14: 213–222.
- Duellman WE, Mendelson III JR. 1995. Amphibians and reptiles from northern Departamento Loreto, Perú: taxonomy and biogeography. *University of Kansas Science Bulletin* 55: 329–376.
- Duellman WE, Ruíz-Carranza PM. 1986. Ontogenetic polychromatism in marsupial frogs (Anura: Hylidae). *Caldasia* 15: 617–627.
- Duellman WE, Señaris JC. 2003. A new species of glass frog (Anura: Centrolenidae) from the Venezuelan Guayana. *Herpetologica* 59: 247–252.
- Duellman WE, Trueb L. 1986. *Biology of Amphibians*. McGraw Hill, New York, New York, USA. 670 p.
- Duellman WE, Veloso A. 1977. Phylogeny of *Pleurodema* (Anura: Leptodactylidae): a biogeographic model. *Occasional Papers of the Museum of Natural History, University of Kansas* 64: 1–46.
- Duellman WE, Wiens JJ. 1992. The status of the hylid frog genus *Ololygon* and the recognition of *Scinax* Wagler, 1830. *Occasional Papers of the Museum of Natural History, University of Kansas* 151: 1–23.
- Duellman WE, Yoshpa M. 1996. A new species of *Tepuihyla* (Anura: Hylidae) from Guyana. *Herpetologica* 52: 275–281.
- Duellman WE, Maxson LR, Jesiolowsky CA. 1988. Evolution of Marsupial frogs (Hylidae: Hemiphraetinae): Immunological evidence. *Copeia* 1988 (3): 527–543.
- Duellman WE, Jungfer KH, Blackburn D. 2011. The phylogenetic relationship of geographically separated “*Flectonotus*” (Anura: Hemiphraetidae), as revealed by molecular, behavioral and morphological data. *Phyllomedusa* 10: 15–29.
- Duellman WE, Marion AB, Hedges SB. 2016. Phylogenetic, classification, and biogeography of the treefrogs (Amphibia: Anura: Arboranae). *Zootaxa* 4104: 001–109.
- Dunn ER. 1942. The American caecilians. *Bulletin Museum Comparative Zoology Harvard* 91: 439–540.
- Dunn ER. 1948. American frogs of the family Pipidae. *American Museum Novitates* 1384: 1–13.
- Durant P. 1993. Estatus poblacional en algunos representantes de la anfibiafauna andino-venezolana. Pp. 247 In: *Libro de Resúmenes III Congreso Latinoamericano de Herpetología, 12 al 18 de diciembre, 1993. Campiñas, São Paulo, Brasil*.
- Durant P, Díaz A. 1996. Herpetofauna de cinco cuencas hidrográficas andino-venezolanas. Pp 351–375 In: *Herpetologia Neotropical. Actas II Congreso Latinoamericano de Herpetología, II Volumen*, Editor,

- Péfaur, J. Universidad de Los Andes, Mérida, Mérida, Venezuela. 451 p.
- Durant P, Dole J. 1974. Informaciones sobre la ecología de *Atelopus oxyrhynchus* (Salientia: Atelopodidae) en el bosque nublado de San Eusebio, estado Mérida. *Revista Forestal Venezolana* 24: 83–91.
- Durant P, Dole J. 1975. Aggressive behavior in *Colostethus collaris* (Anura: Dendrobatidae). *Herpetologica* 31: 23–26.
- Edwards SR. 1974. Taxonomic notes on South American Dendrobatid frogs of the genus *Colostethus*. *Occasional Papers of the Museum of Natural History, University of Kansas* 30: 1–14.
- Escalona N, Prieto-Torres DA, Rojas-Runjaic FJM. 2017. Unveiling the geographic Distribution of *Boana pugnax* (Schmidt, 1857) in Venezuela: new state records, range extension, and potential distribution. *Check List* 13: 671–681.
- Evans M, Lampo M. 1996. Diet of *Bufo marinus* in Venezuela. *Journal of Herpetology* 30: 73–76.
- Fabrezi M, Langone J. 2000. Los caracteres morfológicos del controvertido Neobatrachia *Allophryne ruthveni* Gaige, 1926. *Cuadernos de Herpetología* 14: 47–59.
- Faivovich J, Haddad CFB, Garcia PCA, Frost DR, Campbell JA, Wheeler WC. 2005. Systematic review of the frog family Hylidae, with special reference to Hylinae: phylogenetic analysis and taxonomic revision. *Bulletin of the American Museum of Natural History* 294: 1–240.
- Faivovich J, Haddad CFB, Baêta D, Jungfer KH, Álvares GFR, Brandão RA, Sheil C, Barrientos LS, Barrio-Amorós CL, Cruz CAG, et al. 2010. The phylogenetic relationships of the charismatic poster frogs, Phyllomedusinae (Anura, Hylidae). *Cladistics* 26: 227–261.
- Faivovich J, Ferraro DP, Basso NG, Haddad CFB, Rodrigues MT, Wheeler WC, Lavilla EO. 2012. A phylogenetic analysis of *Pleurodema* (Anura: Leptodactylidae: Leiuperinae) based on mitochondrial and nuclear gene sequences, with comments on the evolution of anuran foam nests. *Cladistics* 28: 460–482.
- Faivovich J, Nicoli L, Blotto BL, Pereyra MO, Baldo D, Barrionuevo J, Fabrezi M, WildER, Haddad CFB. 2014. Big, bad, and beautiful: phylogenetic relationships of the Horned Frogs (Anura: Ceratophryidae). *South American Journal of Herpetology* 9: 207–227.
- Fenolio D, Mendelson III JR, Lamar W. 2012. New diagnosis and description of variation among adult *Rhinella ceratophrys* (Boulenger) (Amphibia: Bufonidae), with notes on ecology and distribution. *South American Journal of Herpetology* 7: 9–15.
- Forlani MC, Bernardo PH, Zaher H. 2012. Amphibia, Anura, Hylidae, *Phyllomedusa tarsius* Cope, 1868: Distribution extension, new country record and geographic distribution map. *Check List* 8: 155–157.
- Fouquet A, Gaucher P, Blanc M, Vélez-Rodríguez CM. 2007a. Description of two new species of *Rhinella* (Anura: Bufonidae) from the lowlands of the Guiana shield. *Zootaxa* 1663: 17–32.
- Fouquet A, Gilles A, Vences M, Marty C, Blanc M, Gemmill NJ. 2007b. Underestimation of species richness in Neotropical frogs revealed by mtDNA analyses. *PLoS ONE* 2 (10): e1109.
- Fouquet A, Recoder R, Texeira Jr M, Cassimiro J, Amaro RC, Camacho A, Damasceno R, Carnaval AC, Moritz C, Rodrigues MT. 2012a. Molecular phylogeny and morphometric analyses reveal deep divergence between Amazonia and Atlantic Forest species of *Dendrophryniscus*. *Molecular Phylogenetics and Evolution* 62: 826–838.
- Fouquet A, Recoder R, Texeira Jr M, Cassimiro J, Amaro RC, Camacho A, Damasceno R, Carnaval AC, Moritz C, Rodrigues MT. 2012b. *Amazonella* Fouquet et al., 2012 (Anura: Bufonidae) junior homonym of *Amazonella* Lundblad, 1931 (Acari: Unionicolidae): proposed replacement by *Amazophrynella* nom. nov. *Zootaxa* 3244: 68.
- Fouquet A, Marques-Souza S, Sales Nunes PM, Kok PJR, Franco Curcio F, De Carvalho CM, Grant T, Rodrigues MT. 2015a. Two new endangered species of *Anomaloglossus* (Anura: Aromobatidae) from Roraima State, northern Brazil. *Zootaxa* 3926: 191–210.
- Fouquet A, Del Orrico VG, Ernst R, Blanc M, Martínez Q, Vacher JP, Rodrigues MT, Ouboter P, Jairam R, Ron S. 2015b. A new *Dendropsophus* Fitzinger, 1843 (Anura: Hylidae) of the *parviceps* group from the lowlands of the Guiana Shield. *Zootaxa* 4052: 39–64.
- Fouquet A, Martínez Q, Zeidler L, Curtois EA, Gaucher P, Blanc M, Lima JD, Souza SM, Rodrigues MT, Kok PJR. 2016. Cryptic diversity in the *Hypsiboas semilineatus* species group (Amphibia, Anura) with the description of a new species from the eastern Guiana Shield. *Zootaxa* 4084: 79–104.
- Fouquette MJ. 1961. Status of the frog *Hyla albomarginata* in Central America. *Fieldiana* 39: 595–601.
- Fouquette MJ. 1968. Some frogs from the Venezuelan Llanos, and the status of *Hyla misera* Werner. *Herpetologica* 24: 321–325.
- Fouquette MJ, Delahoussaye AJ. 1977. Sperm morphology in the *Hyla rubra* group (Amphibia, Anura, Hylidae) and its bearing on generic status. *Journal of Herpetology* 11: 387–396.
- Fouquette Jr MJ, Dubois A. 2014. *A Checklist of North American Amphibians and Reptiles*. Seventh Edition. Volume 1. Amphibians. XLibris, Bloomington, Indiana, USA. 586 p.
- Frost DR (ed.) 1985. *Amphibian Species of the World*. Allen Press Inc. and Association of Systematic Collections, Lawrence, Kansas, USA. 732 p.
- Frost DR. 2019. Amphibian species of the World: an online reference. Version 6.0 Available: <http://research.amnh.org/herpetology/amphibia/index.php>

- [Accessed: 22 February 2018].
- Frost DR, Grant T, Faivovich J, Bain RH, Haas A, Haddad CFB, De Sá RO, Channing A, Wilkinson M, Donnellan SC, et al. 2006. The amphibian tree of life. *Bulletin of the American Museum of Natural History* 297: 1–370.
- Fuentes O, Barrio-Amorós CL. 2003. A new *Eleutherodactylus* (Anura, Leptodactylidae) from Marahuaka tepui, Amazonas, Venezuela. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 28: 285–290.
- Fuentes O, Rodríguez-Acosta A. 1997. The venomous “sapito minero” (*Dendrobates leucomelas* Steindachner, 1864), its medical importance and the phenotypic variation in specimens from two regions of the Amazonas state, Venezuela. *Acta Biológica Venezuelica* 17: 53–57.
- Funkhouser A. 1957. Review of the Neotropical Tree-Frogs of the genus *Phyllomedusa*. *Occasional Papers of the Museum of Natural History of Stanford University* 5: 1–89.
- Funkhouser A. 1962. A new *Phyllomedusa* from Venezuela. *Copeia* 1962 (3): 588–590.
- Gaige HT. 1922. A new *Gastrotheca* from Venezuela. *Occasional Papers, Museum of Zoology, University of Michigan* 107: 1–3.
- Gallardo JM. 1961. On the species of Pseudidae (Amphibia, Anura). *Bulletin of the Museum of Comparative Zoology, Harvard* 125: 111–134.
- Gallardo JM. 1965. The species *Bufo granulosus* Spix (Salientia: Bufonidae) and its geographic variation. *Bulletin of the Museum of Comparative Zoology, Harvard* 134: 107–138.
- García-Pérez JE. 1997. Evaluación del estado poblacional de dos especies de sapitos amenazadas de extinción: *Atelopus mucubajiensis* y *Atelopus* sp. (Anura: Bufonidae) Parque Nacional Sierra Nevada y Parque Nacional Páramo Guaramacal “General Cruz Carrillo”, en los Andes venezolanos. Pp. 211–215 In: *Ciencia y Conservación en el Sistema de Parques Nacionales de Venezuela*. Editor, Novo I. Impresos Altamira S.A., Caracas, Miranda, Venezuela. 270 p.
- García-Pérez JE. 2005. Survival of an undescribed *Atelopus* from the Venezuelan Andes. *Froglog* 68: 2–3.
- García-Pérez JE, La Marca E. 2015. Sapito arlequín de Guaramacal, *Atelopus* sp. In: *Libro Rojo de la Fauna Venezolana*. Cuarta edición. Editors, Rodríguez JP, García-Rawlins A, Rojas-Suárez F. Provita y Fundación Empresas Polar, Caracas, Miranda, Venezuela. Available: <http://animalesamenazados.provita.org.ve/>
- García-Pérez JE, Tovar-Siso P, Pereira-Muñoz A. 2013. Evidencias de reproducción en tres especies de *Atelopus* (Anura: Bufonidae) en la sección nororiental de la Cordillera de Mérida, Venezuela. Pp. 659 In: *Resúmenes X Congreso Venezolano de Ecología, 18 al 22 Noviembre de 2013, Mérida, Venezuela*. Ediciones IVIC: Mérida, Venezuela. 848 p.
- Garda AA, Cannatella DC. 2007. Phylogeny and biogeography of paradoxical frogs (Anura, Hylidae, Pseudae) inferred from 12S and 16S mitochondrial DNA. *Molecular Phylogenetics and Evolution* 44: 104–114.
- Garda AA, Santana DJ, Avelar Sao-Pedro V. 2010. Taxonomic characterization of Paradoxical frogs (Anura, Hylidae, Pseudae): geographic distribution, external morphology, and morphometry. *Zootaxa* 2666: 1–28.
- Gehara M, Crawford AJ, Orrico VGD, Rodríguez A, Lötters S, Fouquet A, Barrientos LS, Brusquetti F, De la Riva I, Ernst R, et al. 2014. High levels of diversity uncovered in a widespread nominal taxon: continental phylogeography of the Neotropical Tree Frog *Dendropsophus minutus*. *PLoS ONE* 9: e103958.
- Ginés H. 1958. Representantes de la familia Pipidae (Amphibia, Salientia) en Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle*, 18: 5–18.
- Ginés H. 1959. Familias y géneros de anfibios Amphibia de Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 19: 85–146.
- Goin C. 1963. A new Centrolenid frog from Venezuela. *Acta Biológica Venezuelica* 3: 283–286.
- Goin C. 1964. Distribution and synonymy of *Centrolenella fleishmanni* in northern South America. *Herpetologica* 20: 1–8.
- Goin C. 1966. Description of a new frog of the genus *Hyla* from Suriname. *Zoologische Mededelingen* 41: 229–232.
- Goin C. 1968. A new centrolenid frog from Guyana. *Quarterly Journal of the Florida Academy of Sciences* 30: 115–118.
- González MM, Señaris JC, Rodríguez-Contreras A. 2010. Dieta del sapito rayado *Atelopus cruciger* (Amphibia: Anura: Bufonidae) en el tramo central de la cordillera de La Costa, Venezuela. *Memoria de la Fundación La Salle de Ciencias Naturales* 173–174: 71–86.
- Gorzula S. 1985a. Notes on the natural history of *Oloolygon rubra* (Laurenti). *British Herpetological Society Bulletin* 14: 14.
- Gorzula S. 1985b. Field notes on *Otophryne robusta steyermarki*. *Herpetological Review* 16: 102.
- Gorzula S. 1988. Una nueva especie de *Dendrobates* (Amphibia: Dendrobatidae) del macizo del Chimantá, estado Bolívar, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 48: 143–149.
- Gorzula S. 1989. Geographic distribution (Amphibia): *Eleutherodactylus johnstoni*. *Herpetological Review* 20: 56.
- Gorzula S. 1991. Geographic distribution (Amphibia): *Epipedobates trivittatus*. *Herpetological Review* 22: 102.
- Gorzula S. 1992. La herpetofauna del macizo del Chimantá. Pp. 267–280 In: *El Macizo del Chimantá*,

- Escudo de Guayana. Venezuela. Un Ensayo Ecológico Tepuyano*. Editor, Huber O. Todtmann Editores, Caracas, Miranda, Venezuela. 343 p.
- Gorzula S, Cerda J. 1979. *La Herpetofauna del Territorio Federal Amazonas*. Serie Informes Científicos. Ministerio del Ambiente y de los Recursos Naturales Renovables, Caracas, Distrito Capital, Venezuela. 20 p.
- Gorzula S, Señaris JC. 1996. Una nueva especie del género *Osteocephalus* (Anura: Hylidae) de la Gran Sabana, Venezuela. *Acta Biológica Venezuelica* 16: 19–22.
- Gorzula S, Señaris JC. 1998. Contribution to the herpetofauna of the Venezuelan Guayana. I. A data base. *Scientia Guaianae* 8: 1–267.
- Gorzula S, Morales J, Hernández L. 1983. Cuidado materno en la rana *Stefania scalae*. *Memoria de la Sociedad de Ciencias Naturales La Salle* 43: 127–128.
- Grant T, Humphrey EC, Myers CW. 1997. The median lingual process of frogs: a bizarre character of Old World ranoids discovered in South American dendrobatids. *American Museum Novitates* 3212: 1–40.
- Grant T, Frost DR, Caldwell JP, Gagliardo R, Haddad CFB, Celio FB, Kok PJR, Means D B, Noonan BP, Schargel WE, et al. 2006. Phylogenetic systematics of dart-poison frogs and their relatives (Anura, Athesphatanura, Dendrobatidae). *Bulletin of the American Museum of Natural History* 299: 1–262.
- Grant T, Rada M, Anganoy-Criollo MA, Batista A, Dias PH, Jeckel AM, Machado DJ, Rueda-Almonacid JV. 2017. Phylogenetic systematics of dart-poison frogs and their relatives revisited (Anura: Dendrobatoidea). *South American Journal of Herpetology* 12 (Special Issue): 1–90.
- Gremone C, Cervigón F, Gorzula S, Medina G, Novoa D. 1986. *Fauna de Venezuela, Vertebrados*. Editorial Biosfera, Caracas, Distrito Capital, Venezuela. 269 p.
- Guarnizo CE, Escallón C, Cannatella D, Amézquita A. 2012. Congruence between acoustic traits and genealogical history reveals a new species of *Dendropsophus* (Anura: Hylidae) in the High Andes of Colombia. *Herpetologica* 68: 523–540.
- Guayasamin JM, Barrio-Amorós CL. 2005. Combat behavior in *Centrolene andinum* (Rivero, 1968) (Anura: Centrolenidae). *Salamandra* 4: 83–85.
- Guayasamin JM, North S. 2009. Notes on geographic distribution. Amphibia, Centrolenidae, *Hyalinobatrachium iaspidiense*: distribution extension. *Check List* 5: 526–529.
- Guayasamin JM, Ron SR, Cisneros-Heredia DF, Lamar W, McCracken SF. 2006. A new species of frog of the *Eleutherodactylus lacrimosus* assemblage (Leptodactylidae) from the western Amazon basin, with comments on the utility of canopy surveys in lowland rainforest. *Herpetologica* 62: 191–202.
- Günther A. 1858. *Catalogue of the Batrachia Salientia of the British Museum*. British Museum, London, United Kingdom. 160 p.
- Haas A. 2003. Phylogeny of frogs as inferred from primarily larval characters (Amphibia: Anura). *Cladistics* 19: 23–89.
- Hanken J, Wake DB. 1982. Genetic differentiation among plethodontid salamanders (genus *Bolitoglossa*) in Central and South America: implications for the South American invasion. *Herpetologica* 38: 272–287.
- Hanselmann R, Rodríguez A, Lampo M, Fajardo-Ramos L, Aguirre AA, Kilpatrick AM, Rodríguez JP, Daszak P. 2004. Presence of an emerging pathogen of amphibians in introduced bullfrogs *Rana catesbeiana* in Venezuela. *Biological Conservation* 120: 115–119.
- Hardy JD. 1982. Biogeography of Tobago, West Indies, with special reference to amphibians and reptiles: a review. *Bulletin of the Maryland Herpetological Society* 18: 37–142.
- Hardy JD. 1984a. Systematic status of the South American frog *Phyllobates mandelorum* (Amphibia, Dendrobatidae). *Bulletin of the Maryland Herpetological Society* 20: 109–111.
- Hardy JD. 1984b. A new species of *Centrolenella orientalis* (Anura: Centrolenidae) from Tobago, West Indies. *Bulletin of the Maryland Herpetological Society* 20: 165–173.
- Hardy JD, Harris HS. 1979. Occurrence of the West Indian frog, *Eleutherodactylus johnstonei*, in South America and on the island of Curaçao. *Bulletin of the Maryland Herpetological Society* 15: 124–133.
- Hass CA, Dunsky JF, Maxson LR, Hoogmoed MS. 1995. Divergent lineages within the *Bufo margaritifera* complex (Amphibia: Anura; Bufonidae) revealed by albumin immunology. *Biotropica* 27: 238–249.
- Heatwole H. 1962. Contribution to the natural history of *Eleutherodactylus cornutus maussi*. *Stahlia* 2: 1–11.
- Heatwole H. 1963. Contribución a la historia natural de *Eleutherodactylus terraebolivaris* (Anura). *Acta Biológica Venezuelica* 3: 301–313.
- Heatwole H, Solano H, Heatwole A. 1965. Notes on amphibians from the Venezuelan Guayanas with description of two new forms. *Acta Biológica Venezuelica* 4: 349–364.
- Hedges SB, Duellman WE, Heinicke MP. 2008. New World direct-developing frogs (Anura: Terrarana): molecular phylogeny, classification, biogeography, and conservation. *Zootaxa* 1737: 1–182.
- Heinicke MP, Duellman WE, Hedges SB. 2007. Major Caribbean and Central American frog faunas originated by ancient oceanic dispersal. *Proceedings of the National Academy of Sciences of the United States of America* 104: 10,092–10,097.
- Heinicke MP, Barrio-Amorós CL, Hedges SB. 2015. Molecular and morphological data support recognition of a new genus of New World direct-developing frog (Anura: Terrarana) from an under-sampled region of South America. *Zootaxa* 3986: 151–172.

- Heinicke MP, Lemmon AR, Lemmon EM, McGrath K, Hedges SB. 2018. Phylogenomic support for evolutionary relationships of New World direct-developing frogs (Anura: Terraranae). *Molecular Phylogenetics and Evolution* 118: 145–155.
- Heinicke MP, Duellman WE, Trueb L, Means DB, MacCulloch RD, Hedges SB. 2009. A new frog family (Anura: Terrarana) from South America and an expanded direct-developing clade revealed by molecular phylogeny. *Zootaxa* 2009: 1–35.
- Hero JM, Galatti U. 1990. Characteristics distinguishing *Leptodactylus pentadactylus* and *Leptodactylus knudseni* in the Central Amazon rainforest. *Journal of Herpetology* 24: 226–228.
- Hero JM, Mijares-Urrutia A. 1995. The tadpole of *Scinax rostrata* (Amphibia: Hylidae). *Journal of Herpetology* 29: 307–311.
- Heyer WR. 1970. Studies on the genus *Leptodactylus* (Amphibia: Leptodactylidae). 2. Diagnosis and distribution of the *Leptodactylus* of Costa Rica. *Revista Biología Tropical* 16: 171–205.
- Heyer WR. 1972. The status of *Leptodactylus pumilio* Boulenger (Amphibia, Leptodactylidae) and the description of a new species of *Leptodactylus* from Ecuador. *Contributions in Science, Natural History Museum Los Angeles County* 231: 1–8.
- Heyer WR. 1973. Systematics of the *marmoratus* species group (Amphibia: Leptodactylidae) within the subfamily Leptodactylinae. *Contributions in Science, Natural History Museum Los Angeles County* 253: 1–46.
- Heyer WR. 1977. A discriminant function analysis of the frogs of the genus *Adenomera* (Amphibia: Leptodactylidae). *Proceedings of the Biological Society of Washington* 89: 581–592.
- Heyer WR. 1978. Systematics of the *fuscus* group of the frog genus *Leptodactylus* (Amphibia: Leptodactylidae). *Natural History Museum Los Angeles County Science Bulletin* 29: 1–85.
- Heyer WR. 1979. Systematics of the *pentadactylus* species group of the frog genus *Leptodactylus* (Amphibia: Leptodactylidae). *Smithsonian Contributions to Zoology* 301: 1–43.
- Heyer WR. 1983. Clarification of the names *Rana mystacea* Spix, 1824, *Leptodactylus amazonicus* Heyer, 1978 and a description of a new species, *Leptodactylus spixi* (Amphibia: Leptodactylidae). *Proceedings of the Biological Society of Washington* 96: 270–272.
- Heyer WR. 1994a. Variation within the *Leptodactylus podicipinus-wagneri* complex of frogs (Amphibia: Leptodactylidae). *Smithsonian Contributions to Zoology* 546: 1–124.
- Heyer WR. 1994b. *Hyla benitezii* (Amphibia: Anura: Hylidae): First record for Brazil and its biogeographical significance. *Journal of Herpetology* 28: 497–499.
- Heyer WR. 1995. South American rocky habitat leptodactylid (Amphibia: Anura: Leptodactylidae) with description of two new species. *Proceedings of the Biological Society of Washington* 108: 695–716.
- Heyer WR. 1997. Geographic variation in the frog genus *Vanzolinius* (Amphibia: Leptodactylidae). *Proceedings of the Biological Society of Washington* 110: 338–365.
- Heyer WR. 1998. The relationships of *Leptodactylus diedrus* (Anura, Leptodactylidae). *Alytes* 16: 1–24.
- Heyer WR. 2002. *Leptodactylus fragilis*, the valid name for the middle American and northern South American white-lipped frog (Amphibia: Leptodactylidae). *Proceedings of the Biological Society of Washington* 115: 321–322.
- Heyer WR. 2014. Morphological analyses of frogs of the *Leptodactylus latrans* complex (Amphibia, Leptodactylidae) from selected localities in South America. *Proceedings of the Biological Society of Washington* 126: 369–378.
- Heyer WR, Barrio-Amorós CL. 2009. The advertisement calls of two sympatric frogs, *Leptodactylus lithonaetes* (Amphibia: Anura: Leptodactylidae) and *Pristimantis vilarsi* (Amphibia: Anura: Strabomantidae). *Proceedings of the Biological Society of Washington* 122: 282–291.
- Heyer WR, de Sá RO. 2011. Variation, systematics, and relationships of the *Leptodactylus bolivianus* complex (Amphibia: Anura: Leptodactylidae). *Smithsonian Contributions to Zoology* 35: 1–58.
- Heyer WR, Heyer MM. 2001. *Leptodactylus lithonaetes*. *Catalogue of the American Amphibians and Reptiles* 723: 1–3.
- Heyer WR, Pyburn WF. 1983. *Leptodactylus riveroi*, a new frog species from Amazonia, South America (Anura: Leptodactylidae). *Proceedings of the Biological Society of Washington* 96: 560–566.
- Heyer WR, Thompson AS. 2000. *Leptodactylus rugosus*. *Catalogue of the American Amphibians and Reptiles* 708: 1–5.
- Hillis DM, de Sá R. 1988. Phylogeny and taxonomy of the *Rana palmipes* group (Salientia: Ranidae). *Herpetological Monographs* 2: 1–26.
- Hillis DM, Wilcox TP. 2005. Phylogeny of the New World true frogs (*Rana*). *Molecular Phylogenetics and Evolution* 34: 299–314.
- Hof C, Araújo MB, Jetz W, Rahbek C. 2011. Additive threats from pathogens, climate and land-use change for global amphibian diversity. *Nature* 480: 516–519.
- Hoogmoed MS. 1969. Notes on the herpetofauna of Surinam II. On the occurrence of *Allophryne ruthveni* Gaige (Amphibia, Salientia, Hylidae) in Surinam. *Zoologische Mededelingen* 4: 75–81.
- Hoogmoed MS. 1977. On the presence of *Bufo nasicus* Werner in Guiana, with a redescription of the species on the basis of recently collected material. *Zoologische Mededelingen* 51: 265–275.
- Hoogmoed MS. 1979a. Resurrection of *Hyla ornatissima*

- Noble (Amphibia, Hylidae) and remarks on related species of Green tree frogs from the Guiana Area. Notes on the Herpetofauna of Surinam VI. *Zoologische Verhandelingen* 172: 1–46.
- Hoogmoed MS. 1979b. The herpetofauna of the Guianan region. Pp. 241–279 In: *The South American Herpetofauna: Its Origin, Evolution and Dispersal*. Editor, Duellman WE. Museum of Natural History, University of Kansas Monographs 7. University of Kansas, Lawrence, Kansas, USA. 485 p.
- Hoogmoed MS. 1986. Biosystematic studies of the *Bufo typhonius* group. A preliminary progress report. Pp. 147–150 In: *Studies in Herpetology*. Editor, Rozek Z. Charles University, Prague, Czech Republic. 754 p.
- Hoogmoed MS. 1989. South American Bufonids (Amphibia: Anura: Bufonidae), an enigma for taxonomists. Pp. 167–180 In: *Treballs d'Ictiologia i Herpetologia*. Editors, Fontanet X, Horta N. Societat Catalana d'Ictiologia Herpetologia, Barcelona, Spain. 267 p.
- Hoogmoed MS. 1990a. Biosystematics of South American Bufonidae, with special reference to the *Bufo "typhonius"* group. Pp. 113–123 In: *Vertebrates in the Tropics*. Editors, Peters G, Hutterer R. Museum Alexander Köening, Bonn, Germany. 424 p.
- Hoogmoed MS. 1990b. Resurrection of *Hyla wavrini* Parker (Amphibia: Anura: Hylidae), a gladiator frog from northern South America. *Zoologische Mededelingen* 64: 71–93.
- Hoogmoed MS, Gorzula S. 1979. Checklist of the savanna inhabiting frogs of the El Manteco region with notes on their ecology and the description of a new species of tree frog (Hylidae, Anura). *Zoologische Mededelingen* 54: 183–216.
- Hoogmoed MS, Grüber U. 1983. Spix and Wagler type specimens of reptiles and amphibians in the Natural History Museum in Munich (Germany) and Leiden (The Netherlands). *Spixiana* 9: 319–415.
- ICZN. 1999. International Code of Zoological Nomenclature = ICZN (4th edition). International Trust for Zoological Nomenclature, London, United Kingdom. Available: www.vliz.be/imisdocs/publications/271138.pdf [Accessed: 8 March 2017].
- Infante-Rivero E. 2009. Anfibios y reptiles de la Guajira venezolana. *Boletín del Centro de Investigaciones Biológicas Universidad del Zulia* 43: 263–277.
- Infante-Rivero E, Velozo P. 2015. Inventario de anfibios y reptiles en la agropecuaria San Sebastián, tierras bajas de Machiques de Perijá, estado Zulia, Venezuela. *Boletín del Centro de Investigaciones Biológicas Universidad del Zulia* 49: 138–150.
- Infante-Rivero EE, Barrio-Amorós CL, Rojas-Runjaic FJM. 2006a. Geographic distribution: Anura: *Phyllomedusa venusta*. *Herpetological Review* 37: 101.
- Infante-Rivero EE, Rojas-Runjaic FJM, Barrio-Amorós CL. 2006b. Geographic distribution: Anura: *Relictivomer pearsei*. *Herpetological Review* 37: 102–103.
- Infante-Rivero EE, Rojas-Runjaic FJM, Barrio-Amorós CL. 2009 “2008”. Un nuevo *Cryptobatrachus* Ruthven, 1916 (Anura, Cryptobatrachidae) de la vertiente venezolana de la sierra de Perijá. *Memoria de la Fundación La Salle de Ciencias Naturales* 169: 45–63.
- IUCN. 2015. The IUCN Red List of Threatened Species. Version 2015–4. Available: <http://www.iucnredlist.org>. [Accessed: 8 February 2016].
- Jowers MJ, Downie JR, Cohen BL. 2008. The Golden Tree Frog of Trinidad, *Phyllodytes auratus* (Anura: Hylidae): systematic and conservation status. *Studies on Neotropical Fauna and Environment* 43: 181–188.
- Jowers MJ, Lehtinen RM, Downie RJ, Georgiadis AP, Murphy JC. 2014. Molecular phylogenetics of the glass frog *Hyalinobatrachium orientale* (Anura: Centrolenidae): evidence for Pliocene connections between mainland Venezuela and the island of Tobago. *Mitochondrial DNA* 26 (4): 613–618.
- Jungfer KH, Böhme W. 2004. A new poison-dart frog (*Dendrobates*) from northern central Guyana (Amphibia: Anura: Dendrobatidae). *Salamandra* 40: 1–6.
- Jungfer KH, Hödl W. 2002. A new species of *Osteocephalus* from Ecuador and a redescription of *O. leprieurii* (Duméril & Bibron, 1841) (Anura: Hylidae). *Amphibia-Reptilia* 23: 21–46.
- Jungfer KH, Faivovich J, Padial JM, Castroviejo-Fisher S, Lyra M, Berneck BVM, Iglesias PP, Kok PJR, MacCulloch RD, Rodrigues MT, et al. 2013. Systematics of spiny-backed treefrogs (Hylidae: *Osteocephalus*): an Amazonian puzzle. *Zoologica Scripta* 42: 351–380.
- Kaiser H, Hardy JD, Green DM. 1994. Taxonomic status of Caribbean and South American frogs currently ascribed to *Eleutherodactylus urichi* (Anura: Leptodactylidae). *Copeia* 1994: 780–796.
- Kaiser H, Barrio-Amorós CL, Trujillo JD, Lynch JD. 2002. Expansion of *Eleutherodactylus johnstonei* in northern South America: rapid dispersal through human interactions. *Herpetological Review* 33: 290–294.
- Kaiser H, Steinlein C, Feichtinger W, Schmidt M. 2003. Chromosome banding of six dendrobatid frogs (*Colostethus*, *Mannophryne*). *Herpetologica* 59: 203–218.
- Kaiser H, Barrio-Amorós CL, Rivas GA, Steinlein C, Schmid M. 2015. Five new species of *Pristimantis* (Anura: Strabomantidae) from the coastal cloud forest of the Península de Paria, Venezuela. *Journal of Threatened Taxa* 7 (4): 7,047–7,088.
- Kenny JS. 1966. Nest building in *Phyllomedusa trinitatis* Mertens. *Caribbean Journal of Science* 6: 15–22.
- Kenny JS. 1969. The Amphibia of Trinidad. *Studies on the Fauna of Curaçao and other Caribbean Islands* 29: 1–78.
- Kluge AG. 1979. The gladiator frogs of Middle America

- and Colombia, a reevaluation of their systematics (Anura: Hylidae). *Occasional Papers of the Museum of Zoology, University of Michigan* 688: 1–24.
- Kok PJR. 2009. A new species of *Oreophrynella* (Anura: Bufonidae) from the Pantepui region of Guyana, with notes on *O. macconelli* Boulenger, 1900. *Zootaxa* 2071: 35–49.
- Kok PJR. 2010. A redescription of *Anomaloglossus praderioi* (La Marca, 1998) (Anura: Aromobatidae: Anomaloglossinae), with description of its tadpole and call. *Papeis Avulsos de Zoologia* 50: 51–68.
- Kok PJR. 2013. Two new charismatic *Pristimantis* species (Anura: Craugastoridae) from the tepuis of “The Lost World” (Pantepui region, South America). *European Journal of Taxonomy* 60: 1–24.
- Kok PJR, Barrio-Amorós CL. 2013. On the taxonomic validity of *Pristimantis tepuiensis* (Schlüter & Rödder, 2007) and *P. stegolepis* (Schlüter & Rödder, 2007), with remarks on the type series of *P. guaiquinimensis* (Schlüter & Rödder, 2007). *Zootaxa* 3694: 75–80.
- Kok PJR, Castroviejo-Fisher S. 2008. Glassfrogs (Anura: Centrolenidae) from Kaieteur National Park, Guyana, with notes on the distribution and taxonomy of some species of the family in the Guiana Shield. *Zootaxa* 1680: 25–53.
- Kok PJR, Kalamandeen M. 2008. Introduction to the taxonomy of the amphibians of Kaieteur National Park, Guyana. *Abc Taxa* 5: 1–278.
- Kok PJR, Kokubum MNC, MacCulloch RD, Lathrop A. 2007. Morphological variation in *Leptodactylus lutzi* (Anura, Leptodactylidae) with description of its advertisement call and notes on its courtship behaviour. *Phyllomedusa* 6: 45–60.
- Kok PJR, Means DB, Bossuyt F. 2011. A new highland species of *Pristimantis* Jiménez de la Espada, 1871 (Anura: Strabomantidae) from the Pantepui region, northern South America. *Zootaxa* 2934: 1–19.
- Kok PJR, MacCulloch RD, Means DB, Roelants K, Van Bocxlaer I, Bossuyt F. 2012. Low genetic diversity in tepui summit vertebrates. *Current Biology* 22 (15): R589–R590.
- Kok PJR, Willaert B, Means BD. 2013. A new diagnosis and description of *Anomaloglossus roraima* (La Marca, 1998) (Anura: Aromobatidae: Anomaloglossinae), with description of its tadpole and call. *South American Journal of Herpetology* 8: 29–45.
- Kok PJR, Ratz S, Tagelaar M, Aubret F, Means DB. 2015. Out of taxonomic limbo: a name for the species of *Tepuihyla* (Anura: Hylidae) from the Chimantá Massif, Pantepui region, northern South America. *Salamandra* 51: 283–314.
- Kok PJR, Russo VG, Ratz S, Aubret F. 2016. On the distribution and conservation of two “Lost World” tepui summit endemic frogs, *Stefania ginesi* Rivero, 1968 and *S. satelles* Señaris, Ayarzagüena and Gorzula, 1997. *Amphibian & Reptile Conservation* 10 (1) [Special Section]: 5–12 (e115).
- Kok PJR, Dezfulian R, Means DB, Fouquet A, Barrio-Amorós CB. 2018. Amended diagnosis and redescription of *Pristimantis marmoratus* (Boulenger, 1900) (Amphibia: Craugastoridae), with a description of its advertisement call and notes on its breeding ecology and phylogenetic relationships. *European Journal of Taxonomy* 397: 1–30.
- Kwet A. 2001. Südbrasilianische Laubfrösche der Gattung *Scinax* mit Bemerkungen zum Geschlecht des Gattungsnamens und zum taxonomischen Status von *Hyla granulata* Peters, 1871. *Salamandra* 37: 211–238.
- La Marca E. 1983. A new frog of the genus *Atelopus* (Anura: Bufonidae) from Venezuelan cloud forest. *Contributions in Biology and Geology of the Milwaukee Public Museum* 54: 1–12.
- La Marca E. 1984a. Longevity in the Venezuelan Yellow Frog *Atelopus oxyrhinchus carbonerensis* (Anura: Bufonidae). *Transactions of the Kansas Academy of Sciences* 87: 66–67.
- La Marca E. 1984b. *Eleutherodactylus vanadise* sp. nov. (Anura: Leptodactylidae): First cloud forest *Eleutherodactylus* from the Venezuelan Andes. *Herpetologica* 40: 31–37.
- La Marca E. 1985a. Systematics and ecological observation on the Neotropical frogs *Hyla jahni* and *Hyla platydactyla*. *Journal of Herpetology* 19: 227–237.
- La Marca E. 1985b. A new species of *Colostethus* (Anura: Dendrobatidae) from the Cordillera de Mérida, Northern Andes, South America. *Occasional Papers of the Museum of Zoology, University Michigan* 710: 1–10.
- La Marca E. 1986. Description of the tadpole of *Ceratophrys calcarata*. *Journal of Herpetology* 2: 459–461.
- La Marca E. 1989. A new species of collared frog (Anura: Dendrobatidae: *Colostethus*) from Serranía de Portuguesa, Andes of Estado Lara, Venezuela. *Amphibia-Reptilia* 10: 175–183.
- La Marca E. 1992. *Catálogo Taxonómico, Biogeográfico y Bibliográfico de las Ranas de Venezuela*. Cuadernos Geográficos ULA 9. Universidad de Los Andes, Mérida, Mérida, Venezuela. 197 p.
- La Marca E. 1993. Phylogenetic relationships and taxonomy of *Colostethus mandelorum* (Anura: Dendrobatidae) with notes on coloration, natural history and description of the tadpole. *Bulletin of the Maryland Herpetological Society* 29: 4–19.
- La Marca E. 1994 “1991a.” Descripción de un género nuevo de ranas (Amphibia: Dendrobatidae) de cordillera de Mérida, Venezuela. *Anuario de Investigación 1991, Instituto de Geografía ULA* 1991: 39–41.
- La Marca E. 1994 “1991b.” Ecología de anfibios en dos ambientes contrastantes (selva nublada y páramo)

- de la cordillera de Mérida, Venezuela. *Anuario de Investigación 1991, Instituto de Geografía ULA* 1991: 31–37.
- La Marca E. 1994 “1991c.” Biogeografía de las ranas del género *Mannophryne* (Anura: Dendrobatidae) en la América del Sur. *Anuario de Investigación 1991, Instituto de Geografía ULA* 1991: 39–41.
- La Marca E. 1994a. Taxonomy of the frogs of the genus *Mannophryne* (Amphibia: Anura: Dendrobatidae). *Publicaciones de la Asociación Amigos de Doñana* 4: 1–75.
- La Marca E. 1994b. Geographic distribution (Anura): *Hyla platidactyla*. *Herpetological Review* 25: 160.
- La Marca E. 1994c. Geographic distribution (Anura): *Centrolene andinum*. *Herpetological Review* 25: 159.
- La Marca E. 1994d. Descripción de una nueva especie de *Atelopus* (Amphibia: Anura: Bufonidae) de la selva nublada andina de Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 54: 101–108.
- La Marca E. 1995a. Crisis de biodiversidad en anfibios de Venezuela: estudio de casos. Pp. 47. In: *La Biodiversidad Neotropical y la Amenaza de las Extinciones*. Editor, Alonso M. Cuadernos de Química Ecológica 4. Facultad de Ciencias, Universidad de Los Andes, Mérida, Mérida, Venezuela. 160 p.
- La Marca E. 1995b. Biological and systematic synopsis of a genus of frogs from Northern mountains of South America (Anura: Dendrobatidae: *Mannophryne*). *Bulletin of the Maryland Herpetological Society* 31: 40–77.
- La Marca E. 1995c. Harlequin frogs, in the face of extinction? *Reptilian Magazine* 3: 22–24.
- La Marca E. 1995d. Geographic distribution (Anura): *Pristimantis anolirex* (Robber Frog). *Herpetological Review* 26: 104.
- La Marca E. 1996a. First record of *Hyla pugnax* (Amphibia: Anura: Hylidae) in Venezuela. *Bulletin of the Maryland Herpetological Society* 32: 35–42.
- La Marca E. 1996b. Geographic distribution (Anura): *Phyllomedusa tarsius*. *Herpetological Review* 27: 149.
- La Marca E. 1996c. Geographic distribution (Anura): *Centrolene buckleyi*. *Herpetological Review* 27: 148–149.
- La Marca E. 1996d. Análisis de la biodiversidad de anfibios en la Cordillera de Mérida, Venezuela. Pp. 285 In: *Libro de Resúmenes: IV Congreso Latinoamericano de Herpetología, 14–19 de octubre de 1996, Santiago de Chile*. Universidad de Chile, Santiago, Chile. 294 p.
- La Marca E. 1997a. Ranas del género *Colostethus* (Amphibia: Anura: Dendrobatidae) de la Guayana Venezolana, con la descripción de siete nuevas especies. *Publicaciones de la Asociación Amigos de Doñana* 9: 1–64.
- La Marca E. 1997b. Lista actualizada de los anfibios de Venezuela. Pp: 103–120 In: *Vertebrados Actuales* de la cordillera de Mérida, Venezuela. Editor, La Marca E. Museo de Ciencia y Tecnología de Mérida, Mérida, Venezuela. 298 p.
- La Marca E. 2004. Descripción de dos nuevos anfibios del piedemonte andino de Venezuela. *Herpetotropicos* 1: 1–9.
- La Marca E. 2007. Sinopsis taxonómica de dos nuevos géneros de anfibios (Anura: Leptodactylidae) de los Andes de Venezuela. *Herpetotropicos* 3: 67–87.
- La Marca E. 2009. A frog survivor (Amphibia: Anura: Aromobatidae: *Mannophryne*) of the traditional coffee belt in the Venezuelan Andes. *Herpetotropicos* 5: 49–54.
- La Marca E. 2016. Yapacana’s little red frog, *Minyobates steyermarki* (Rivero, 1971). Pp. 387–392 In: *Aposematic Poison Frogs (Dendrobatidae) of the Andean Countries: Bolivia, Colombia, Ecuador, Perú and Venezuela*. Editors, Kahn TR, La Marca E, Lötters S, Brown JL, Twomey E, Amézquita A. Conservation International Tropical Field Guide Series. Conservation International, Arlington, Virginia, USA. 588 p.
- La Marca E, Lötters S. 1997. Monitoring of declines in Venezuelan *Atelopus* (Amphibia: Anura: Bufonidae). *Herpetologia Bonnensis* 1997: 207–213.
- La Marca E, Manzanilla J. 1997. Geographic distribution (Anura): *Bufo sternosignatus*. *Herpetological Review* 28: 207.
- La Marca E, Mijares-Urrutia A. 1988. Description of the tadpole of *Colostethus mayorgai* (Anura: Dendrobatidae) with preliminary data on the reproductive biology of the species. *Bulletin of the Maryland Herpetological Society* 24: 47–57.
- La Marca E, Mijares-Urrutia A. 1996. Taxonomy and geographic distribution of a Northwestern Venezuelan toad (Anura, Bufonidae, *Bufo sternosignatus*). *Alytes* 14: 101–114.
- La Marca E, Mijares-Urrutia A. 1997. The tadpole of *Colostethus bromelicola* (Test, 1956) (Amphibia: Anura: Dendrobatidae) from Northern Venezuela. *Comunicaciones do Museu de Ciencia Tecnologia-PUCRS, série Zoologia, Porto Alegre* 10: 3–11.
- La Marca E, Smith HM. 1982a. *Eleutherodactylus colostichos*, a new frog species from the Páramo de los Conejos, in the Venezuelan Andes (Anura: Leptodactylidae). *Occasional Papers of the Museum of Zoology, University Michigan* 710: 1–8.
- La Marca E, Smith HM. 1982b. The anuran named *Hyla loveridgei* Rivero. *Caribbean Journal of Science* 18: 21.
- La Marca E, Pérez E, Renjifo JM. 1989. Una nueva especie de *Atelopus* (Amphibia: Anura: Bufonidae) del Páramo de Tamá, estado Apure, Venezuela. *Caldasia* 16: 97–104.
- La Marca E, Vences M, Lötters S. 2002. Rediscovery and mitochondrial relationships of the dendrobatid frog *Colostethus humilis* suggest parallel colonization of the Venezuelan Andes by poison frogs. *Studies in*

- Neotropical Fauna and Environment* 37: 233–240.
- Lampo M, Chacón A, Díaz de Pascual A. 2004. Muge y no es Vaca. La rana toro, un invasor letal. *EsCiencia* 10: 14–15.
- Lampo M, Barrio-Amorós CL, Han B. 2006. *Batrachochytrium dendrobatidis* infection in the recently rediscovered *Atelopus mucubajiensis* (Anura, Bufonidae), a critically endangered frog from the Venezuelan Andes. *Ecohealth* 3: 299–302.
- Lampo M, Señaris JC, Rodríguez-Contreras A, Rojas-Runjaic FJM, García CZ. 2011. High turnover rates in remnant populations of the Harlequin Frog *Atelopus cruciger* (Bufonidae): low risk of extinction? *Biotropica* 2011: 1–7.
- Lathrop A, MacCulloch RD. 2007. A new species of *Oreophrynella* (Anura: Bufonidae) from Mount Ayanganna, Guyana. *Herpetologica* 63: 87–93.
- Lavilla E, Vaira M, Ferrari L. 2003. A new species of *Elachistocleis* (Anura: Microhylidae) from the Andean Yungas of Argentina, with notes on the *Elachistocleis ovalis*-*E. bicolor* controversy. *Amphibia-Reptilia* 24: 269–284.
- Lavilla E, Langone J, Padial JM, de Sá R. 2010. The identity of the crackling, luminiscent frog of Suriname (*Rana typhonia* Linnaeus, 1758) (Amphibia, Anura). *Zootaxa* 2671: 17–30.
- Lavilla EO, Caramaschi U, Langone JA, Pombal Jr JP, De Sá RO. 2013. The identity of *Rana margaritifera* Laurenti, 1768 (Anura, Bufonidae). *Zootaxa* 3646: 251–264.
- León-Ochoa JR. 1975. Desarrollo temprano y notas sobre la historia natural de la larva de *Hyla x-signata* (Amphibia: Hylidae). *Caribbean Journal of Science* 15: 57–65.
- León-Ochoa JR, Donoso-Barros R. 1970. Desarrollo embrionario y metamorfosis de *Pleurodema brachyops* (Cope) (Salientia, Leptodactylidae). *Boletín de la Sociedad Biológica de Concepción* 42: 355–379.
- Lescure J. 1975. Contribution a l'étude des amphibiens de Guyana Française. V. Les Centrolenides. *Bulletin de la Société Zoologique de France* 100: 385–394.
- Lichtenstein M, Martens E. 1856. *Nomenclator Reptilium et Amphibiorum Musei Zoologici Berolinensis*. Gedruckt Akademische Wissenschaften, Berlin, Germany. 48 p.
- Lima A. 1992. The tadpole of *Leptodactylus riveroi* Heyer & Pyburn, 1983 (Anura: Leptodactylidae). *Journal of Herpetology* 26: 91–93.
- Lima AP, Caldwell JP, Strussmann C. 2009. Redescription of *Allobates brunneus* (Cope, 1887) (Anura: Aromobatidae: Allobatinae), with a description of the tadpole, call, and reproductive behaviour. *Zootaxa* 1988: 1–16.
- Lotkatz S. 2007. Taxonomía y zoogeografía de la herpetofauna del macizo de Nirgua, Venezuela. Ph.D. Dissertation, Johann Wolfgang Goethe-Universität, Frankfurt am Main, Germany. 161 p.
- Lötters S. 1996. *The Neotropical Toad Genus Atelopus. Checklist, Biology, Distribution*. Vences und Glaw Verlags GbR, Köln, Germany. 143 p.
- Lötters S, La Marca E. 2001. Case 3173. *Phrynidium crucigerum* Lichtenstein & Martens, 1856 (currently *Atelopus cruciger*; Amphibia, Anura): proposed conservation of the specific name by the designation of a neotype. *Bulletin of Zoological Nomenclature* 58: 119–121.
- Lötters S, Böhme W, Günther R. 1998. Notes on the type material of the Neotropical Harlequin frogs *Atelopus varius* (Lichtenstein & Martens, 1856) and *Atelopus cruciger* (Lichtenstein & Martens, 1856) deposited in the Museum für Naturkunde of Berlin (Anura, Bufonidae). *Mitteilungen aus dem Museum für Naturkunde in Berlin. Zoologische Reihe* 74: 173–184.
- Lötters S, La Marca E, Vences M. 2004. Redescriptions of two toad species of the genus *Atelopus* from Coastal Venezuela. *Copeia* 2004 (2): 222–234.
- Lotzkatz S, Hertz A, Valera-Leal J. 2007. Amphibia, Anura, Hylidae, *Hylomantis medinai*: distribution extension by discovery of a third population. *Check List* 3: 200–203.
- Lourenço LB, Targueta CP, Baldo D, Nascimento J, Garcia PC, Andrade GV, Haddad CF, Recco-Pimentel SM. 2015. Phylogeny of frogs from the genus *Physalaemus* (Anura, Leptodactylidae) inferred from mitochondrial and nuclear gene sequences. *Molecular Phylogenetics and Evolution* 92: 204–216.
- Lutz A. 1927. Notas sobre batrachios da Venezuela e da Ilha de trinidad. *Memórias do Instituto Oswaldo Cruz* 20: 35–65.
- Lynch JD. 1970. Systematic status of the American leptodactylid frog genera *Engystomops*, *Eupemphix* and *Physalaemus*. *Copeia* 1970: 488–496.
- Lynch JD. 1975. A review of the broad-headed Eleutherodactylinae frogs of South America (Leptodactylidae). *Occasional Papers of the Museum of Natural History, University of Kansas* 37: 1–46.
- Lynch JD. 1976. The species groups of the South American frogs of the genus *Eleutherodactylus* (Leptodactylidae). *Occasional Papers of the Museum of Natural History, University of Kansas* 61: 1–24.
- Lynch JD. 1978. A new Eleutherodactylinae frog from the Andes of northern Colombia (Leptodactylidae). *Copeia* 1978(1): 17–21.
- Lynch JD. 1979a. A new genus for *Elosia duidensis* Rivero (Amphibia, Leptodactylidae) from Southern Venezuela. *American Museum Novitates* 2680: 1–8.
- Lynch JD. 1979b. The amphibians of the lowland tropical forests. Pp. 189–215 In: *The South American Herpetofauna: Its Origin, Evolution and Dispersal*. Editor, Duellman WE. Museum of Natural History, University of Kansas Monographs 7. University of Kansas, Lawrence, Kansas, USA. 485 p.

- Lynch JD. 1980. A taxonomic and distributional synopsis of the Amazonian frogs of the genus *Eleutherodactylus*. *American Museum Novitates* 2696: 1–24.
- Lynch JD. 1981. Leptodactylid frogs of the genus *Eleutherodactylus* in the Andes of northern Ecuador and adjacent Colombia. *University of Kansas, Museum Natural History Miscellaneous Publications* 72: 1–46.
- Lynch JD. 1982. Relationships of the frogs of the genus *Ceratophrys* (Leptodactylidae) and their bearing on hypothesis of Pleistocene forest refugia in South America and punctuated equilibria. *Systematics and Zoology* 31: 166–179.
- Lynch JD. 1983. A new leptodactylid frog from the Cordillera Oriental de Colombia. Pp. 52–57 In: *Advances in Herpetology and Evolutionary Biology: Essays in Honors of Ernest E. Williams*. Editors, Rhodin AGJ, Miyata K. Museum of Comparative Zoology, Cambridge, Massachusetts, USA. 725 pp.
- Lynch JD. 1989a. A review of the Leptodactylid frogs of the genus *Pseudopaludicola* in northern South America. *Copeia* 1989: 577–588.
- Lynch JD. 1989b. Two new frogs (*Eleutherodactylus*) from the Serranía de Perijá, Colombia. *Revista de la Academia Colombiana Ciencias Exactas, Físicas y Naturales* 27: 613–617.
- Lynch JD. 2000 “1999.” Una aproximación a las culebras ciegas de Colombia (Amphibia: Gymnophiona). *Revista de la Academia Colombiana Ciencias Exactas, Físicas y Naturales* 23 (Suplemento Especial): 317–337.
- Lynch JD. 2003. Two new frogs (*Eleutherodactylus*) from the Serranía de Perijá, Colombia. *Revista de la Academia Colombiana Ciencias Exactas, Físicas y Naturales* 27: 613–617.
- Lynch JD, Duellman WE. 1997. Frogs of the genus *Eleutherodactylus* (Leptodactylidae) in western Ecuador: systematics, ecology and biogeography. *University of Kansas Natural History Museum, Special Publications* 23: 1–236.
- Lynch JD, Freeman HL. 1966. Systematic status of a South American frog, *Allophryne ruthveni* Gaige. *University of Kansas Publications, Museum Natural History* 17: 493–502.
- Lynch JD, Hoogmoed MS. 1977. Two new species of *Eleutherodactylus* (Amphibia, Leptodactylidae) from northeastern South America. *Proceedings of the Biological Society of Washington* 90: 424–439.
- Lynch JD, La Marca E. 1993. Synonymy and variation in *Eleutherodactylus bicumulus* (Peters) from Northern Venezuela, with a description of a new species (Amphibia: Leptodactylidae). *Caribbean Journal of Science* 29: 133–146.
- Lynch JD, Suárez-Mayorga A. 2001. The distribution of the gladiator frogs (*Hyla boans* group) in Colombia, with comments on size variation and sympatry. *Caldasia* 23: 491–507.
- Lynch JD, Suárez-Mayorga A. 2011. Clave ilustrada de los renacuajos en las tierras bajas al oriente de los Andes, con énfasis en Hylidae. *Caldasia* 33: 235–270.
- Lynch JD, Vargas-Ramírez MA. 2000. Lista preliminar de especies de anuros del departamento del Guanía, Colombia. *Revista Academia Colombiana Ciencias Exactas, Físicas y Naturales* 24: 579–589.
- MacCulloch RD, Lathrop A. 2002. Exceptional diversity of *Stefania* (Anura, Hylidae) on Mount Ayanganna, Guyana: three new species and new distribution records. *Herpetologica* 58: 327–346.
- MacCulloch RD, Lathrop A. 2005. Hylid frogs from Mount Ayanganna, Guyana: new species, redescrptions, and distributional records. *Phyllomedusa* 4: 17–37.
- MacCulloch RD, Lathrop A. 2009. Herpetofauna of Mount Ayanganna, Guyana. Results of the Royal Ontario Museum Expedition 2000. *Royal Ontario Museum Science Contributions* 4: 1–35.
- MacCulloch RD, Lathrop A, Minter LR. 2008. *Otophryne* (Anura: Microhylidae) from the highlands of Guyana: redescrptions, vocalisations, tadpoles and new distributions. *Papéis Avulsos de Zoologia* 48: 247–261.
- MacCulloch RD, Lathrop A, Reynolds RP, Señaris JC, Schneider GE. 2007. Herpetofauna of Mount Roraima, Guiana Shield region, northeastern South America. *Herpetological Review* 38: 24–30.
- MacCulloch RD, Lathrop A, Kok PJR, Minter LR, Khan SZ, Barrio-Amorós CL. 2008. A new species of *Adelophryne* (Anura: Eleutherodactylidae) from Guyana, with additional data on *A. gutturosa*. *Zootaxa* 1884: 36–50.
- Maciel AO, Hoogmoed MS. 2011a. Taxonomy and distribution of caecilian amphibians (Gymnophiona) of Brazilian Amazonia, with a key to their identification. *Zootaxa* 2984: 1–53.
- Maciel AO, Hoogmoed MS. 2011b. Notes on the vertebrates of northern Pará, Brazil: a forgotten part of the Guianan Region, III. A new species of *Microcaecilia* (Amphibia: Gymnophiona: Caeciliidae). *Boletim do Museu Paraense Emílio Goeldi. Série Ciências Naturais* 6: 67–72.
- Mägdefrau H, Mägdefrau K, Schlüter A. 1991. Herpetologische Daten vom Guaiquinima-Tepui, Venezuela. *Herpetofauna* 13: 13–26.
- Manzanilla J, Sánchez D. 2003. Geographic distribution. (Anura): *Gastrotheca ovifera*. *Herpetological Review* 34: 381.
- Manzanilla J, La Marca E. 2004 “2002.” Museum records and field samplings as sources of data indicating population crashes for *Atelopus cruciger*, a proposed critically endangered species from the Venezuelan Coastal Range. *Memoria de la Fundación La Salle de Ciencias Naturales* 157: 5–30.
- Manzanilla J, Rivero R, Schmidt M. 1996. Geographic distribution (Anura). *Eleutherodactylus mausii*. *Herpetological Review* 27: 29.

- Manzanilla J, La Marca E, Mijares-Urrutia A. 2000. Geographic distribution (Anura): *Hyla alemani*. *Herpetological Review* 31(4): 250–251.
- Manzanilla J, La Marca E, García-París M. 2009. Phylogenetic patterns of diversification in a clade of Neotropical frogs (Anura: Aromobatidae: *Mannophryne*). *Biological Journal of the Linnean Society* 97: 135–199.
- Manzanilla J, Fernández-Badillo A, La Marca E, Visbal R. 1995. Fauna del Parque Nacional Henri Pittier, Venezuela: composición y distribución de los anfibios. *Acta Científica Venezolana* 46: 294–302.
- Manzanilla J, Jowers MJ, La Marca E, García-París M. 2007a. Taxonomic reassessment of *Mannophryne trinitatis* (Anura: Dendrobatidae) with description of a new species from Venezuela. *Herpetological Journal* 17: 31–42.
- Manzanilla J, La Marca E, Jowers MJ, Sánchez D, García-París M. 2007b. Un nuevo *Mannophryne* (Amphibia: Anura: Dendrobatidae) del macizo del Turimiquire, noreste de Venezuela. *Herpetotropicos* 2: 105–113.
- Martins M. 1998. The frogs of Ilha de Maraca. Pp. 285–306. In: *Maraca. The Biodiversity and Environment of an Amazonian Rainforest*. Editors, Milliken W, Ratter JA. John Wiley and Sons, Chichester, United Kingdom and New York, New York, USA. 508 p.
- Martins LB, Da Silva WR, Giaretta AA. 2009. Distribution and calls of two South American frogs (Anura). *Salamandra* 45: 106–109.
- McDiarmid R. 1971. Comparative morphology and evolution on frogs of the Neotropical genera *Atelopus*, *Dendrophryniscus*, *Melanophryniscus* and *Oreophrynella*. *Bulletin of Los Angeles County Museum of Natural History* 12: 1–66.
- McDiarmid R. 1973. A new species of *Atelopus* (Anura, Bufonidae) from Northeastern South America. *Contributions in Science, Natural History Museum of Los Angeles County* 240: 1–12.
- McDiarmid RW, Donnelly MA. 2005. The herpetofauna of the Guayana Highlands: amphibians and reptiles of the Lost World. Pp. 461–560. In: *Ecology and Evolution in the Tropics: A Herpetological Perspective*. Editors, Donnelly MA, Crother BI, Guyer C, Wake MH, White ME. University of Chicago Press, Chicago, Illinois, USA. 584 p.
- McDiarmid RW, Gorzula S. 1989. Aspects of the reproductive ecology of the Tepui Toads, genus *Oreophrynella* (Anura, Bufonidae). *Copeia* 1989: 445–451.
- McDiarmid RW, Paolillo A. 1988. Herpetological collections: Cerro de la Neblina. Pp. 665–670. In: *Cerro de la Neblina. Resultados de la Expedición 1983-1988*. Editor, Brewer-Carías C. FUDECI, Caracas, Miranda, Venezuela. 922 p.
- Meinhardt DJ, Parmalee JR. 1996. A new species of *Colostethus* (Anura: Dendrobatidae) from Venezuela. *Herpetologica* 52: 70–77.
- Melin D. 1941. Contributions to the knowledge of the Amphibia of South America. *Göteborgs Kungliga Vetenskaps- och Vitterhets-Samhälles Handlingar Serie B* 1: 1–71.
- Mendoza JS. 2014. Aportes para la identificación de las ranas gladiatoras del género *Hypsiboas* (Wagler, 1830); (Anura: Hylidae) presentes en las tierras baja del Caribe colombiano. *Revista Colombiana de Ciencia Animal* 6: 55–69.
- Mertens R. 1926. Herpetologische Mitteilungen VIII–XV. *Senckenbergiana* 8: 137–155.
- Mertens R. 1950. Ein neuer Laubfrosch aus Venezuela. *Senckenbergiana* 31: 1–2.
- Mertens R. 1957a. Zur Naturgeschichte des venezolanischen Riesen-Beutelfrosches, *Gastrotheca ovifera*. *Der Zoologische Garten* 23: 110–133.
- Mertens R. 1957b. Zoologische Beobachtungen in Nebelwalde von Rancho Grande, Venezuela. *Natur und Volk* 87: 337–344.
- Mertens R. 1967. Die herpetologische Sektion des Natur-Museums und Forschungs-Institutes Senckenberg in Frankfurt a. M. nebst einem Verzeichnis ihrer Typen. *Senckenbergiana Biologica* 48: 1–106.
- Meza-Joya, FL. 2016. First records of two rain frogs, genus *Pristimantis* (Anura, Craugastoridae), for Colombia. *Check List* 12: 1–6.
- Mijares-Urrutia AE. 1990a. The tadpole of *Centrolenella andina* (Anura: Centrolenidae). *Journal of Herpetology* 24: 410–412.
- Mijares-Urrutia AE. 1990b. El renacuajo de *Hyla meridensis* (Anura: Hylidae) de los Andes de Venezuela. *Revista de Biología Tropical* 38: 1–4.
- Mijares-Urrutia AE. 1991. Descripción del renacuajo de *Colostethus leopardalis* Rivero con algunos comentarios sobre su historia natural. *Amphibia-Reptilia* 12: 145–152.
- Mijares-Urrutia AE. 1992. Sobre el renacuajo de *Hyla alemani* Rivero (Anura: Hylidae). *Acta Biológica Venezuelica* 13: 35–39.
- Mijares-Urrutia AE. 1997. Un nuevo *Leptodactylus* (Anura, Leptodactylidae) de un bosque nublado del oeste de Venezuela. *Alytes* 15: 113–120.
- Mijares-Urrutia AE. 1998. Una nueva especie de rana arborícola (Amphibia: Hylidae: *Hyla*) de un bosque nublado del oeste de Venezuela. *Revista Brasileira de Biologia* 58: 489–493.
- Mijares-Urrutia AE, Arends A. 1993. New distributional records of amphibians and reptiles for the state of Falcón, Venezuela. *Herpetological Review* 24: 157–158.
- Mijares-Urrutia AE, Arends A. 1999a. A new *Mannophryne* (Anura: Dendrobatidae) from Western Venezuela, with comments on the generic allocation of *Colostethus larandinus*. *Herpetologica* 55: 106–114.
- Mijares-Urrutia AE, Arends A. 1999b. Un nuevo

- Mannophryne* (Anura: Dendrobatidae) del estado Falcón, con comentarios sobre la conservación del género en el noroeste de Venezuela. *Caribbean Journal of Science* 35: 231–237.
- Mijares-Urrutia AE, Arends A. 2001. A new toad of the *Bufo margaritifera* complex (Amphibia, Bufonidae) from Northwestern Venezuela. *Herpetologica* 57: 523–531.
- Mijares-Urrutia AE, Hero J. 1997. Los renacuajos de *Hyla luteoocellata* e *H. vigilans* (Anura: Hylidae) de Venezuela. *Revista de Biología Tropical* 44–45: 585–592.
- Mijares-Urrutia AE, La Marca E. 1997. Tadpoles of the genus *Nepheleobates* (Amphibia: Anura: Dendrobatidae) from Venezuela. *Tropical Zoology* 10: 133–142.
- Mijares-Urrutia AE, Rivero R. 2000. A new treefrog from the Sierra de Aroa, Northern Venezuela. *Journal of Herpetology* 34: 80–84.
- Mijares-Urrutia AE, Arends A, Rivero R. 1998. Geographic distribution (Anura): *Hyla vigilans*. *Herpetological Review* 29: 107.
- Mijares-Urrutia AE, Manzanilla-Pupo J, La Marca E. 1999. Una nueva especie de *Tepuihyla* (Anura: Hylidae) del noroeste de Venezuela, con comentarios sobre su biogeografía. *Revista de Biología Tropical* 47: 1,099–1,110.
- Molina CR. 2004 “2002.” Reproducción de *Pleurodema brachyops* (Anura: Leptodactylidae) en los llanos del estado Apure, Venezuela. *Memoria de la Fundación La Salle de Ciencias Naturales* 158: 117–125.
- Molina C, Señaris JC, Lampo M, Rial A. 2009. *Anfibios de Venezuela, Estado del Conocimiento y Recomendaciones para su Conservación*. Ediciones Grupo TEI, Conservación Internacional, Instituto Venezolano de Investigaciones Científicas, Universidad Central de Venezuela y Fundación La Salle, Caracas, Miranda, Venezuela. 130 p.
- Molina-Rodríguez C, Kahn TR. 2016. Yellow-banded poison frog. *Dendrobates leucomelas* Steindachner 1864. Pp. 317–322. In: *Aposematic Poison Frogs (Dendrobatidae) of the Andean Countries: Bolivia, Colombia, Ecuador, Perú and Venezuela*. Editors, Kahn TR, La Marca E, Lötters S, Brown JL, Twomey E, Amézquita A. Conservation International Tropical Field Guide Series. Conservation International, Arlington, Virginia, USA. 588 p.
- Morales VR. 1994. Taxonomía de algunos *Colostethus* (Anura: Dendrobatidae) de Sudamérica, con descripción de dos especies nuevas. *Revista Española de Herpetología* 8: 95–103.
- Morales VR. 2000. Sistemática y biogeografía del grupo *trilineatus* (Amphibia, Anura, Dendrobatidae, *Colostethus*) con descripción de once nuevas especies. *Publicaciones de la Asociación Amigos de Doñana* 13: 1–59.
- Moran L, Cardozo-Urdaneta A, Sánchez-Mercado A. 2016. Ampliación de la distribución de *Mannophryne lamarcai* Mijares-Urrutia & Arends, 1999 (Anura: Aromobatidae) en la serranía de Ziruma, estado Falcón, Venezuela. *Cuadernos de Herpetología* 30: 79–80.
- Moreno-Arias RA, Medina-Rangel GF, Carvajal-Cogollo JE, Castaño-Mora OV. 2010. Herpetofauna de la Serranía de Perijá. Pp. 449–470. In: *Colombia. Diversidad Biótica VIII. Media y Baja Montaña de la Serranía de Perijá*. Editor, Rangel JO. Universidad Nacional de Colombia-Instituto de Ciencias Naturales, Bogotá D.C, Colombia. 708 p.
- Muëdeking MH, Heyer RW. 1976. Description of eggs and reproductive patterns of *Leptodactylus pentadactylus* (Amphibia: Leptodactylidae). *Herpetologica* 32: 137–139.
- Mueses-Cisneros JJ. 2009. *Rhaebo haematiticus* (Cope, 1862): un complejo de especies. Con redescrpción de *Rhaebo hypomelas* (Boulenger, 1913) y descripción de una nueva especie. *Herpetotropicos* 5: 29–47.
- Mueses-Cisneros JJ, Cisneros-Heredia DF, McDiarmid RW. 2012. A new Amazonian species of *Rhaebo* (Anura: Bufonidae) with comments on *Rhaebo glaberrimus* (Gunther, 1869) and *Rhaebo guttatus* (Schneider, 1799). *Zootaxa* 3447: 22–40.
- Müller L. 1935. Sobre una nueva raza de *Atelopus cruciger* Licht. & Mart. en Venezuela. *Boletín de la Academia Ciencias Físicas, Matemáticas y Naturales* 2: 1–10.
- Müller L, Hellmich W. 1936. Amphibien und Reptilien. I. Teil: Amphibia, Chelonia, Loricata. *Wissenschaftliche Ergebnisse der Deutschen Gran Chaco-Expedition*. 4: 1–120.
- Murphy JC. 1997. *Amphibians and Reptiles of Trinidad and Tobago*. Krieger Publishing Company, Malabar, Florida, USA. 245 p.
- Murphy JC, Angarita-Sierra T, Downie JR, Jowers MJ. 2017. Toads, tall mountains and taxonomy: the *Rhinella granulosa* group (Amphibia: Anura: Bufonidae) on both sides of the Andes. *Salamandra* 53: 267–278.
- Myers CW. 1997. Preliminary remarks on the summit herpetofauna of Auyantepui, eastern Venezuela. *Acta Terramaris* 10: 1–8.
- Myers CW, Donnelly MA. 1996. A new herpetofauna from Cerro Yaví, Venezuela: first results of the Robert G. Goelet American Museum-Terramar expedition to the Northwestern tepuis. *American Museum Novitates* 3172: 1–56.
- Myers CW, Donnelly MA. 1997. A tepui herpetofauna on a granitic mountain (Tamacuari) in the borderland between Venezuela and Brazil. Report of the Phipps-Tapirapecó expedition. *American Museum Novitates* 3213: 1–71.
- Myers CW, Donnelly MA. 2001. Herpetofauna of the Yutajé-Corocoro massif, Venezuela: second report from the Robert G. Goelet American Museum-Terramar expedition to the Northwestern tepuis. *Bulletin American Museum Natural History* 261: 1–85.

- Myers CW, Donnelly MA. 2008. The summit herpetofauna of Auyantepui, Venezuela: report from the Robert G. Goelet American Museum-Terramar expedition. *Bulletin of the American Museum of Natural History* 308: 1–147.
- Myers CW, Paolillo A, Daly JW. 1991. Discovery of a defensively malodorous and nocturnal frog in the family Dendrobatidae: phylogenetic significances of a new genus and species from the Venezuelan Andes. *American Museum Novitates* 3002: 1–33.
- Narvaes P. 2003. Revisão taxonômica das espécies de *Bufo* do complexo *granulosus* (Amphibia, Anura, Bufonidae). Ph.D. Dissertation, Universidade de São Paulo, Instituto de Biociências, São Paulo, São Paulo, Brazil. 110 p.
- Narvaes P, Rodrigues MT. 2009. Taxonomic revision of *Rhinella granulosa* species group (Amphibia, Anura, Bufonidae), with a description of a new species. *Arquivos de Zoologia* 40: 1–73.
- Nascimento LB, Caramaschi U, Cruz CAG. 2005. Taxonomic review of the species group of the genus *Physalameus* Fitzinger, 1826 with revalidation of the genera *Engystomops* Jimenez-de-la-Espada, 1872 and *Eupemphix* Steindachner, 1836 (Amphibia, Anura, Leptodactylidae). *Arquivos do Museu Nacional. Rio de Janeiro* 63: 297–320.
- Nelson CE. 1971. A Brazilian record from the microhylid *Otophryne robusta*. *Herpetologica* 27: 324–325.
- Nelson CE, Lescure J. 1975. The taxonomy and distribution of *Myersiella* and *Synapturanus* (Anura: Myrohylidae). *Herpetologica* 31: 389–397.
- Nieto-Castro MJ. 1999. Estudio preliminar de las especies del género *Scinax* (Amphibia: Anura: Hylidae) en Colombia. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 23 (Suplemento Especial): 339–346.
- Noonan BP, Bonett RM. 2003. A new species of *Hyalinobatrachium* (Anura: Centrolenidae) from the highlands of Guyana. *Journal of Herpetology* 37: 92–97.
- Nussbaum RA. 1977. Rhinatrematidae: a new family of caecilians (Amphibia: Gymnophiona). *Occasional Papers of the Museum of Zoology, University Michigan* 682: 1–30.
- Nussbaum RA, Wilkinson M. 1989. On the classification and phylogeny of caecilians (Amphibia: Gymnophiona), a critical review. *Herpetological Monographs* 3: 1–42.
- Padial JM, Grant T, Frost D. 2014. Molecular systematics of terraranas (Anura; Brachycephaloidea) with an assessment of the effects of alignment and optimality criteria. *Zootaxa* 3825: 1–132.
- Parra-Olea G, Flores-Villela O, Mendoza-Almeralla C. 2014. Biodiversidad de anfibios en México. *Revista Mexicana de Biodiversidad* 85: 460–466.
- Paolillo A. 1977. El sapito minero y su veneno (*Dendrobates leucomelas*). *Natura* 62: 36–39.
- Paolillo A. 1986. Geographic distribution (Anura): *Hamptophryne boliviana*. *Herpetological Review* 17: 25–26.
- Paolillo A, Cerda J. 1981. Nuevos hallazgos de *Aparasphenodon venezolanus* (Mertens) (Salientia, Hylidae) en el Territorio Federal Amazonas, Venezuela, con anotaciones sobre su biología. *Memoria de la Sociedad de Ciencias Naturales La Salle* 41: 57–75.
- Parker HW. 1927. A revision of the frogs of the genera *Pseudopaludicola*, *Physalaeus* and *Pleurodema*. *Annals and Magazine of Natural History* 20: 450–478.
- Parker HW. 1936. A collection of reptiles and amphibians from the Upper Orinoco. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique* 12: 1–4.
- Parra-Olea G, García-París M, Wake DB. 2004. Molecular diversification of salamanders of the tropical American genus *Bolitoglossa* (Caudata: Plethodontidae) and its evolutionary and biogeographical implications. *Zoological Journal of the Linnean Society* 81: 325–346.
- Péfaur JE. 1985. New species of Venezuelan *Colostethus* (Dendrobatidae). *Journal of Herpetology* 19: 321–327.
- Péfaur JE. 1993. Description of a new *Colostethus* (Dendrobatidae) with some natural history on the genus in Venezuela. *Alytes* 11: 88–96.
- Péfaur JE, Díaz de Pascual A. 1982. Aspectos biogeográficos de las comunidades de anfibios y saurios de los Andes venezolanos. In: *Zoología Neotropical. Actas VIII Congreso Latinoamericano de Zoología*. Editor, Salinas PJ. Producciones Alfa, Mérida, Mérida, Venezuela. 1,531 p.
- Péfaur JE, Díaz de Pascual A. 1987. Distribución ecológica y variación temporal de los anfibios del estado Barinas, Venezuela. *Revista de Ecología Latinoamericana* 1: 9–19.
- Péfaur JE, Pérez R. 1995. Zoogeografía y variación espacial y temporal de algunos vertebrados epigeos de la zona xerófila de la cuenca media del río Chama, Mérida, Venezuela. *Ecotropicos* 8: 15–38.
- Péfaur JE, Rivero JA. 2000. Distribution, species-richness, endemism, and conservation of Venezuelan amphibians and reptiles. *Amphibian & Reptile Conservation* 2: 42–70 (e10).
- Péfaur JE, Sierra N. 1995. Status of *Leptodactylus labyrinthicus* (Calf Frog, Rana Ternero) in Venezuela. *Herpetological Review* 26: 124–127.
- Péfaur JE, Pérez R, Sierra N, Godoy F. 1987. Density reappraisal of caecilians in the Andes of Venezuela. *Journal of Herpetology* 21: 335–337.
- Péfaur JE, Sierra N, Pérez R, Godoy F. 1992. Aspectos biológicos de una población de cecilidos de los Andes venezolanos. *Acta Zoologica Lilloana* 41: 67–74.
- Peloso PLV, Sturaro MJ, Forlani MC, Gaucher P, Motta AP, Wheeler WC. 2014. Phylogeny, taxonomic revision, and character evolution of the genera

- Chiasmocleis* and *Syncope* (Anura, Microhylidae) in Amazonia, with descriptions of three new species. *Bulletin of the American Museum of Natural History* 386: 1–112.
- Peloso PLV, Frost DR, Richards SJ, Rodrigues MT, Donnellan SC, Matsui M, Raxworthy CJ, Biju SD, Lemmon EM, Wheeler WC. 2016. The impact of anchored phylogenomics and taxon sampling on phylogenetic inference in narrow-mouthed frogs (Anura, Microhylidae). *Cladistics* 32: 113–140.
- Pereyra MO, Baldo D, Blotto BL, Iglesias PP, Thomé MTC, Haddad CFB, Barrio-Amorós C, Ibáñez R, Faivovich J. 2016. Phylogenetic relationships of toads of the *Rhinella granulosa* group (Anura: Bufonidae): a molecular perspective with comments on hybridization and introgression. *Cladistics* 32: 36–53.
- Piñero J, Durant P. 1993. Dieta y hábitat de una comunidad de anuros de la selva nublada en los Andes merideños. Pp. 253 In: *Libro de Resúmenes III Congreso Latino-Americano de Herpetología, 12 al 18 de diciembre, 1993. Campiñas, São Paulo, Brasil*.
- Piñero J, La Marca E. 1996. Hábitos alimentarios de *Nephelobates alboguttatus* (Anura: Dendrobatidae) en una selva nublada andina de Venezuela. *Revista de Biología Tropical* 44: 827–833.
- Praderio MJ, Robinson M. 1990. Reproduction in the toad *Colostethus trinitatis* (Anura: Dendrobatidae) in a northern Venezuelan seasonal environment. *Journal of Tropical Ecology* 6: 333–341.
- Pramuk J. 2006. Phylogeny of South American *Bufo* (Anura: Bufonidae) inferred from combined evidence. *Zoological Journal of the Linnean Society* 146: 407–452.
- Pyburn WF. 1973. A new hylid frog from the Llanos of Colombia. *Journal of Herpetology* 7: 297–301.
- Pyburn WF. 1975. A new species of microhylid frog of the genus *Synapturanus* from southeastern Colombia. *Herpetologica* 31: 439–443.
- Pyburn WF. 1978. The voice and relationship of the treefrog *Hyla hobbsi* (Anura: Hylidae). *Proceedings of the Biological Society of Washington* 91: 123–131.
- Pyburn WF. 1992. A new treefrog of the genus *Scinax* from the Vaupes river of northwestern Brazil. *Texas Journal of Science* 44: 405–411.
- Pyburn WF, Fouquette MJ. 1971. A new striped treefrog from central Colombia. *Journal of Herpetology* 5: 97–101.
- Pyburn WF, Glidewell JR. 1971. Nests and breeding behavior of *Phyllomedusa hypochondrialis* in Colombia. *Journal of Herpetology* 5: 49–52.
- Pyron RA, Wiens JJ. 2011. A large-scale phylogeny of Amphibia including over 2,800 species, and a revised classification of extant frogs, salamanders, and caecilians. *Molecular Phylogenetics and Evolution* 61: 543–583.
- Rada D. 1976. Cariotipo de *Colostethus trinitatis* (Amphibia: Dendrobatidae). *Acta Biológica Venezuelica* 9: 213–220.
- Rada D. 1981a. Renacuajos de algunos anfibios de Clarines (Edo. Anzoátegui, Venezuela). *Memoria de la Sociedad de Ciencias Naturales La Salle* 41: 57–75.
- Rada D. 1981b. La ranita de Caracas, *Eleutherodactylus johnstonei*. *Natura* 70–71: 36–37.
- Ramírez-Pinilla MP. 2004. Rana cabezona de Inger. *Eleutherodactylus ingeri*. Pp. 330–333. In: *Libro Rojo de los Anfibios de Colombia. Serie Libros Rojos de Especies Amenazadas de Colombia*. Editors, Rueda-Almonacid JV, Lynch JD, Amézquita A. Conservación Internacional Colombia, Instituto Ciencias Naturales-Universidad Nacional Colombia, Ministerio del Medio Ambiente, Bogotá, Colombia. 384 p.
- Ramo C, Busto B. 1989–1990. Inventario herpetológico (anfibios y reptiles) de las sabanas inundables del módulo Fernando Corrales (Mantecal), estado Apure. *Memoria de la Sociedad de Ciencias Naturales La Salle* 49–50: 287–308.
- Reynolds R, MacCulloch RD. 2012. Preliminary checklist of amphibians and reptiles from Baramita, Guyana. *Check List* 8: 211–214.
- Rivas G. 1998. Geographic distribution (Anura): *Atelopus cruciger*. *Herpetological Review* 29: 172.
- Rivas GA. 2009. Evaluación del estado de conservación y aportes al conocimiento taxonómico del cecílido de Albarico (*Caecilia flavopunctata*) estado Yaracuy, uno de los anfibios menos conocidos de Venezuela. Pp. 189. In: *Una Mano a la Naturaleza; Conservando las Especies Amenazadas Venezolanas*. Editors, Giraldo D, Rojas-Suárez F, Romero V. Provita y Shell Venezuela, S.A., Caracas, Miranda, Venezuela. 220 p.
- Rivas G, Barrio-Amorós CL. 2005. New amphibian and reptile records from Cojedes state, Venezuela. *Herpetological Review* 36: 205–209.
- Rivas GA, Manzanilla J. 1999. Geographic distribution (Anura): *Phyllomedusa hypochondrialis*. *Herpetological Review* 30: 231.
- Rivas GA, De Freitas MS. 2015. Discovery of the critically endangered Golden Tree Frog, *Phytotriades auratus* (Boulenger, 1917) in eastern Venezuela, with comments on its distribution, conservation, and biogeography. *Herpetological Review* 46: 153–157.
- Rivas GA, Molina CR, Ugueto GN, Barros TR, Barrio-Amorós CL, Kok PJR. 2012. Reptiles of Venezuela: an updated and commented checklist. *Zootaxa* 3211: 1–64.
- Rivero JA. 1961. Salientia of Venezuela. *Bulletin of the Museum of Comparative Zoology* 126: 1–267.
- Rivero JA. 1963a. The distribution of Venezuelan frogs I. The Maracaibo basin. *Caribbean Journal of Science* 3: 7–13.
- Rivero JA. 1963b. The distribution of Venezuelan frogs II. The Venezuelan Andes. *Caribbean Journal of Science* 3: 87–102.
- Rivero JA. 1963c. The distribution of Venezuelan frogs

- III. The Sierra de Perijá and the Falcón Region. *Caribbean Journal of Science* 3: 197–199.
- Rivero JA. 1963d. *Hyla ginesi*, a new name for *Hyla loveridgei* Rivero. *Caribbean Journal of Science* 3: 28.
- Rivero JA. 1964a. The distribution of Venezuelan frogs IV. The Coastal Range. *Caribbean Journal of Science* 4: 307–317.
- Rivero JA. 1964b. The distribution of Venezuelan frogs V. The Venezuelan Guayana. *Caribbean Journal of Science* 4: 411–420.
- Rivero JA. 1964c. The distribution of Venezuelan frogs VI. The Llanos and The Delta Region. *Caribbean Journal of Science* 4: 491–495.
- Rivero JA. 1964d. Salientios (Amphibia) en la colección de la Sociedad de Ciencias Naturales La Salle. *Caribbean Journal of Science* 4: 297–305.
- Rivero JA. 1966. Notes on the genus *Cryptobatrachus* (Amphibia: Salientia) with the description of a new race and four new species of a new genus of hylid frogs. *Caribbean Journal of Science* 6: 137–149.
- Rivero JA. 1967a. Anfibios coleccionados por la expedición Franco-Venezolana al Alto Orinoco. *Caribbean Journal of Science* 7: 145–154.
- Rivero JA. 1967b. A new race of *Otophryne robusta* Boul (Amphibia: Salientia) from the Chimanta-Tepui of Venezuela. *Caribbean Journal of Science* 7: 155–158.
- Rivero JA. 1967c. Adiciones recientes a la fauna anfibia de Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 27: 5–10.
- Rivero JA. 1968a. A new species of *Elosia* (Amphibia: Salientia) from Mt. Duida, Venezuela. *American Museum Novitates*. 2334: 155–158.
- Rivero JA. 1968b. Los Centrolénidos de Venezuela (Amphibia: Salientia). *Memoria de la Sociedad de Ciencias Naturales La Salle* 28: 301–334.
- Rivero JA. 1968c. A new species of *Eleutherodactylus* (Amphibia: Salientia) from the Guayana Region, Edo. Bolívar, Venezuela. *Breviora* 306: 1–2.
- Rivero JA. 1968d. A new species of *Hyla* (Amphibia: Salientia) from the Venezuelan Guayana. *Breviora* 307: 1–5.
- Rivero JA. 1968e. El problema de *Leptodactylus rhodomystax* Boulenger (Amphibia: Salientia). *Memoria de la Sociedad de Ciencias Naturales La Salle* 28: 145–150.
- Rivero JA. 1968g. Sobre la identidad de *Hyla rostrata* Peters (Amphibia, Salientia). *Acta Biológica Venezuelica* 6: 133–138.
- Rivero JA. 1969a. Sobre la *Hyla rubra* Laurenti y la *Hyla x-signata* Spix (Amphibia: Salientia). *Memoria de la Sociedad de Ciencias Naturales La Salle* 29: 109–118.
- Rivero JA. 1969b. A new name for *Sphaenorhynchus aurantiacus* (Daudin) (Amphibia: Salientia). *Copeia* 1969(4): 700–703.
- Rivero JA. 1969c. On the identity and relationships of *Hyla luteocellata* Roux (Amphibia: Salientia). *Herpetologica* 25: 126–134.
- Rivero JA. 1969d. A new species of *Hyla* (Amphibia: Salientia) from the Region of Páramo de Tamá, Venezuela. *Caribbean Journal of Science* 9: 145–150.
- Rivero JA. 1970. On the origin, endemism and distribution of the genus *Stefania* Rivero (Amphibia: Salientia) with a description of a new species from southeastern Venezuela. *Boletín de la Sociedad Venezolana de Ciencias Naturales* 28: 456–481.
- Rivero JA. 1971a. Tres nuevos records y una nueva especie de anfibios de Venezuela. *Caribbean Journal of Science* 2: 1–9.
- Rivero JA. 1971b. Notas sobre los anfibios de Venezuela I. Sobre los hylidos de la Guayana venezolana. *Caribbean Journal of Science* 2: 181–193.
- Rivero JA. 1971c. Un nuevo e interesante *Dendrobates* (Amphibia: Salientia) del Cerro Yapacana de Venezuela. *Kasmera* 3: 389–396.
- Rivero JA. 1972. On *Atelopus oxyrhynchus* Boulenger (Amphibia, Salientia), with the description of a new race and a related new species from the Venezuelan paramos. *Boletín de la Sociedad Venezolana de Ciencias Naturales* 29: 600–612.
- Rivero JA. 1976. Notas sobre los anfibios de Venezuela II. Sobre los *Colostethus* de los Andes Venezolanos. *Memoria de la Sociedad de Ciencias Naturales La Salle* 35: 327–344.
- Rivero JA. 1978. Notas sobre los anfibios de Venezuela III. Nuevos *Colostethus* de los Andes Venezolanos. *Memoria de la Sociedad de Ciencias Naturales La Salle* 38: 95–111.
- Rivero JA. 1980. Notas sobre los anfibios de Venezuela IV. Una nueva especie de *Atelopus* (Amphibia, Bufonidae) de los Andes, con anotaciones sobre el posible origen del género en Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 40: 129–139.
- Rivero JA. 1982a. Sobre el *Colostethus mandelorum* (Schmidt) y el *Colostethus inflexus* Rivero (Amphibia, Dendrobatidae). *Memoria de la Sociedad de Ciencias Naturales La Salle* 42 (118): 9–16.
- Rivero JA. 1982b. Los *Eleutherodactylus* (Amphibia, Leptodactylidae) de los Andes Venezolanos I. Especies del Páramo. *Memoria de la Sociedad de Ciencias Naturales La Salle* 42: 17–56.
- Rivero JA. 1982c. Los *Eleutherodactylus* (Amphibia, Leptodactylidae) de los Andes Venezolanos II. Especies subparameras. *Memoria de la Sociedad de Ciencias Naturales La Salle* 42: 57–132.
- Rivero JA. 1983. Sobre las relaciones y el origen de los *Eleutherodactylus* (Amphibia, Leptodactylidae) andinos de Venezuela. Pp. 199–204 In: *Informe Final IX CLAZ Perú, VIII Congreso Latinoamericano de Zoología, Arequipa, Perú*. 1531 pp.
- Rivero JA. 1984. Una nueva especie de *Colostethus* (Amphibia, Dendrobatidae) de la Cordillera de la Costa, con anotaciones sobre otros *Colostethus* de

- Venezuela. *Brenesia* 22: 51–56.
- Rivero JA. 1985. Nuevos centrolenidos de Colombia y Venezuela. *Brenesia* 23: 335–373.
- Rivero JA. 1988. Sobre las relaciones de las especies del género *Colostethus* (Amphibia, Dendrobatidae). *Memoria de la Sociedad de Ciencias Naturales La Salle* 48: 3–32.
- Rivero JA, Esteves AE. 1969. Observations on the agonistic and breeding behavior of *Leptodactylus pentadactylus* and other amphibian species in Venezuela. *Breviora* 321: 1–14.
- Rivero JA, Mayorga H. 1973. Un nuevo *Eleutherodactylus* (Amphibia: Salientia) del páramo de Guaramacal, edo. Trujillo, Venezuela. *Caribbean Journal of Science* 13: 75–79.
- Rivero JA, Langone JA, Prigioni CM. 1986. Anfibios anuros colectados por la expedición del Museo Nacional de Historia Natural de Montevideo al río Caura, estado Bolívar, Venezuela; con la descripción de una nueva especie de *Colostethus* (Dendrobatidae). *Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo* 11: 1–15.
- Rivero R, Mijares-Urrutia A. 2004. Geographic distribution (Anura): *Eleutherodactylus biporcatus*. *Herpetological Review* 35: 77.
- Rivero-Blanco C, Dixon JR. 1979. Origin and distribution of the herpetofauna of northern South America. Pp. 281–298. In: *The South American Herpetofauna: Its Origin, Evolution and Dispersal*. Editor, Duellman WE. Museum of Natural History, University of Kansas Monographs 7. University of Kansas, Lawrence, Kansas, USA. 485 p.
- Rödger D, Jungfer KH. 2008. A new *Pristimantis* (Anura, Strabomantidae) from Yuruaní-tepui, Venezuela. *Zootaxa* 1814: 58–68.
- Rodríguez JP, Rojas-Suárez F. 1995. *El Libro Rojo de la Fauna Venezolana*. Provita, Fundación Polar, Wildlife Conservation Society, Profauna-MARNR, UICN, Caracas, Miranda, Venezuela. 444 p.
- Rodríguez JP, Rojas-Suárez F. 2008. *Libro Rojo de la Fauna Venezolana*. Tercera edición. Provita y Shell Venezuela S.A., Caracas, Miranda, Venezuela. 364 p.
- Rodríguez JP, García-Rawlins A, Rojas-Suárez F. 2015. *Libro Rojo de la Fauna Venezolana*. Provita y Fundación Empresas Polar, Caracas, Miranda, Venezuela. Available: <http://animalesamenazados.provita.org.ve>
- Rodríguez-Contreras A, Señaris JC, Lampo M, Rivero R. 2008. Rediscovery of *Atelopus cruciger* (Anura: Bufonidae): current status in the Cordillera de La Costa, Venezuela. *Oryx* 42: 1–4.
- Rohl E. 1959. *Fauna Descriptiva de Venezuela (Vertebrados)*. 4ta edición, corregida y aumentada. Nuevas Gráficas, Madrid, España. 516 p.
- Rojas RR, De Carvalho VT, Gordo M, Ávila RW, Pires IF, Hrbek T. 2014. A new species of *Amazophrynella* (Anura: Bufonidae) from the southwestern part of the Brazilian Guiana Shield. *Zootaxa* 3753: 079–095.
- Rojas-Runjaic FJM, Barros T, Infante-Rivero EE. 2005. Geographic distribution (Anura): *Pseudis paradoxa*. *Herpetological Review* 36: 334.
- Rojas-Runjaic FJM, Infante-Rivero EE, Barrio-Amorós CL. 2011. A new frog of the genus *Aromobates* (Anura, Dendrobatidae) from Sierra de Perijá, Venezuela. *Zootaxa* 2919: 37–50.
- Rojas-Runjaic FJM, Infante-Rivero E, Cabello P. 2012. New records and distribution extensions of centrolenid frogs from Venezuela. *Check List* 8: 819–825.
- Rojas-Runjaic FJM, Castroviejo-Fischer S, Barrio-Amorós CL. 2013. First record of the Amazonian tiny tree toad *Amazophrynella minuta* (Melin, 1941) (Anura: Bufonidae) for Venezuela. *Check List* 9: 1,122–1,123.
- Rojas-Runjaic FJM, Infante-Rivero EE, Barrio-Amorós CL. 2016. New records, range extension and call description for the stream-breeding frog *Hyloscirtus lascinius* (Rivero, 1970) in Venezuela. *Amphibian & Reptile Conservation* 10 (1) [General Section]: 34–39 (e130).
- Rojas-Runjaic FJM, Matta-Pereira ME, La Marca E. 2018. Unveiling species diversity in collared frogs through morphological and bioacoustic evidence: A new *Mannophryne* (Amphibia, Aromobatidae) from Sierra de Aroa, northwestern Venezuela, and an amended definition and call description of *M. herminae* (Boettger, 1893). *Zootaxa* 4461: 451–476.
- Rojas-Runjaic FJM, Infante-Rivero EE, Barrio-Amorós CL, Barros TR. 2007. New distributional records of amphibians and reptiles from estado Zulia in the Maracaibo basin, Venezuela. *Herpetological Review* 38: 235–237.
- Rojas-Runjaic FJM, Infante-Rivero E, Señaris JC, Cabello P. 2010. Amphibia, Anura, Centrolenidae, *Centrolene daidaleum* (Ruíz-Carranza & Lynch 1991): first record for Venezuela, new altitudinal record and distribution map. *Check List* 6: 460–462.
- Rojas-Runjaic FJM, Salerno PE, Señaris JC, Pauly GB. 2013. Terraranans of the Lost World: a new species of *Pristimantis* (Amphibia, Craugastoridae) from Abakapá-tepui in the Chimantá Massif, Venezuelan Guayana, and additions to the knowledge of *P. muchimuk*. *Zootaxa* 3686: 335–355.
- Rojas-Runjaic FJM, Camargo E, de Carvalho VT, LaMarca E. 2017. New record and range extension of the Horned Toad, *Rhinella ceratophrys* (Boulenger, 1882) (Anura: Bufonidae), in Venezuela, and confirmation of its presence in Brazil. *Check List* 13 (1): 1–6.
- Rojas-Runjaic FJM, Barrio-Amorós CL, Molina CR, Señaris JC, Fedón IC. 2008. Amphibia, Anura, Hylidae, *Scarthyia vigilans*: range extensions and new state records from Delta Amacuro and Miranda states, Venezuela. *Check List* 4: 301–303.
- Rojas-Runjaic FJM, Camargo E, Bolaños W, Mora D,

- Aular L, García F. 2014. A new locality and range extension for the Rancho Grande Leaf Frog *Agalychnis medinae* (Funkhouser, 1962) (Anura: Hylidae) in northern Venezuela. *Check List* 10: 392–394.
- Rojas-Runjaic FJM, Camargo-Siliet E, de Carvalho VT, La Marca E. 2017. New record and range extension of the Horned Toad, *Rhinella ceratophrys* (Boulenger, 1882) (Anura: Bufonidae), in Venezuela, and confirmation of its presence in Brazil. *Check List* 13 (1): 1–6.
- Rojas-Runjaic FJM, Infante-Rivero EE, Salerno PE, Meza-Joya FL. 2018. A new species of *Hyloscirtus* (Anura, Hylidae) from the Colombian and Venezuelan slopes of Sierra de Perijá, and the phylogenetic position of *Hyloscirtus jahni* (Rivero, 1961). *Zootaxa* 4382: 121–146.
- Ron SR, Venegas PJ, Ortega-Andrade HM, Gagliardi-Urrutia G, Salerno PE. 2016. Systematics of *Ennomiohyala tuberculosa* with the description of a new species and comments on the taxonomy of *Trachycephalus typhonius* (Anura, Hylidae). *ZooKeys* 630: 115–154.
- Roux J. 1927. Contribution a l'herpetologie de Venezuela. *Verhandlungen dem Naturforschenden Gesellschaft in Basel* 38: 259–260.
- Royero R, Hernández O. 1995. Presencia de *Pipa parva* Ruthven y Gage (Anura: Pipidae) en la cuenca del lago de Valencia: un problema de introducción de especies. *Biollania* 11: 57–62.
- Roze JA. 1964. La herpetología de la isla Margarita, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 69: 209–241.
- Roze JA, Solano H. 1963. Resumen de la familia Caecilidae (Amphibia: Gymnophiona) de Venezuela. *Acta Biológica Venezuelica* 3: 287–300.
- Ruiz-Carranza PM, Lynch JD. 1995. Ranas Centrolenidae de Colombia VII. Redescripción de *Centrolene andinum* (Rivero, 1985). *Lozania* 64: 1–12.
- Ruiz-Carranza PM, Lynch J. 1998. Ranas *Centrolenidae* de Colombia XI. Nuevas especies de ranas de cristal del género *Hylinobatrachium*. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 22: 571–586.
- Ruiz-Carranza PM, Ardila-Robayo MC, Lynch JD. 1996. Lista actualizada de la fauna de Amphibia de Colombia. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 20: 365–415.
- Ruthven AG, Gage HT. 1923. Description of a new species of *Pipa* from Venezuela. *Occasional Papers of the Museum of Zoology, University Michigan* 136: 1–2.
- Ryan MJ, Bernal XE, Rand AS. 2007. Patterns of mating call preferences in túngara frogs, *Physalaemus pustulosus*. *Journal of Evolutionary Biology* 20: 2,235–2,247.
- Sabaj MH. 2016. Standard symbolic codes for institutional resource collections in herpetology and ichthyology: An Online Reference. Version 6.5. Available: <http://www.asih.org/> [Accessed: 16 August 2016].
- Salerno PE, Pauly G. 2012. Clutch size variation in egg-brooding *Stefania*. *South American Journal of Herpetology* 7: 47–54.
- Salerno PE, Señaris JC, Rojas-Runjaic FJM, Cannatella DC. 2014. Recent evolutionary history of Lost World endemics: Population genetics, species delimitation, and phylogeography of sky-island treefrogs. *Molecular Phylogenetics and Evolution* 82: 314–323.
- Salerno PE, Ron SR, Señaris JC, Rojas-Runjaic FJM, Noonan BP, Cannatella DC. 2012. Ancient tepui summits harbor young rather than old lineages of endemic frogs. *Evolution* 66: 3,000–3,013.
- Santos SPL, Ibáñez R, Ron SR. 2015. Systematics of the *Rhinella margaritifera* complex (Anura, Bufonidae) from western Ecuador and Panama with insights in the biogeography of *Rhinella alata*. *ZooKeys* 501: 109–145.
- Santos JC, Coloma LA, Summers K, Caldwell JP, Ree R, Cannatella DC. 2009. Amazonian amphibian diversity is primarily derived from Late Miocene Andean lineages. *PLoS Biology* 7(3): e1000056.
- Savage JM. 1986. Nomenclatural notes on the Anura (Amphibia). *Proceedings of the Biological Society of Washington* 99: 42–45.
- Savage JM. 2002. *The Amphians and Reptiles of Costa Rica; A Herpetofauna between Two Continents, between Two Seas*. The University of Chicago Press, Chicago, Illinois, USA and London, United Kingdom. 934 p.
- Savage JM, Myers CW. 2002. Frogs of the *Eleutherodactylus biporcatus* group (Leptodactylidae) of Central America and northern South America, including rediscovered, resurrected and new taxa. *American Museum Novitates* 3357: 1–48.
- Schargel W, Rivas G. 2003. Two new country records of salamanders of the genus *Bolitoglossa* from Colombia and Venezuela. *Herpetozoa* 16: 94–96.
- Schargel W, García JE, Smith E. 2002. A new species of *Bolitoglossa* (Caudata: Plethodontidae) from the Cordillera de Mérida, Venezuela. *Proceedings of the Biological Society of Washington* 115: 534–542.
- Schlüter A, Mägdefrau K. 1991. First record of *Hyla parviceps* on the lower slope of a central Venezuelan table mountain. *Amphibia-Reptilia* 12: 217–219.
- Schmid M, Feichtinger W, Steinlein C, Nanda I, Mais C, Haaf T, Visbal-García R, Fernández-Badillo A. 2002. Chromosome banding in Amphibia XXII. Atypical Y chromosomes in *Gastrotheca walkeri* and *Gastrotheca ovifera* (Anura, Hylidae). *Cytogenetic and Genome Research* 96: 228–238.
- Schmidt KP. 1932. Reptiles and amphibians of the Mandel Venezuelan expedition. *Field Museum of Natural History, Zoology Series* 18: 157–163.
- Schneider JG. 1799. *Historiae Amphibiorum Naturalis et Literarie*. Jena, Germany. 264 pp.
- Schulte R. 1999. Pfeilgiftfrösche, “Artenteil Peru”.

- Waiblingen INIBICO. Nikola Verlag, Stuttgart, Germany. 292 p.
- Señaris JC. 1993. Una nueva especie de *Oreophrynella* (Anura; Bufonidae) de la cima del Auyan-tepui, estado Bolívar, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 53: 177–183.
- Señaris JC. 1997. Geographic distribution (Anura): *Cochranella oyampiensis*. *Herpetological Review* 28: 207.
- Señaris JC. 1999. Una nueva especie de *Hyalinobatrachium* (Anura: Centrolenidae) de la Cordillera de la Costa, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 59: 133–145.
- Señaris JC, Ayarzagüena J. 1994. Una nueva especie de *Centrolenella* (Anura: Centrolenidae) del Auyán-tepui, edo. Bolívar, Venezuela. *Memoria de la Sociedad de Ciencias Naturales La Salle* 53: 121–126.
- Señaris JC, Ayarzagüena J. 2001. Una nueva especie de rana de cristal del género *Hyalinobatrachium* (Anura: Centrolenidae) del Delta del Orinoco, Venezuela. *Revista de Biología Tropical* 49: 1,083–1,093.
- Señaris JC, Ayarzagüena J. 2002. A new species of *Hyla* (Anura: Hylidae) from the highlands of Venezuelan Guayana. *Journal of Herpetology* 36: 634–640.
- Señaris JC, Barrio CL. 2002. Geographic distribution (Anura): *Hyla calcarata*. *Herpetological Review* 33: 61.
- Señaris JC, Ayarzagüena J. 2004 “2002.” Contribución al conocimiento de la anurofauna del Delta del Orinoco, Venezuela: diversidad, ecología y biogeografía. *Memoria de la Fundación La Salle de Ciencias Naturales* 157: 129–152.
- Señaris JC, Rojas-Runjaic FJM. 2009. Riqueza y endemismo. Pp. 41–47. In: *Anfibios de Venezuela Estado del Conocimiento y Recomendaciones para su Conservación*. Editors, Molina C, Señaris JC, Lampo M, Rial A. Ediciones Conservación Internacional, Instituto Venezolano de Investigaciones Científicas, Universidad Central de Venezuela y Fundación La Salle, Caracas, Miranda, Venezuela. 130 p.
- Señaris JC, Vernet O. 1997. Geographic distribution (Anura): *Hyla ornatissima*. *Herpetological Review* 28: 207.
- Señaris JC, Ayarzagüena J, Gorzula S. 1994. Los sapos de la familia Bufonidae (Amphibia: Anura) de las tierras altas de la Guayana venezolana: descripción de un nuevo género y tres especies. *Publicaciones de la Asociación Amigos de Doñana* 3: 1–37.
- Señaris JC, Ayarzagüena J, Gorzula S. 1996. Revisión taxonómica del género *Stefania* (Anura; Hylidae) en Venezuela, con la descripción de cinco nuevas especies. *Publicaciones de la Asociación Amigos de Doñana* 7: 1–55.
- Señaris JC, Molina C, Villarreal O. 2003. Geographic distribution (Anura): *Synapturanus salseri*. *Herpetological Review* 34: 260.
- Señaris JC, Rojas-Runjaic FJM, Barrio-Amorós CL. 2009. Capítulo 7. Anfibios y reptiles de la cuenca alta del río Cuyuní, Estado Bolívar, Venezuela: Resultados del RAP Alto Cuyuní 2008. Pp. 120–128. In: *Evaluación Rápida de la Biodiversidad de los Ecosistemas Acuáticos del Alto Río Cuyuní, Guayana Venezolana*. Editors, Lasso CA, Señaris JC, Flores AL, Rial A. RAP Bulletin of Biological Assessment N° 55. Conservation International, Arlington, Virginia, USA. 235 p.
- Señaris JC., Rojas-Runjaic FJM, Vieira-Fernades JL. 2015. Ranita de cristal del Ávila, *Hyalinobatrachium guairarepanensis*. In: *Libro Rojo de la Fauna Venezolana. Cuarta edición*. Editors, Rodríguez JP, García-Rawlins A, Rojas-Suárez F. Provita y Fundación Empresas Polar, Caracas, Miranda, Venezuela.
- Señaris JC, Lampo M, Rojas-Runjaic FJM, Barrio-Amorós CL. 2014. *Guía Ilustrada de los Anfibios del Parque Nacional Canaima, Venezuela*. Ediciones IVIC, Instituto Venezolano de Investigaciones Científicas, Caracas, Miranda, Venezuela. 264 p.
- Sexton OJ. 1958. Observations on the life history of a Venezuelan frog *Atelopus cruciger*. *Acta Biológica Venezuelica* 2: 235–242.
- Sexton OJ. 1960. Some aspects of the behavior and of the territory of a dendrobatid frog *Prostherapis trinitatis*. *Ecology* 41: 107–115.
- Sexton OJ. 1962. Apparent territorialism in *Leptodactylus insularum* Barbour. *Herpetologica* 18: 212–214.
- Silverstone P. 1975. A revision of the poison-arrow frogs of the genus *Dendrobates* Wagler. *Natural History Museum of Los Angeles County, Science Bulletin* 21: 1–55.
- Silverstone P. 1976. A revision of the poison arrow frogs of the genus *Phyllobates* Bibron in Sagra (Family Dendrobatidae). *Natural History Museum of Los Angeles County, Science Bulletin* 27: 1–53.
- Sinsch U, Juraske N. 2006. Advertisement calls of hemiphractine frogs. IV. *Stefania* spp. Pp. 159–162. In: *Proceedings of the 13th Congress of the Societas Europaea Herpetologica, 27 September-2 October 2005, Bonn Germany*. Editors, Vences M, Köhler J, Ziegler T, Böhme W. Herpetologia Bonnensis II. Societas Europaea Herpetologica, Bonn, Germany. 414 p.
- Smith JM, Downie JR, Dye RF, Ogilvy V, Thornham DG, Rutherford MG, Charles SP, Murphy JC. 2011. Amphibia, Anura, Hylidae, *Scarthyia vigilans* (Solano, 1971): range extension and new country record for Trinidad, West Indies, with notes on tadpoles, habitat, behavior and biogeographical significance. *Check List* 7: 574–577.
- Solano H. 1971. Una nueva especie del género *Hyla* (Amphibia: Anura) de Venezuela. *Acta Biológica Venezuelica* 7: 211–218.
- Solano H. 1987a. Algunos aspectos de la biología reproductiva del sapito silbador *Leptodactylus fuscus* (Schneider) (Amphibia: Leptodactylidae). *Amphibia-*

- Reptilia* 8: 111–128.
- Solano H. 1987b. Variations saisonnières du régime alimentaire de *Leptodactylus fuscus* (Anoures Leptodactylidae) dans les “Llanos” du Venezuela. *Bulletin de la Société Zoologique de France* 111: 75–87.
- Solano H. 1989. Aspectos de la biología de *Oreophrynella quelchii* (Boulenger) en los tepuyes venezolanos. *Acta Biológica Venezolana* 12: 55–63.
- Spix JB. 1824. *Animalia Nova sive Species novae Testudinum et ranarum quas in itinere per Brasilian Annis MDCCCXVII-MDCCCXX Jussu et auspiciis Maximiliani Josephi I. Bavariae Regis*. Hübschmann FS, München, Germany. 55 p.
- Staton MA, Dixon JR. 1977. The herpetofauna of the central Llanos of Venezuela: noteworthy records, a tentative checklist and ecological notes. *Journal of Herpetology* 11: 17–24.
- Steindachner F. 1864. Batrachologische Mitteilungen. *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien* 14: 239–288.
- Stejneger L. 1901. An annotated list of batrachians and reptiles collected in vicinity of La Guaira, Venezuela, with description of two new species of snakes. *Proceedings United States National Museum* 24: 172–192.
- Suárez-Mayorga A, Lynch JD. 2001. Redescription of the tadpole of *Hyla vigilans* (Anura: Hylidae) and notes about possible taxonomic relationships. *Caribbean Journal of Science* 37: 116–119.
- Tárano Z. 2001. Variation in male advertisement calls in the Neotropical frog *Physalaemus enesefae*. *Copeia* 2001 (4): 1,064–1,072.
- Tárano Z. 2002. Vocal responses to conspecific call variation in the Neotropical frog *Physalaemus enesefae*. *Journal of Herpetology* 36: 615–620.
- Tárano Z. 2010. Advertisement calls and calling habits of frogs from a flooded savanna of Venezuela. *South American Journal of Herpetology* 5: 221–240.
- Tárano Z, Ryan MJ. 2002. No pre-existing biases for heterospecific call traits in the frog *Physalaemus enesefae*. *Animal Behavior* 64: 599–607.
- Tárano Z, Herrera EA. 2003. Female preferences for call traits and male mating success in the Neotropical frog *Physalaemus enesefae*. *Ethology* 109: 121–134.
- Taylor EH. 1968. *The Caecilians of the World: A Taxonomic Review*. University of Kansas Press, Lawrence, Kansas, USA. 848 p.
- Tello J. 1968. Clase Amphibia. Pp. 246–247. In: *Historia Natural de Caracas*. Ediciones del Concejo Municipal del Distrito Federal, Caracas, Miranda, Venezuela. 323 p.
- Test FH. 1956. Two new dendrobatid frogs from northern Venezuela. *Occasional Papers of the Museum of Zoology, University Michigan* 577: 1–9.
- Test FH. 1962. The highly developed courtship of the frog *Prostherapis trinitatis*. *Occasional Papers of the Museum of Zoology of the University of Michigan* 577: 1–9.
- Test FH. 1963. A protective behavior pattern in Venezuelan frogs of mountain streams. *Caribbean Journal of Science* 3: 125–128.
- Torres D, Barrio CL. 2001. Conservation (Anura): *Atelopus carbonerensis*. *Herpetological Review* 32: 179.
- Trapido H. 1942. A new salamander from Venezuela. *Boletín de la Sociedad Venezolana de Ciencias Naturales* 8: 297–301.
- Trueb L. 1984. Description of a new species of *Pipa* (Anura: Pipidae) from Panamá. *Herpetologica* 40: 225–234.
- Trueb L, Duellman WE. 1971. A synopsis of Neotropical hylid frogs, genus *Osteocephalus*. *Occasional Papers of the Museum of Natural History, University of Kansas* 1: 1–47.
- Trueb L, Cannatella DC. 1986. Systematics, morphology and phylogeny of genus *Pipa* (Anura: Pipidae). *Herpetologica* 42: 412–449.
- Trueb L, Masméjan D. 2001. The osteology and relationships of *Pipa aspera* (Amphibia: Anura: Pipidae), with notes on its natural history in French Guiana. *Amphibia-Reptilia* 22: 33–54.
- Ugueto GN, Rivas G. 2010. *Amphibians and Reptiles of Margarita, Coche and Cubagua*. Frankfurt Contributions to Natural History. Chimaira, Frankfurt am Main, Germany. 350 p.
- Valera-Leal J, Acevedo A, Pérez-Sánchez A, Vega J, Manzanilla J. 2011. Registro histórico de *Gastrotheca ovifera* (Anura: Hemiphysalidae): evidencias de disminución en selvas nubladas de la Cordillera de la Costa venezolana. *Revista de Biología Tropical* 59: 329–345.
- Vargas-Galarce JY, La Marca E. 2007. A new species of collared frog (Amphibia: Anura: Aromobatidae: *Mannophryne*) from the Andes of Trujillo state, Venezuela. *Herpetotropicos* 3: 51–57.
- Vélez C. 1995. Estudio taxonómico del grupo *Bufo typhonius* (Amphibia, Anura, Bufonidae) en Colombia. M.S. Thesis, Universidad Nacional de Colombia, Bogotá, Colombia. 174 p.
- Vélez C. 1999. Presencia de *Bufo sternosignatus* Günther 1859 (Amphibia: Anura: Bufonidae) en Colombia. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 23 (Suplemento Especial): 411–416.
- Vences M, Kosuch J, Boistel R, Haddad C, La Marca E, Lötters S, Veith M. 2003. Convergent evolution of aposematic coloration in Neotropical poison frogs: a molecular phylogenetic perspective. *Organisms, Diversity and Evolution* 3: 215–226.
- Vences M, Kosuch J, Lötters S, Widmer A, Jungfer KH, Köhler J, Veith M. 2000. Phylogeny and classification of poison frogs (Amphibia: Dendrobatidae), based on mitochondrial 16S and 12S ribosomal RNA gene

- sequences. *Molecular Phylogenetics and Evolution* 15: 34–40.
- Vieira-Fernandes JL, Rojas-Runjaic FJM, Quihua JD, Infante-Rivero EE. 2016 “2013.” Nuevos registros del sapo hojarasquero *Rhaebo haematiticus* Cope, 1862 (Anura, Bufonidae) y ampliación de su distribución en Venezuela. *Memoria de la Fundación La Salle de Ciencias Naturales* 73 (179–180): 71–77.
- Vieites DR, Román SN, Wake MH, Wake DB. 2011. A multigenic perspective on phylogenetic relationships in the largest family of salamanders, the Plethodontidae. *Molecular Phylogenetics and Evolution* 59: 623–635.
- Walker CF, Test FH. 1955. New Venezuelan frogs of the genus *Eleutherodactylus*. *Occasional Papers of the Museum of Zoology, University Michigan* 561: 1–10.
- Walsh JG. 1994. *Jewels of the Rainforest. Poison Frogs of the Family Dendrobatidae*. TFH Publications, Monmouth, New Jersey, USA. 288 p.
- Warren A. 1971. *Roraima. Report of the 1971 British Expedition to Mount Roraima in Guyana, South America*. Privately printed. 152 p.
- Wassersug RJ, Pyburn WF. 1987. The biology of the Pe-ret’ toad, *Otophryne robusta* (Microhylidae), with special considerations of its fossorial larva and systematic relationships. *Zoological Journal of the Linnean Society* 91: 137–169.
- Wells KD. 1980. Social behavior and communication of a dendrobatid frog (*Colostethus trinitatis*). *Herpetologica* 36: 189–199.
- Wiens JJ, Kuczynski CA, Hua X, Moen DS. 2010. An expanded phylogeny of treefrogs (Hylidae) based on nuclear and mitochondrial sequence data. *Molecular Phylogenetics and Evolution* 55: 871–882.
- Wild E. 1994. New genus and species of Amazonian microhylid frog with a phylogenetic analysis of New World genera. *Copeia* 1994 (4): 837–849.
- Wilkinson M. 1996a. On the status of *Nectocaecilia fasciata* Taylor, with a discussion of the Typhlonectidae (Amphibia: Gymnophiona). *Herpetologica* 45: 23–36.
- Wilkinson M. 1996b. Resolution of the taxonomic status of *Nectocaecilia haydeae* (Roze) and a revised key to the genera of Typhlonectidae (Amphibia: Gymnophiona). *Journal of Herpetology* 30: 413–415.
- Yanek K, Heyer WR, de Sá RO. 2006. Genetic resolution of the enigmatic Lesser Antillean distribution of the frog *Leptodactylus validus* (Anura, Leptodactylidae). *South American Journal of Herpetology* 1: 192–201.
- Yáñez-Muñoz M, Pérez-Peña P, Cisneros-Heredia D. 2009. New country records of *Hyalinobatrachium iaspidiense* (Amphibia, Anura, Centrolenidae) from the Amazonian lowlands of Ecuador and Peru. *Herpetology Notes* 2: 49–52.
- Yústiz E. 1976a. Anfibios y ofidios del parque Nacional Yacambú. Comunicación preliminar. *Revista Universidad Centrooccidental Lisandro Alvarado, Tarea Común* 2: 75–80.
- Yústiz E. 1976b. *Gastrotheca yacambuensis* (Salientia-Hylidae). Nueva especie en el Parque Nacional Yacambú, Sierra de Portuguesa, estado Lara, Venezuela. *Revista de la Universidad Centrooccidental Lisandro Alvarado, Tarea Común* 3: 87–97.
- Yústiz E. 1991. Un nuevo *Colostethus* (Amphibia: Dendrobatidae) en la Sierra de Barbacoas, estado Lara, Venezuela. *Bioagro* 3: 145–151.
- Yústiz E. 1996. Aspectos biogeográficos de la herpetofauna de la cuenca hidrográfica del río Turbio (Estado Lara, Venezuela). Pp. 317–349. In: *Herpetología Neotropical. Actas del II Congreso Latinoamericano de Herpetología*. Editor, Péfaur JE. Publicaciones ULA, CSH, Mérida, Mérida, Venezuela. 451 p.
- Zimmermann H, Zimmermann E. 1988. Etho-taxonomie und zoogeographische Artengruppenbildung bei Pfeilgift-fröschen (Anura: Dendrobatidae). *Salamandra* 24: 125–160.
- Zippel KC, Mendelson III JR. 2008. The amphibian extinction crisis: a call to action. *Herpetological Review* 39: 23–29.
- Zug GR, Zug PB. 1979. The marine toad, *Bufo marinus*: a natural history resumé of native populations. *Smithsonian Contributions to Zoology* 284: 1–58.
- Zweifel RG. 1986. A new genus and species of microhylid frog from the Cerro de la Neblina region of Venezuela and a discussion of relationships among New World microhylid genera. *American Museum Novitates* 2847: 1–24.
- Zweifel RG, Myers CW. 1989. A new frog of the genus *Ctenophryne* (Microhylidae) for the Pacific lowlands of northwestern South America. *American Museum Novitates* 2947: 1–16.



César L. Barrio Amorós is a graduate in Geography and History (Anthropology) from the Universitat de Barcelona, Spain, and was co-founder and Director of Fundación AndígenA in Venezuela from 1999 to 2009. As a member of several exploration teams, César has produced more than 200 publications and described 51 new taxa of amphibians and reptiles, mainly from Venezuela. His main interests are taxonomy of Terraranae, Arboranae, and Dendrobatoids, as well as some reptile groups; biogeography of the Pantepui based on herpetofauna; and natural history of amphibians at the Pacific versant of Central America. César is currently running Doc Frog Expeditions© and partner of CRWild© in Costa Rica. *Photo: Lucas Bustamante.*



Fernando J.M. Rojas-Runjaic is a researcher at the Museo de Historia Natural La Salle in Caracas, Venezuela, as well as curator of the amphibian, reptile, and arachnid collections. Fernando has a B.Sc. in Biology from the Universidad del Zulia (Venezuela), and a Master's degree in Biodiversity and Conservation of Tropical Areas from the Universidad Internacional Menéndez Pelayo (Spain). While currently enrolled in the Ph.D. program in Zoology at the Pontificia Universidade Católica do Rio Grande do Sul (Brazil), Fernando's research interests are broad and include evolution, phylogenetic systematics, taxonomy, diversity, biogeography, and conservation of amphibians, reptiles, and scorpions. *Photo: Santi Castroviejo Fisher.*



J. Celsa Señaris is a Biology graduate from the Universidad Central de Venezuela (UCV), with a Ph.D. from Universidad de Santiago de Compostela on Venezuelan centrolenids. She was director of the Museo de Historia Natural La Salle from 1991 to 2012, and is currently a researcher at the Laboratorio de Ecología y Genética de Poblaciones del Instituto Venezolano de Investigaciones Científicas (IVIC) as well as a professor of Herpetology at the UCV and IVIC. She is the author of three books and 89 papers on Venezuelan herpetofauna, with two genera and 37 species described, and has served as editor of 12 scientific books. She is a founding member of PROVITA, one of the most important NGOs in Venezuela, and has coordinated six expeditions in the Guayanan region of Venezuela. Since 2005, she has been co-president for Venezuela of the Amphibian Specialist Group (ASG), IUCN. *Photo: J. Celsa Señaris.*

Appendix 1. Species known to inhabit Venezuela but not yet described or correctly identified.

Several species of amphibians known to be in Venezuela lack proper names. Some are undescribed (*Atelopus* sp 1, *Pristimantis* sp 4); some are incorrectly identified (even for a long time), e.g., *Allobates* aff. *marchesianus*, or the *Osteocephalus taurinus* complex, with at least two different candidate species identified in Venezuela (Jungfer et al. 2013); others include a new *Adenomera* sp. Q (Fouquet et al. 2014), and the five new candidate species of *Stefania* reported by Kok et al. (2016), which all deserve proper descriptions and names. Certain taxa, like *Rhinella* cf. *proboscidea* are documented by a photograph, although without vouchers. However, those complexes with more than one taxon (for example *Boana xerophylla* complex, apparently with at least three or four different putative species) are not counted as individual species herein. For general purposes, this listing accounts for species included in the biodiversity of Venezuela, while acknowledging the need to properly work on them. McDiarmid and Paolillo (1988) provide a very interesting list of species collected during the Neblina expeditions (from 1983 to 1987), which are mostly in the USNM and AMNH. The importance of checking these collections is acknowledged, as many species await proper attention. Among them, this catalog does not include species without at least a recognized genus. For example, the Bufonid sp. nov. from the higher camps of Neblina could be a *Metaphryniscus*, but without corroborating data it is not included on this list. In the case of the many “*Eleutherodactylus*” from Neblina, only those with a decent number of collected specimens are counted as candidate species. Of these 33 species, some are mentioned for the first time herein; while some have been mentioned in the literature but are not correctly identified or yet described.

Family Bufonidae

Atelopus sp. 1

Distribution: Endemic to Macizo de Guaramacal, between Trujillo and Portuguesa states, Venezuelan Andes.

Remarks: Though this new *Atelopus* was discovered in December 1987, it has not been described yet (García-Pérez and La Marca 2015). Its population status has been mentioned several times (García-Pérez 1997, 2005; García-Pérez and La Marca 2015). It appears as *Atelopus* sp. 2 in Rueda-Almonacid et al. (2005). The proper description of this species is imperative.

Selected references: García-Pérez 1997; La Marca and Lötters 1997; La Marca 2004; García-Pérez 2005; La Marca et al. 2005; Lötters et al. 2005; Rueda-Almonacid et al. 2005.

Atelopus sp. 2

Distribution: Endemic to near Queniquea, estado Táchira.

Remarks: This species was collected in 1988 and is not yet described (A. Chacón and CBA, in prep.).

Rhinella cf. *proboscidea* (Spix, 1824)

Holotype: ZSM 1145/0

Type locality: River Solimoes, Brazil.

Distribution: Upper and middle Amazon, from Peru to Manaus. This species is referred in Venezuela through a picture by Javier Mesa taken in the middle section of La Escalera, Sierra de Lema, Bolivar state (Image 26), that was compared with similar *Rhinella* (*proboscidea*, *dapsilis*). At this time, we conclude that it looks more like *proboscidea* than any other species, pending the collection and examination of more specimens.

Family Centrolenidae

“*Cochranella*” sp.

Distribution: Temiche, base of Mount Marahuaka, Amazonas state.

Remarks: Rivero (1961) reported a “*Cochranella* sp.” from Temiche, at the base of Mount Marahuaka, a tepui in Amazonas state, Venezuela. Goin (1968) mentions it could be *Hyalinobatrachium taylori*, but its poor condition prevents identification. It also could be “*C.*” *duidaeana*, known from a higher altitude (2,140 m) in the same general area, or any other kind of glassfrog (or a Hyloid, as Rivero proved to confuse his *Centrolenella pulidoi* also from Duida with *Boana benitezi* — Faivovich et al. 2005; this work). As this area has been not well studied, more attention must be paid for new species. Unfortunately, old specimens of glassfrogs lose their characteristics quickly if not properly preserved, such as the specimen MCZ 28569.

References: Goin 1968; Rivero 1961.

Family Dendrobatidae

Allobates aff. *marchesianus* (Melin, 1941)

Syntype: NHMG 509.

Type locality: “Taracúá, Río Uaupés [Estado do Amazonas,] Brazil”.

Distribution: Reported from the foothills of Cerros Duida and Marahuaka, two neighboring tepuis in Amazonas state.

Remarks: Considered herein under one putative species name are all reports of *Allobates brunneus* and *A. marchesianus* from Venezuela, until the proper identity of such populations is resolved. They are considered aff. *marchesianus* rather than aff. *brunneus* as the *marchesianus* type locality is closer to the Venezuelan southern border and the possibility of its presence is still likely. *Allobates brunneus* is certainly not present in Venezuela, as its type locality lies south of the Amazon and, though similar, the Venezuelan material does not fall into the recent redescription of *A. brunneus* from its type locality (Lima et al. 2009).

Selected references: Caldwell et al. 2002; La Marca 1996e; Lima et al. 2009; Morales 1994; Rivero 1961, 1964a,b,d, 1988.

Allobates “Neblina species”

Remarks: This is the *Colosthetus* sp. A in McDiarmid and Paolillo (1988) and already tested by Grant et al. (2006). It awaits formal description.

Aromobates sp. 1

Remarks: This species was discovered during the Calderas RAP (Barrio-Amorós 2010; Barrio-Amorós and Molina 2010) and demonstrated as a candidate species by Barrio-Amorós and Santos (2012); however, it was not described since the only materials were tadpoles and recent metamorphs.

References: Barrio-Amorós 2010a; Barrio-Amorós and Molina 2010; Barrio-Amorós and Santos 2012.

Mannophryne sp. 1 (aff. *herminae*)

Distribution: Santos and Barrio-Amorós (genetic unpub. data) indicate that *Manophryne* from Bejuma and surroundings in Carabobo state, is not the same *M. herminae* that inhabits Rancho Grande. FRR, based on preliminary morphology and bioacoustics, suggests that *M. herminae* from RG is apparently conspecific to those in San Esteban valley, but differs from the population in Bejuma.

References: Barrio-Amorós 2006; Barrio-Amorós et al. 2010b.

Mannophryne sp. 2

Distribution: The *Mannophryne* sympatric with *M. oblitteratus* at Guatopo National Park is indeed a new species to be described (J.C. Santos and CBA; unpub. data). Barrio-Amorós and Santos refrained from describing it due to the lack of permits at the time.

Family Hemiphractidae

Stefania sp. 1

Distribution: Serranía de la Neblina, Amazonas state.

References: McDiarmid and Paolillo 1988.

Stefania sp. 2

Distribution: Abakapá-tepui, Bolívar state.

References: Kok et al. 2016.

Stefania sp. 3

Distribution: Angasima-tepui, Bolívar state.

References: Kok et al. 2016.

Stefania sp. 4

Distribution: Upuigma-tepui, Bolívar state.

References: Kok et al. 2016.

Stefania sp. 5

Distribution: Amurí-tepui, Bolívar state.

References: Kok et al. 2016.

Stefania sp. 6

Distribution: Murisipán-tepui, Bolívar state.

References: Kok et al. 2016.

Family Hylidae

Dendropsophus aff. *minutus* (Peters, 1872)

Syntypes: ZMB 7456 (five specimens. *D. minutus sensu stricto*).

Type locality: Nova Friburgo, Rio de Janeiro, Brazil (for *D. minutus sensu stricto*).

Distribution: Based on the phylogeny of Gehara et al. (2014) the Guianan lineages are widely distributed in Venezuela (Andes, Cordillera de La Costa, Amazon, and Guiana Shield), Guiana, Suriname, French Guiana, and northern Brazil. No name is available yet for those populations that could represent more than one species.

Remarks: Gehara et al. (2014) showed this is a composite of species with at least four mitochondrial lineages in Venezuela that are not part of the clade of *D. minutus* species complex. Gehara et al. (2014) proposed to remove *Hyla goughi* Boulenger, 1911 from the synonymy of *D. minutus* and allocate it in the “Guianan lineages”. However, in a recent visit to the BMNH, CBA corroborated the holotype of *Hyla goughi* from Trinidad as *Dendropsophus microcephalus*.

Selected references: Barrio-Amorós 2010a; Barrio-Amorós and Duellman 2009; Barrio-Amorós et al. 2011b; Donnelly and Myers 1991; Duellman 1997; Gehara et al. 2014; Gorzula and Señaris 1998; Heatwole et al. 1965; Hoogmoed and Gorzula 1979; Magdefrau et al. 1991; Rivero 1961, 1964b, 1971b; Rivero and Esteves 1969; Señaris et al. 2014.

Boana sp. (cf. *rufitela*)

Distribution: A few localities along the Caribbean coastal range and Maracaibo Lake basin, also scattered in Caribbean Colombia. Those localities are widespread in the literature but there is no mention of a viable population.

Remarks: In all previous lists of Venezuelan amphibians this species was confused with *H. albomarginatus*, a species found in southeastern Brazil. Barrio-Amorós (2004) identified Venezuelan populations as *H. rufitelus*, apparently the closest similar congeneric, known from Nicaragua through southern Central America to northern Colombia. Only one specimen collected in Maracaibo, Zulia, Venezuela (MCZ 15369; Fig. 185) looks very much like *H. albomarginatus*; all other citations are based on misidentifications of juvenile *H. crepitans* or *H. pugnax*, both in Venezuela and Colombia. Here it is concluded that: 1- the specimen MCZ 15369 from a site in Brazil was mislabeled and corresponds with *H. albomarginatus*, or 2- there is an unidentified species (not *albomarginatus* or *rufitelus*) to be collected and described in Caribbean Venezuela and Colombia.

Selected references: The following references are about either *H. rufitelus* or *H. albomarginatus*: Barrio-Amorós 2004, 2013; Fouquette 1968; Ginés 1959; Lutz 1927; Mendoza 2014; Rivero 1961; Spix 1824; Tello 1968.

Osteocephalus aff. *planiceps* Cope, 1874 [Ca1_Neblina411]

Referred specimen: AMNH A-131254.

Distribution: Only known from base of Cerro de la Neblina (Base Camp, Rio Baria, Amazonas state) at southern border of Venezuela. Probably more extensive through southern Venezuela and northern Brazil.

Remarks: There is only a single report of this species in the country by Jungfer et al. (2013), based on specimen AMNH A-131254. In the phylogeny of *Osteocephalus* inferred by these authors, the species is recovered as sister to a clade integrated by *O. leoniae*, *O. fuscifacies*, and *O. deridens*, and not clustered with any terminal of *O. planiceps*. Based on this phylogenetic evidence, they refer it as a confirmed candidate species [Ca1_Neblina411] related to *Osteocephalus planiceps*. In the *Osteocephalus planiceps* species group (Jungfer et al. 2013). Description of this new species is pending. Other specimens collected during the 1983–1987 expedition to Neblina and deposited in AMNH, USNM and MBUCV as *O. taurinus* (McDiarmid and Paolillo 1988) probably correspond to this new taxon.

References: McDiarmid and Paolillo 1988; Jungfer et al. 2013.

Osteocephalus aff. *taurinus* [Ca2_Neblina410]

Referred specimen: AMNH A-131245.

Distribution: Only known from the base of Cerro de la Neblina (Base Camp, Rio Baria, Amazonas state) at the southern border of Venezuela. Probably more extensive through southern Venezuela and northern Brazil.

Remarks: Jungfer et al. (2013) discovered this species from a single specimen (AMNH A-131245). In the phylogeny of *Osteocephalus* inferred by these authors it is recovered as sister to a clade integrated by *O. oophagus*, *O. taurinus*, and three other undescribed species, and is not clustered with any terminal of *O. taurinus sensu stricto*. They refer it as a confirmed candidate species [Ca2_Neblina410] related to *O. taurinus*. In the *Osteocephalus taurinus* species group (Jungfer et al. 2013). Description of this new species is pending. Other specimens collected during the 1983–1987 expedition to Neblina and deposited in AMNH, USNM and MBUCV as *O. taurinus* (McDiarmid and Paolillo 1988) probably correspond to this new taxon.

References: McDiarmid and Paolillo 1988; Jungfer et al. 2013.

Osteocephalus aff. *taurinus* [Ca3_AJC2959_3181]

Referred specimens: MHNLS 18325, 19907, 20034, and 20083.

Distribution: Only known from northwestern Amazonas state, southern Venezuela.

Remarks: In the phylogeny of *Osteocephalus* inferred by Jungfer et al. (2013) this taxon is recovered as sister to a clade integrated by *O. oophagus*, *O. taurinus*, and two other undescribed species, and is not clustered with any terminal of *O. taurinus sensu stricto*. Jungfer et al. (2013) refer it as a confirmed candidate species [Ca3_AJC2959_3181] related to *O. taurinus*. In the *Osteocephalus taurinus* species group (Jungfer et al. 2013). Description of this new species is pending. Numerous specimens deposited in MHNLS, EBRG, and MBUCV as *O. taurinus* (McDiarmid and Paolillo 1988) probably correspond to this new taxon. The identity of populations in Bolívar and Delta Amacuro previously referred as *O. taurinus* (Barrio-Amorós 1998; Gorzula and Señaris 1999; Señaris and Ayarzagüena 2004) must be reevaluated.

References: Jungfer et al. 2013.

Family Leptodactylidae

Adenomera sp. 1

Distribution: A single sample was analyzed by Fouquet et al. (2014) from the border between Brazil, Colombia, and Venezuela.

Remarks: This is the *Adenomera* sp. Q of Fouquet et al. (2014).

References: Fouquet et al 2014.

Adenomera cf. *simonstuarti* Angulo and Icochea, 2010

Holotype: MHNSM 18218.

Type locality: “Campamento Segakiato, c. 340 m asl, Río Camisea, District of Echarate, Province of La Convención, Región of Cusco, Peru.”

Distribution: Recently described from the eastern versant of the Peruvian Andes. Widely distributed along the eastern Andean piedmont from Peru to Venezuela. In Venezuela, reported from Calderas, Barinas state by Barrio-Amorós (2010a) as *Adenomera* sp.

Remarks: Fouquet et al. (2014) found a sample from Calderas, Barinas, and embedded it into a clade with *A. simonstuarti*.

Selected references: Angulo and Icochea 2010; Barrio-Amorós et al. 2010a; Fouquet et al. 2014.

Leptodactylus sp. 1

Distribution: Andes of Venezuela, at least in Mérida, Trujillo, and Táchira states, around 1,000 m asl (CBA personal observation). E. La Marca restricts it to the Meseta de Mérida.

Remarks: Currently in description by E. La Marca, who listed it as Endangered in the fourth edition of the Venezuelan Red List (La Marca 2015).

References: La Marca 2015.

Leptodactylus aff. *macrosternum* Miranda-Ribeiro, 1926

Type: MZUSP 448.

Type locality: Bahia (Brazil).

Distribution: Venezuela north of the Orinoco river, in open areas.

Remarks: De Sá et al. (2014) restrict the distribution of *L. macrosternum* to its type locality in Bahía, Brazil, leaving the Venezuelan populations without a proper name to be applied. *Leptodactylus ocellatus* Girard, 1853, a previous name by which many Venezuelan populations were known, is now under synonymy of *L. latrans* (Steffen, 1815), a southern South American species. A thorough review of the *latrans* species group is needed. Heyer (2014) indicates the Venezuelan examples in his work are a different new species, compared with *L. latrans sensu lato*. In the meantime, *Leptodactylus* aff. *macrosternum* is used for the Venezuelan populations to be consistent with the classic literature. In the *latrans* species group of De Sá et al. (2014).

Selected references: Barrio-Amorós et al. 2011b; De Sá et al. 2014; Dixon and Staton 1976; Gorzula and Señaris 1998; Heyer 2014; Hoogmoed and Gorzula 1979; La Marca 1992; Rada 1981; Ramo and Busto 1989, 1990; Rivero 1967c; Staton and Dixon 1977; Tárano 2010.

Family Strabomantidae

Pristimantis sp. 1

Distribution: Páramo Los Granates, Mérida state.

Remarks: The Andes harbor a surprising diversity of high mountain *Pristimantis*, all very similar in shape. Some preliminary molecular work (Barrio-Amorós et al. 2013) determined the validity of several candidate species.

References: Barrio-Amorós et al. 2013.

Pristimantis sp. 2

Distribution: La Motús, subparamo in Mérida Andes.

Remarks: A second new species, allied to *P. lancinii*, but different in some morphological and molecular traits, awaits proper attention.

References: Barrio-Amorós et al. 2013.

Pristimantis sp. 3

Distribution: Piñango, Mérida state.

Remarks: Barrio-Amorós et al. (2013) show this species as a close ally of *P. bricenii*.

References: Barrio-Amorós et al. 2013.

Pristimantis sp. 4

Distribution: Murisipan-tepui, 05°53'N, 62°04'W, 2,350 m asl, Estado Bolívar (MHNLS 11383).

Remarks: This species, collected by S. Gorzula, awaits a proper description (CBA, in prep.).

Pristimantis sp. 5

Distribution: Cerro de la Neblina, Amazonas state; camps I, III, and VII.

Remarks: This species corresponds to *Eleutherodactylus* “bromeliad” in McDiarmid and Paolillo (1988).

Pristimantis sp. 6

Distribution: Cerro de la Neblina, Amazonas state; camps I, II, X, and XI.

Remarks: This species corresponds to *Eleutherodactylus* “bromlike” in McDiarmid and Paolillo (1988).

Pristimantis sp. 7

Distribution: Cerro de la Neblina, Amazonas state; camps VII and XI.

Remarks: This species corresponds to *Eleutherodactylus* “stream” in McDiarmid and Paolillo (1988).

Pristimantis sp. 8

Distribution: Cerro de la Neblina, Amazonas state; camps VII, XI.

Remarks: This species corresponds to *Eleutherodactylus* “violet” in McDiarmid and Paolillo (1988).

Family Plethodontidae

Bolitoglossa cf. *altamazonica* (Cope, 1874)

Syntypes: ANSP or USNM, now lost or destroyed.

Terra typica: “Nauta,” Departamento Loreto, Perú.

Distribution: Valle del río Doradas.

Remarks: Barrio-Amorós et al. (2015), when reporting *B. leandrae* for Venezuela, state the presence of *B. altamazonica* must be corroborated. The only specimen of this species reported, a juvenile (ULABG 3392), cannot be positively identified and possibly represents *B. leandrae*. However, until more data is available, the possibility of a widespread Amazonian species in the Doradas River valley cannot be ruled out, as the area is an important locality for upper Amazonian herpetofauna (Barrio et al. 1999; Barrio 1999a, 2001; Barrio-Amorós et al. 2002, 2003; Chacón et al. 2002; Barrio-Amorós and Chacón 2004; Barrio-Amorós and Díaz de Pascual 2008).

References: Barrio-Amorós 2004; Barrio-Amorós et al. 2015; Schargel and Rivas 2003.

Appendix 2. Taxonomic list of the Amphibians of Venezuela.

In the past 15 years, amphibian taxonomy has undergone many changes. As a living science, many genetic studies on previously unknown species or groups are still being performed, and the taxonomic panorama is being modified continuously. While it is not imperative to follow the latest papers on each taxon, here the most recent taxonomic reviews based on genetic and morphological data are presented, and specific points of disagreement are explained. The following sources are used for the taxa indicated: Faivovich et al. (2005) and Duellman et al. (2016) for Arboranae; Faivovich et al. (2010) and Duellman et al. (2016) for Phyllomedusidae; Faivovich et al. (2012) for *Pleurodema*, and Faivovich et al. (2014), for Ceratophryidae; Frost et al. (2006) for Amphibia in general (with exceptions); Grant et al. (2006, 2017) and Santos et al. (2009) for Dendrobatidae; Guayasamin et al. (2009) for Allophrynidae and Centrolenidae; Castroviejo-Fisher et al. (2015) for Hemiphractidae; Hedges et al. (2008) and Heinicke et al. (2009, 2018) for Terraranae; Jungfer et al. (2013) for *Osteocephalus* and *Tepuihyla*; De Sá et al. (2012, 2014) for Microhylidae and *Leptodactylus*; and Blackburn and Wake (2011) for higher amphibian taxa. Many of these works are in conflict, and decisions are presented here on which is the most appropriate for each taxon. This comprehensive list also shows the species known to exist in Venezuela but not yet described, and under our subjective view taxa that have been incorrectly identified (see Appendix 1).

*Species with an asterisk are endemic to Venezuela.

CLASS AMPHIBIA Gray, 1825

Order ANURA Fischer von Waldheim, 1813

Family Allophrynidae Goin, Goin and Zug, 1978

Genus *Allophryne* Gaige, 1926

1. *Allophryne ruthveni* Gaige, 1926

Family Bufonidae Gray, 1825

Genus *Amazophrynella* Fouquet, Recoder, Teixeira, Cassimiro, Amaro, Camacho, Damasceno, Carnaval, Moritz and Rodrigues, 2012

2. *Amazophrynella minuta* (Melin, 1941)

Genus *Atelopus* Duméril and Bribon, 1841

3. *Atelopus carbonerensis* Rivero, 1972*
4. *Atelopus chrysocorallus* La Marca, 1996*
5. *Atelopus cruciger* (Lichtenstein and Martens, 1856)*
6. *Atelopus mucubajensis* Rivero, 1974*
7. *Atelopus oxyrhynchus* Boulenger, 1903*
8. *Atelopus pinangoi* Rivero, 1980*
9. *Atelopus sorianoi* La Marca, 1983*
10. *Atelopus tamaense* La Marca, Garcia-Perez and Renjifo, 1990
11. *Atelopus vogli* Müller, 1934*
12. *Atelopus* sp.1
13. *Atelopus* sp. 2

Genus *Metaphryniscus* Señaris, Ayarzagüena and Gorzula, 1994

14. *Metaphryniscus sosae* Señaris, Ayarzagüena and Gorzula, 1994*

Genus *Oreophrynella* Boulenger, 1895

15. *Oreophrynella cryptica* Señaris, 1995*
16. *Oreophrynella huberi* Diego-Aransay and Gorzula, 1988*
17. *Oreophrynella macconelli* Boulenger, 1900
18. *Oreophrynella nigra* Señaris, Ayarzagüena and Gorzula, 1994*
19. *Oreophrynella quelchii* (Boulenger, 1895)
20. *Oreophrynella vasquezii* Señaris, Ayarzagüena and Gorzula, 1994*

Genus *Rhaebo* Cope, 1862

21. *Rhaebo glaberrimus* (Gunther, 1868)
22. *Rhaebo guttatus* Schneider, 1799
23. *Rhaebo haematiticus* Cope, 1862
24. *Rhaebo nasicus* (Werner, 1903)

Genus *Rhinella* Fitzinger, 1826

25. *Rhinella ceratophrys* (Boulenger, 1882)
26. *Rhinella horribilis* (Wiegmann, 1833)
27. *Rhinella humboldti* (Gallardo, 1965)
28. *Rhinella margaritifera* (Laurenti, 1758)
29. *Rhinella marina* (Linnaeus, 1758)
30. *Rhinella merianae* (Gallardo, 1965)
31. *Rhinella nattereri* (Bokermann, 1967)
32. *Rhinella* cf. *proboscidea* (Spix, 1824)
33. *Rhinella sclerocephala* (Mijares-Urrutia and Arends, 2001)*
34. *Rhinella sternosignata* (Günther, 1859)

Family Centrolenidae Taylor, 1951

Subfamily Centroleninae Taylor, 1951

Genus *Centrolene* Jiménez de la Espada, 1872

35. *Centrolene altitudinalis* (Rivero, 1968)*
36. *Centrolene daidalea* (Ruíz-Carranza and Lynch, 1991)
37. *Centrolene notosticta* Ruíz-Carranza and Lynch, 1991
38. *Centrolene venezuelensis* (Rivero, 1968)*

Genus *Cochranella* Taylor, 1951

39. “*Cochranella*” *duidaeana* (Ayarzagüena, 1992)*
40. “*Cochranella*” *riveroi* (Ayarzagüena, 1992)*
41. “*Cochranella*” sp. 1

Genus *Espadarana* Guayasamin, Castroviejo-Fischer, Trueb, Ayarzagüena, Rada and Vilà, 2009

42. *Espadarana andina* (Rivero, 1968)

Genus *Vitreorana* Guayasamin, Castroviejo-Fischer, Trueb, Ayarzagüena, Rada and Vilà, 2009

43. *Vitreorana antisthenesi* (Goin, 1963)*
44. *Vitreorana castroviejoi* (Ayarzagüena and Señaris, 1997)*
45. *Vitreorana gorzulae* (Ayarzagüena, 1992)
46. *Vitreorana helenae* (Ayarzagüena, 1992)

Subfamily Hyalinobatrachinae Guayasamin, Castroviejo-Fischer, Trueb, Ayarzagüena, Rada and Vilà, 2009

Genus *Celsiella* Guayasamin, Castroviejo-Fischer, Trueb, Ayarzagüena, Rada and Vilà, 2009

- 47. *Celsiella revocata* (Rivero, 1985)*
- 48. *Celsiella vozmediano* (Ayarzagüena and Señaris, 1997)*

Genus *Hyalinobatrachium* Ruíz-Carranza and Lynch, 1991

- 49. *Hyalinobatrachium cappellei* van Lidth de Jeude, 1904
- 50. *Hyalinobatrachium durante* (Rivero, 1985)*
- 51. *Hyalinobatrachium fragile* (Rivero, 1985)*
- 52. *Hyalinobatrachium guairarepanense* Señaris, 1999*
- 53. *Hyalinobatrachium iaspidiense* (Ayarzagüena, 1992)*
- 54. *Hyalinobatrachium mesai* Barrio-Amorós and Brewer-Carías, 2008*
- 55. *Hyalinobatrachium mondolfii* Ayarzagüena and Señaris, 2001*
- 56. *Hyalinobatrachium orientale* (Rivero, 1985)*
- 57. *Hyalinobatrachium orocostale* (Rivero, 1968)*
- 58. *Hyalinobatrachium pallidum* (Rivero, 1985)*
- 59. *Hyalinobatrachium tatayoi* (Castroviejo-Fisher, Ayarzagüena and Vilà, 2007)*
- 60. *Hyalinobatrachium taylori* (Goin, 1968)

Family Ceratophrydae Tschudi, 1838

Genus *Ceratophrys* Wied-Neuwied, 1824

- 61. *Ceratophrys calcarata* Boulenger, 1890

Family Ceuthomantidae Heinicke, Duellman, Trueb, Means, MacCulloch and Hedges, 2009

Genus *Ceuthomantis* Heinicke, Duellman, Trueb, Means, MacCulloch and Hedges, 2009

- 62. *Ceuthomantis aracamuni* (Barrio-Amorós and Molina, 2006)*
- 63. *Ceuthomantis cavernibardus* (Myers et Donnelly, 1997)
- 64. *Ceuthomantis duellmani* Barrio-Amorós, 2010*

Family Craugastoridae Hedges, Duellman and Heinicke, 2008

Genus *Tachiramantis* Heinicke, Barrio-Amorós and Hedges, 2015

- 65. *Tachiramantis lentiginosus* (Rivero, 1984)*
- 66. *Tachiramantis prolixodiscus* Lynch, 1978

Family Dendrobatidae Cope, 1865

Subfamily Aromobatinae Grant, Frost, Caldwell, Gagliardo, Haddad, Kok, Means, Noonan, Schargel and Wheeler, 2006

Genus *Prostherapis* Cope, 1868

67. *Prostherapis dumni* Rivero, 1961*

Genus *Allobates* Zimmermann and Zimmermann, 1988

68. *Allobates algorei* Barrio-Amorós and Santos, 2009*
69. *Allobates bromelicola* (Test, 1956)*
70. *Allobates caribe* (Barrio-Amorós, Rivas and Kaiser, 2006)*
71. *Allobates femoralis* (Boulenger, 1884)
72. *Allobates humilis* (Rivero, 1980)*
73. *Allobates mandelorum* (Schmidt, 1932)*
74. *Allobates* aff. *marchesianus* (Melin, 1941)
75. *Allobates pittieri* (La Marca, Manzanilla and Mijares-Urrutia, 2004)*
76. *Allobates sanmartini* (Rivero, Langone and Prigioni, 1986)*
77. *Allobates undulatus* (Myers and Donnelly, 2001)*

Genus *Anomaloglossus* Grant, Frost, Caldwell, Gagliardo, Haddad, Kok, Means, Noonan, Schargel and Wheeler, 2006

78. *Anomaloglossus ayarzaguenai* (La Marca, 1997)*
79. *Anomaloglossus breweri* (Barrio-Amorós, 2006)*
80. *Anomaloglossus guanayensis* (La Marca, 1997)*
81. *Anomaloglossus moffetti* Barrio-Amorós and Brewer-Carías, 2008*
82. *Anomaloglossus murisipanensis* (La Marca, 1997)*
83. *Anomaloglossus parimae* (La Marca, 1997)*
84. *Anomaloglossus parkerae* (Meinhardt and Parmalee, 1996)*
85. *Anomaloglossus praderioi* (La Marca, 1997)*
86. *Anomaloglossus roraima* (La Marca, 1997)*
87. *Anomaloglossus rufulus* (Gorzula, 1990)*
88. *Anomaloglossus shrevei* (Rivero, 1961)*
89. *Anomaloglossus tamacuarensis* (Myers and Donnelly, 1997)
90. *Anomaloglossus tepuyensis* (La Marca, 1997)*
91. *Anomaloglossus triunfo* (Barrio-Amorós, Fuentes and Rivas, 2004)*
92. *Anomaloglossus verveeksnyderorum* Barrio-Amorós, Santos and Jovanovic 2009*
93. *Anomaloglossus wothuja* (Barrio-Amorós, Fuentes and Rivas, 2004)*

Genus *Aromobates* Myers, Paolillo and Daly, 1991

94. *Aromobates alboguttatus* (Boulenger, 1903)*
95. *Aromobates cannatellai* Barrio-Amorós and Santos, 2012*
96. *Aromobates capurinensis* (Péfaur, 1993)*
97. *Aromobates durantii* (Péfaur, 1985)*
98. *Aromobates ericksonae* Barrio-Amorós and Santos, 2012*
99. *Aromobates haydeae* (Rivero, 1978)*
100. *Aromobates inflexus* (Rivero, 1978)*
101. *Aromobates leopardalis* (Rivero, 1978)*
102. *Aromobates mayorgai* (Rivero, 1980)*
103. *Aromobates meridensis* (Dole and Durant, 1973)*
104. *Aromobates molinari* (La Marca, 1985)*
105. *Aromobates nocturnus* Myers, Paolillo, and Daly, 1991*
106. *Aromobates ornatissimus* Barrio-Amorós, Rivero and Santos, 2011*
107. *Aromobates orostoma* (Rivero, 1978)*
108. *Aromobates saltuensis* (Rivero, 1980)*
109. *Aromobates serranus* (Péfaur, 1985)*
110. *Aromobates tokuko* Rojas-Runjaic, Infante and Barrio-Amorós, 2011*
111. *Aromobates walterarpi* (La Marca et Otero, 2012)*
112. *Aromobates zippeli* Barrio-Amorós and Santos, 2012*
113. *Aromobates* sp. 1

Genus *Mannophryne* La Marca, 1992

- 114. *Mannophryne caquetio* Mijares-Urrutia and Arends-R., 1999*
- 115. *Mannophryne collaris* (Boulenger, 1912)*
- 116. *Mannophryne cordilleriana* La Marca, 1995*
- 117. *Mannophryne herminae* (Boettger, 1893)*
- 118. *Mannophryne lamarcai* Mijares-Urrutia and Arends-R., 1999*
- 119. *Mannophryne larandina* (Yústiz, 1991)*
- 120. *Mannophryne leonardo* Manzanilla, La Marca, Jowers, Sánchez and García-París, 2007*
- 121. *Mannophryne molinai* Rojas-Runjaic, Matta-Pereira and La Marca, 2018*
- 122. *Mannophryne neblina* (Test, 1956)*
- 123. *Mannophryne oblitterata* (Rivero, 1984)*
- 124. *Mannophryne orellana* Barrio-Amorós, Santos and Molina, 2010*
- 125. *Mannophryne riveroi* (Donoso-Barros, 1965)*
- 126. *Mannophryne speeri* La Marca, 2009*
- 127. *Mannophryne trujillensis* Vargas and La Marca, 2007*
- 128. *Mannophryne urticans* Barrio-Amorós, Santos and Molina, 2010*
- 129. *Mannophryne venezuelensis* Manzanilla, Jowers, La Marca and García-París, 2007*
- 130. *Mannophryne vulcano* Barrio-Amorós, Santos and Molina, 2010*
- 131. *Mannophryne yustizi* (La Marca, 1989)*
- 132. *Mannophryne* sp. 1
- 133. *Mannophryne* sp. 2

Subfamily Dendrobatinae Cope, 1865

Genus *Ameerega* Bauer, 1986

- 134. *Ameerega picta* (Tschudi, 1838)
- 135. *Ameerega trivittata* (Spix, 1824)

Genus *Dendrobates* Wagler, 1830

- 136. *Dendrobates leucomelas* Steindachner, 1864

Genus *Minyobates* Myers, 1997

- 137. *Minyobates steyermarki* Rivero, 1971*

Family Eleutherodactylidae Lutz, 1954

Subfamily Eleutherodactylinae Lutz, 1954

Genus *Eleutherodactylus* Duméril and Bribon, 1841

- 138. *Eleutherodactylus johnstonei* Barbour, 1914

Subfamily Phyzelaphryninae Hedges, Duellman and Heinicke, 2008

Genus *Adelophryne* Hoogmoed and Lescure, 1984

- 139. *Adelophryne gutturosa* Hoogmoed and Lescure, 1984

Family Hemiphractidae Peters, 1862

Genus *Cryptobatrachus* Ruthven, 1916

140. *Cryptobatrachus remotus* Infante, Rojas-Ruijac and Barrio-Amorós, 2009*

Genus *Flectonotus* Miranda-Ribeiro, 1920

141. *Flectonotus fitzgeraldi* (Parker, 1933)
142. *Flectonotus pygmaeus* (Boettger, 1893)

Genus *Gastrotheca* Fitzinger, 1843

143. *Gastrotheca helenae* Dunn, 1944
144. *Gastrotheca nicefori* Gaige, 1933
145. *Gastrotheca ovifera* Lichtenstein and Weinland, 1854*
146. *Gastrotheca walkeri* Duellman, 1980*
147. *Gastrotheca williamsoni* Gaige, 1922*
148. *Gastrotheca yacambuensis* Yústiz, 1976*

Genus *Stefania* Rivero, 1968

149. *Stefania breweri* Barrio-Amoros and Fuentes, 2003*
150. *Stefania ginesi* Rivero, 1968*
151. *Stefania goini* Rivero, 1968*
152. *Stefania marahuaquensis* (Rivero, 1961)*
153. *Stefania oculosa* Señaris, Ayarzagüena and Gorzula, 1997*
154. *Stefania percristata* Señaris, Ayarzagüena and Gorzula, 1997*
155. *Stefania riae* Duellman and Hoogmoed, 1984*
156. *Stefania riveroi* Señaris, Ayarzagüena and Gorzula, 1997*
157. *Stefania satelles* Señaris, Ayarzagüena and Gorzula, 1997*
158. *Stefania scalae* Rivero, 1970*
159. *Stefania schuberti* Señaris, Ayarzagüena and Gorzula, 1997*
160. *Stefania tamacuarina* Myers and Donnelly, 1997

Family Hylidae Rafinesque, 1815

Subfamily Cophomantinae Hoffmann, 1878

Genus *Hyloscirtus* Peters, 1882

161. *Hyloscirtus jahni* (Rivero, 1961)*
162. *Hyloscirtus japreria* Rojas-Runjaic, Infante-Rivero, Salerno and Meza-Joya, 2018
163. *Hyloscirtus lascinius* (Rivero, 1969)*
164. *Hyloscirtus platydactylus* (Boulenger, 1905)*

Genus *Boana* Wagler, 1830

165. *Boana alemani* (Rivero, 1964)*
166. *Boana benitezi* (Rivero, 1961)*
167. *Boana boans* (Linnaeus, 1758)
168. *Boana calcarata* (Troschel, 1848)
169. *Boana cinerascens* (Spix, 1824)
170. *Boana geographica* (Spix, 1824)
171. *Boana hobbsi* (Cochran and Goin, 1970)
172. *Boana jimenezi* Señaris and Ayarzagüena, 2006*
173. *Boana lanciformis* (Cope, 1870)
174. *Boana lemai* (Rivero, 1971)

Catalogue of the amphibians of Venezuela

- 175. *Boana multifasciata* (Günther, 1859)
- 176. *Boana ornatissima* (Noble, 1923)
- 177. *Boana pugnax* (Schmidt, 1857)
- 178. *Boana punctata* (Schneider, 1799)
- 179. *Boana roraima* Duellman and Hoogmoed, 1992
- 180. *Boana rhythmica* (Señaris and Ayarzagüena, 2002)*
- 181. *Boana sibleszi* (Rivero, 1971)
- 182. *Boana tepuiana* Barrio-Amorós and Brewer-Carías, 2008
- 183. *Boana wavrini* (Parker, 1936)
- 184. *Boana xerophylla* (Duméril and Bibron, 1841)
- 185. *Boana* sp. (cf. *rufitela*)

Genus *Myersiohyla* Faivovich, Haddad, García, Frost, Campbell and Wheeler, 2005

- 186. *Myersiohyla aromatica* (Ayarzagüena and Señaris, 1994)*
- 187. *Myersiohyla chamaeleo* Faivovich, McDiarmid and Myers, 2013*
- 188. *Myersiohyla inparquesi* (Ayarzagüena and Señaris, 1994)*
- 189. *Myersiohyla loveridgei* (Rivero, 1961)*
- 190. *Myersiohyla neblinaria* Faivovich, McDiarmid and Myers, 2013*

Subfamily Dendropsophinae Fitzinger, 1843

Genus *Dendropsophus* Fitzinger, 1843

- 191. *Dendropsophus amicornum* (Mijares-Urrutia, 1998)*
- 192. *Dendropsophus battersbyi* (Rivero, 1961)*
- 193. *Dendropsophus luteocellatus* (Roux, 1927)*
- 194. *Dendropsophus marmoratus* (Laurenti, 1768)
- 195. *Dendropsophus meridensis* (Rivero, 1961)*
- 196. *Dendropsophus microcephalus* (Cope, 1886)
- 197. *Dendropsophus minusculus* (Rivero, 1971)
- 198. *Dendropsophus* aff. *minusculus* (Peters, 1872)
- 199. *Dendropsophus parviceps* (Boulenger, 1882)
- 200. *Dendropsophus pelidnus* (Duellman, 1989)
- 201. *Dendropsophus sarayacuensis* (Shreve, 1935)
- 202. *Dendropsophus yaracuyanus* (Mijares-Urrutia and Rivero, 2000)*

Subfamily Lophyohylineae Miranda-Ribeiro, 1926

Genus *Aparasphenodon* Miranda-Ribeiro, 1920

- 203. *Aparasphenodon venezolanus* (Mertens, 1950)

Genus *Osteocephalus* Steindachner, 1862

- 204. *Osteocephalus helenae* (Ruthven, 1919)
- 205. *Osteocephalus leprieurii* (Duméril and Bibron, 1841)
- 206. *Osteocephalus* aff. *planiceps* (Ca1)
- 207. *Osteocephalus taurinus* Steindachner, 1862
- 208. *Osteocephalus* aff. *taurinus* (sp 1; Ca2)
- 209. *Osteocephalus* aff. *taurinus* (sp 2; Ca3)

Genus *Phytotriades* Jowers, Downie and Cohen, 2008

- 210. *Phytotriades auratus* (Boulenger, 1917)

Genus *Tepuihyla* Ayarzagüena, Señaris and Gorzula, 1993

- 211. *Tepuihyla aecii* (Ayarzagüena, Señaris and Gorzula, 1992)*
- 212. *Tepuihyla edelcae* (Ayarzagüena, Señaris and Gorzula, 1992)*
- 213. *Tepuihyla exophthalma* (Smith and Noonan, 2001)
- 214. *Tepuihyla luteolabris* (Ayarzagüena, Señaris and Gorzula, 1992)*
- 215. *Tepuihyla obscura* (Kok, Ratz, Tegelaar, Aubret and Means, 2015)*
- 216. *Tepuihyla rodriguezii* (Ayarzagüena, Señaris and Gorzula, 1992)

Genus *Trachycephalus* Fitzinger, 1843

- 217. *Trachycephalus resinifictrix* (Goeldi, 1907)
- 218. *Trachycephalus typhonius* (Laurenti, 1768)

Subfamily Pseudinae Fitzinger, 1843

Genus *Pseudis* Wagler, 1830

- 219. *Pseudis paradoxa* (Linnaeus, 1758)

Genus *Scarthyla* Duellman et de Sá, 1988

- 220. *Scarthyla vigilans* (Solano, 1971)

Subfamily Scinaxinae Duellman, Marion and Hedges, 2016

Genus *Scinax* Wagler, 1830

- 221. *Scinax baumgardneri* (Rivero, 1961)*
- 222. *Scinax boesemani* (Goin, 1966)
- 223. *Scinax danae* (Duellman, 1986)*
- 224. *Scinax exiguus* (Duellman, 1986)*
- 225. *Scinax fuscomarginatus* (Lutz, 1925)
- 226. *Scinax garbei* (Miranda-Ribeiro, 1926)
- 227. *Scinax kennedyi* (Pyburn, 1973)
- 228. *Scinax manriquei* Barrio-Amorós, Orellana and Chacón, 2004
- 229. *Scinax nebulosus* (Spix, 1824)
- 230. *Scinax rostratus* (Peters, 1863)
- 231. *Scinax ruber* (Laurenti, 1768)
- 232. *Scinax wandae* (Pyburn and Fouquette, 1971)
- 233. *Scinax x-signatus* (Spix, 1824)

Genus *Sphaenorhynchus* Tschudi, 1838

- 234. *Sphaenorhynchus lacteus* Daudin, 1802

Family Leptodactylidae Werner, 1896

Subfamily Leiuperinae Bonaparte, 1850

Genus *Engystomops* Jiménez de la Espada, 1872

- 235. *Engystomops pustulosus* (Cope, 1864)

Genus *Physalaemus* Fitzinger, 1826

Catalogue of the amphibians of Venezuela

- 236. *Physalaemus cuvieri* (Fitzinger, 1826)
- 237. *Physalaemus ephippifer* (Steindachner, 1864)
- 238. *Physalaemus fisheri* (Boulenger, 1890)

Genus *Pleurodema* Tschudi, 1838

- 239. *Pleurodema brachyops* (Cope, 1869)

Genus *Pseudopaludicola* Miranda-Ribeiro, 1926

- 240. *Pseudopaludicola boliviana* Parker, 1927
- 241. *Pseudopaludicola llanera* Lynch, 1989
- 242. *Pseudopaludicola pusilla* (Ruthven, 1916)

Subfamily Leptodactylinae Werner, 1896

Genus *Adenomera* Fitzinger, 1867

- 243. *Adenomera andreae* (Müller, 1923)
- 244. *Adenomera hylaedactyla* (Cope, 1868)
- 245. *Adenomera* cf. *simonstuarti* (Angulo and Icochea, 2010)
- 246. *Adenomera* sp. 1

Genus *Leptodactylus* Fitzinger, 1826

- 247. *Leptodactylus bolivianus* Boulenger, 1898
- 248. *Leptodactylus colombiensis* Heyer, 1994
- 249. *Leptodactylus diedrus* Heyer, 1994
- 250. *Leptodactylus fragilis* (Brocchi, 1877)
- 251. *Leptodactylus fuscus* (Schneider, 1799)
- 252. *Leptodactylus guianensis* Heyer and de Sá, 2011
- 253. *Leptodactylus insularum* Barbour, 1906
- 254. *Leptodactylus knudseni* Heyer, 1972
- 255. *Leptodactylus leptodactyloides* (Andersson, 1945)
- 256. *Leptodactylus lithonaetes* Heyer, 1996
- 257. *Leptodactylus longirostris* Boulenger, 1882
- 258. *Leptodactylus* aff. *macrosternum* Miranda-Ribeiro, 1926
- 259. *Leptodactylus magistris* Mijares-Urrutia, 1997*
- 260. *Leptodactylus mystaceus* (Spix, 1824)
- 261. *Leptodactylus pentadactylus* (Laurenti, 1768)
- 262. *Leptodactylus petersii* (Steindachner, 1864)
- 263. *Leptodactylus poecilochilus* (Cope, 1862)
- 264. *Leptodactylus rhodomystax* Boulenger, 1884
- 265. *Leptodactylus riveroi* Heyer and Pyburn, 1983
- 266. *Leptodactylus rugosus* Noble, 1923
- 267. *Leptodactylus sabanensis* Heyer, 1994
- 268. *Leptodactylus turimiquensis* Heyer, 2005*
- 269. *Leptodactylus validus* Garman, 1888
- 270. *Leptodactylus* sp. 1

Genus *Lithodytes* Fitzinger, 1843

- 271. *Lithodytes lineatus* (Schneider, 1799)

Family Microhylidae Günther, 1858

Genus *Adelastes* Zweifel, 1986

272. *Adelastes hylonomos* Zweifel, 1986*

Subfamily Gastrophryinae Fitzinger, 1843

Genus *Chiasmocleis* Méhely, 1904

273. *Chiasmocleis hudsoni* Parker, 1940

Genus *Ctenophryne* Mocquard, 1904

274. *Ctenophryne geayi* Mocquard, 1904

Genus *Elachistocleis* Parker, 1927

275. *Elachistocleis ovalis* (Schneider, 1799)

276. *Elachistocleis pearsei* (Ruthven, 1914)

277. *Elachistocleis surinamensis* (Daudin, 1802)

Genus *Hamptophryne* Carvalho, 1954

278. *Hamptophryne boliviana* (Parker, 1927)

Subfamily Otophryninae Wassersug and Pyburn, 1987

Genus *Otophryne* Boulenger in Lankaster, 1900

279. *Otophryne pyburni* Campbell and Clarke, 1998

280. *Otophryne robusta* Boulenger, 1900

281. *Otophryne steyermarki* Rivero, 1968

Genus *Synapturanus* Carvalho, 1954

282. *Synapturanus mirandaribeiroi* Nelson and Lescure, 1975

283. *Synapturanus salseri* Pyburn, 1975

Family Phyllomedusidae Günther 1859

Genus *Agalychnis* Cope, 1864

284. *Agalychnis medinae* (Funkhouser, 1962)*

Genus *Callimedusa* Duellman, Marion and Hedges, 2016

285. *Callimedusa tomopterna* (Cope, 1868)

Genus *Pithecopus* Cope, 1866

286. *Pithecopus hypochondrialis* (Daudin, 1802)

Genus *Phyllomedusa* Wagler, 1830

287. *Phyllomedusa bicolor* (Boddaert, 1772)

Catalogue of the amphibians of Venezuela

- 288. *Phyllomedusa neildi* Barrio-Amorós, 2006*
- 289. *Phyllomedusa tarsius* (Cope, 1868)
- 290. *Phyllomedusa trinitatis* Mertens, 1926
- 291. *Phyllomedusa vaillanti* Boulenger, 1882
- 292. *Phyllomedusa venusta* Duellman and Trueb, 1971

Family Pipidae Gray, 1825

Genus *Pipa* Laurenti, 1768

- 293. *Pipa arrabali* Izecksohn, 1976
- 294. *Pipa parva* Ruthven and Gaige, 1923
- 295. *Pipa pipa* (Linnaeus, 1758)

Family Ranidae Rafinesque-Schmaltz, 1814

Genus *Lithobates* Fitzinger, 1843

- 296. *Lithobates catesbeianus* (Shaw, 1802)
- 297. *Lithobates palmipes* (Spix, 1824)

Family Strabomantidae Hedges, Duellman and Heinicke, 2008

Incertae sedis

Genus *Dischidodactylus* Lynch, 1979

- 298. *Dischidodactylus colonnelloi* Ayarzagüena, 1985*
- 299. *Dischidodactylus duidensis* (Rivero, 1968)*

Subfamily Pristimantinae Ohler and Dubois, 2012

Genus *Pristimantis* Jiménez de la Espada, 1871

- 300. *Pristimantis abakapa* Rojas-Runjaic, Salerno, Señaris and Pauly, 2013*
- 301. *Pristimantis ameliae* Barrio-Amorós, 2011*
- 302. *Pristimantis anolirex* (Lynch, 1983)
- 303. *Pristimantis anotis* (Walker and Test, 1955)*
- 304. *Pristimantis aureoventris* Kok, Means and Bossuyt, 2011
- 305. *Pristimantis auricarens* (Myers and Donnelly, 2008)*
- 306. *Pristimantis avius* (Myers and Donnelly, 1997)*
- 307. *Pristimantis bicumulus* (Peters, 1864)*
- 308. *Pristimantis boconoensis* (Rivero and Mayorga, 1973)*
- 309. *Pristimantis briceni* (Boulenger, 1903)*
- 310. *Pristimantis cantitans* (Myers and Donnelly, 1996)*
- 311. *Pristimantis colostichos* (La Marca and Smith, 1982)*
- 312. *Pristimantis conservatio* Barrio-Amorós, Heinicke and Hedges, 2013*
- 313. *Pristimantis culatensis* (La Marca, 2007)*
- 314. *Pristimantis fasciatus* Barrio-Amorós, Rojas-Runjaic and Infante, 2007*
- 315. *Pristimantis flabellidiscus* (La Marca, 2007)*
- 316. *Pristimantis geminus* Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*
- 317. *Pristimantis ginesi* (Rivero, 1964)*
- 318. *Pristimantis gryllus* Barrio-Amorós, Guayasamín and Hedges, 2012
- 319. *Pristimantis guaiquinimensis* (Schlüter and Rödder, 2007)*
- 320. *Pristimantis hoogmoedi* Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*

321. *Pristimantis imthurni* Kok, 2013*
322. *Pristimantis incertus* (Lutz, 1927)*
323. *Pristimantis jabonensis* (La Marca, 2007)*
324. *Pristimantis jamescameroni* Kok, 2013*
325. *Pristimantis lancinii* (Donoso-Barros, 1965)*
326. *Pristimantis lassoalcalai* Barrio-Amorós, Rojas-Runjaic and Barros, 2010*
327. *Pristimantis longicorpus* Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*
328. *Pristimantis marahuaka* (Fuentes and Barrio-Amorós, 2004)*
329. *Pristimantis marmoratus* (Boulenger, 1900)
330. *Pristimantis melanoproctus* (Rivero, 1984)*
331. *Pristimantis memorans* (Myers and Donnelly, 1997)*
332. *Pristimantis mondolfii* (Rivero, 1984)*
333. *Pristimantis muchimuk* Barrio-Amorós, Mesa, Brewer-Carías and McDiarmid, 2010*
334. *Pristimantis nicefori* (Cochran and Goin, 1970)
335. *Pristimantis nubisilva* Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*
336. *Pristimantis paramerus* (Rivero, 1984)*
337. *Pristimantis pariagnomus* Kaiser, Barrio-Amorós, Rivas-Fuenmayor, Steilein and Schmidt, 2015*
338. *Pristimantis pedimontanus* (La Marca, 2004)*
339. *Pristimantis pleurostriatus* Rivero, 1984*
340. *Pristimantis pruinatus* Myers and Donnelly, 1996*
341. *Pristimantis pulvinatus* Rivero, 1984*
342. *Pristimantis reticulatus* Walker and Test, 1955*
343. *Pristimantis rhigophilus* (La Marca, 2007)*
344. *Pristimantis rivasi* Barrio-Amorós, Rojas-Runjaic and Barros, 2010*
345. *Pristimantis riveroi* Lynch and La Marca, 1993*
346. *Pristimantis rozei* Rivero, 1961*
347. *Pristimantis sarisarinama* Barrio-Amorós and Brewer-Carías, 2008*
348. *Pristimantis stenodiscus* (Walker and Test, 1955)*
349. *Pristimantis telefericus* La Marca, 2005*
350. *Pristimantis thyellus* (La Marca, 2007)*
351. *Pristimantis tubernasus* Rivero, 1984 *
352. *Pristimantis turik* Barrio-Amorós, Rojas-Runjaic and Infante, 2007*
353. *Pristimantis turumiquirensis* Rivero, 1961*
354. *Pristimantis vanadisae* La Marca, 1984*
355. *Pristimantis vilarsi* Melin, 1941
356. *Pristimantis yaviensis* Myers and Donnelly, 1996*
357. *Pristimantis yukpa* Barrio-Amorós, Rojas-Runjaic and Infante, 2007*
358. *Pristimantis yuruaniensis* Rödder and Jungfer, 2008*
359. *Pristimantis yustizi* Barrio-Amorós and Chacón, 2004*
360. *Pristimantis zeuctotylus* Lynch and Hoogmoed, 1977
361. *Pristimantis* sp. 1
362. *Pristimantis* sp. 2
363. *Pristimantis* sp. 3
364. *Pristimantis* sp. 4
365. *Pristimantis* sp. 5
366. *Pristimantis* sp. 6
367. *Pristimantis* sp. 7
368. *Pristimantis* sp. 8

Subfamily Strabomantinae Hedges, Duellman and Heinicke, 2008

Genus *Strabomantis* Cope, 1862

369. *Strabomantis biporcatus* (W. Peters, 1863)*

Catalogue of the amphibians of Venezuela

Order URODELA Duméril, 1805

Family Plethodontidae Gray, 1850

Subfamily Hemidactylinae Hallowell, 1856

Genus *Bolitoglossa* Duméril, Bibron and Duméril, 1854

- 370. *Bolitoglossa* cf. *altamazonica* (Cope, 1884)
- 371. *Bolitoglossa borburata* Trapido, 1942*
- 372. *Bolitoglossa guaramacalensis* Schargel, García-Pérez and Smith, 2002*
- 373. *Bolitoglossa leandrae* Acevedo, Wake, Marquez, Silva, Franco and Amezcuita, 2013
- 374. *Bolitoglossa mucuyensis* García-Gutiérrez, Escalona, Mora, Díaz de Pascual and Fermín, 2013*
- 375. *Bolitoglossa orestes* Brame and Wake, 1962*
- 376. *Bolitoglossa tamaense* Acevedo, Wake, Márquez, Silva, Franco and Amézquita, 2013

Order GYMOPHIONA Müller, 1831

Family Caeciliidae Rafinesque, 1814

Genus *Caecilia* Linnaeus, 1758

- 377. *Caecilia flavopunctata* Roze and Solano, 1963*
- 378. *Caecilia subnigricans* Dunn, 1942
- 379. *Caecilia tentaculata* Linnaeus, 1758

Family Rhinatrematidae Nussbaum, 1977

Genus *Epicrionops* Boulenger, 1883

- 380. *Epicrionops niger* (Dunn, 1942)

Family Siphonopidae Bonaparte, 1850

Genus *Microcaecilia* Taylor, 1968

- 381. *Microcaecilia rabei* (Roze and Solano, 1963)*

Genus *Siphonops* Wagler, 1830

- 382. *Siphonops annulatus* (Mikan, 1820)

Family Typhlonectidae Taylor, 1968

Genus *Nectocaecilia* Taylor, 1968

- 383. *Nectocaecilia petersii* (Boulenger, 1882)

Genus *Potomotyphlus* Taylor, 1968

- 384. *Potomotyphlus kaupii* (Berthold, 1858)

Genus *Typhlonectes* Peters, 1879

- 385. *Typhlonectes natans* (Fisher, 1879)
- 386. *Typhlonectes compressicauda* Dumeril and Bibron, 1841

Appendix 3. List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

Species	1	2	3	4	5	6
<i>Allophryne ruthveni</i>				X	X	
<i>Amazophrynella minuta</i>				X		
<i>Atelopus carbonerensis</i> *	X					
<i>Atelopus chrysocorallus</i> *	X					
<i>Atelopus cruciger</i> *		X				
<i>Atelopus mucubajiensis</i> *	X					
<i>Atelopus oxyrhynchus</i> *	X					
<i>Atelopus pinangoi</i> *	X					
<i>Atelopus sorianoi</i> *	X					
<i>Atelopus tamaense</i>	X					
<i>Atelopus vogli</i> *		X				
<i>Atelopus</i> sp.1*	X					
<i>Atelopus</i> sp. 2*	X					
<i>Metaphryniscus sosae</i> *					X	
<i>Oreophrynella cryptica</i> *					X	
<i>Oreophrynella huberi</i> *					X	
<i>Oreophrynella macconelli</i>					X	
<i>Oreophrynella nigra</i> *					X	
<i>Oreophrynella quelchii</i>					X	
<i>Oreophrynella vasquezii</i> *					X	
<i>Rhaebo glaberrimus</i>	X					
<i>Rhaebo guttatus</i>				X	X	
<i>Rhaebo haematiticus</i>	X					
<i>Rhaebo nasicus</i>					X	
<i>Rhinella beebei</i>			X		X	X
<i>Rhinella ceratophrys</i>					X	
<i>Rhinella margaritifera</i>	X	X		X	X	
<i>Rhinella marina</i>	X	X	X	X	X	X
<i>Rhinella merianae</i>					X	
<i>Rhinella nattereri</i>					X	
<i>Rhinella</i> cf. <i>proboscidea</i>					X	
<i>Rhinella sclerocephala</i> *		X				
<i>Rhinella sternosignata</i>	X	X				
<i>Centrolene altitudinale</i> *	X					
<i>Centrolene daidalea</i>	X					
<i>Centrolene notosticta</i>	X					
<i>Centrolene venezuelensis</i> *	X					
" <i>Cochranella</i> " <i>duidaeana</i> *					X	
" <i>Cochranella</i> " <i>riveroi</i> *					X	
" <i>Cochranella</i> " sp. 1*					X	

Catalogue of the amphibians of Venezuela

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Espadarana andina</i>	X					
<i>Vitreorana antisthenesi</i> *		X				
<i>Vitreorana castroviejoii</i> *		X				
<i>Vitreorana gorzulae</i>					X	
<i>Vitreorana helenae</i>					X	
<i>Celsiella revocata</i> *		X				
<i>Celsiella vozmedianoi</i> *		X				
<i>Hyalinobatrachium cappellei</i>					X	
<i>Hyalinobatrachium durantii</i> *	X					
<i>Hyalinobatrachium fragile</i> *		X				
<i>Hyalinobatrachium guairarepanensis</i> *		X				
<i>Hyalinobatrachium iaspidiensis</i>					X	
<i>Hyalinobatrachium mesai</i> *					X	
<i>Hyalinobatrachium mondolfii</i>				X		
<i>Hyalinobatrachium orientale</i>		X				
<i>Hyalinobatrachium orocostale</i> *		X				
<i>Hyalinobatrachium pallidum</i> *	X					
<i>Hyalinobatrachium tatayoi</i> *	X					
<i>Hyalinobatrachium taylori</i>					X	
<i>Ceratophrys calcarata</i>			X			X
<i>Ceuthomantis aracamuni</i> *					X	
<i>Ceuthomantis cavernibardus</i>					X	
<i>Ceuthomantis duellmani</i> *					X	
<i>Dischidodactylus colonnelloi</i> *					X	
<i>Dischidodactylus duidensis</i> *					X	
<i>Pristimantis abakapa</i> *					X	
<i>Pristimantis ameliae</i> *	X					
<i>Pristimantis anolirex</i>	X					
<i>Pristimantis anotis</i> *		X				
<i>Pristimantis aureoventris</i>					X	
<i>Pristimantis auricarens</i> *					X	
<i>Pristimantis avius</i> *					X	
<i>Pristimantis bicumulus</i> *		X				
<i>Pristimantis boconoensis</i> *	X					
<i>Pristimantis briceni</i> *	X					
<i>Pristimantis cantitans</i> *					X	
<i>Pristimantis colostichos</i> *	X					
<i>Pristimantis conservatio</i> *	X					
<i>Pristimantis culatensis</i> *	X					
<i>Pristimantis fasciatus</i> *	X					
<i>Pristimantis flabellidiscus</i> *	X					

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Pristimantis geminus</i> *		X				
<i>Pristimantis ginesi</i> *	X					
<i>Pristimantis gryllus</i>	X					
<i>Pristimantis guaiquinimensis</i> *					X	
<i>Pristimantis hoogmoedi</i> *		X				
<i>Pristimantis imthurni</i> *					X	
<i>Pristimantis incertus</i> *		X				
<i>Pristimantis jamescameroni</i> *					X	
<i>Pristimantis lassocalcai</i> *	X					
<i>Pristimantis lancinii</i> *	X					
<i>Pristimantis longicarpus</i> *		X				
<i>Pristimantis marahuaka</i> *					X	
<i>Pristimantis marmoratus</i>					X	
<i>Pristimantis melanoproctus</i>	X					
<i>Pristimantis memorans</i>					X	
<i>Pristimantis mondolfii</i>	X					
<i>Pristimantis muchimuk</i> *					X	
<i>Pristimantis nicefori</i>	X					
<i>Pristimantis nubisilva</i> *		X				
<i>Pristimantis paramerus</i> *	X					
<i>Pristimantis pariagnomus</i> *		X				
<i>Pristimantis pedimontanus</i> *	X					
<i>Pristimantis pleurostriatus</i> *	X					
<i>Pristimantis pruinatus</i> *					X	
<i>Pristimantis pulvinatus</i>					X	
<i>Pristimantis reticulatus</i> *		X				
<i>Pristimantis rhigophilus</i> *	X					
<i>Pristimantis rivasi</i> *	X					
<i>Pristimantis riveroi</i> *		X				
<i>Pristimantis rozei</i> *		X				
<i>Pristimantis sarisarinama</i> *					X	
<i>Pristimantis stenodiscus</i> *		X				
<i>Pristimantis telefericus</i> *	X					
<i>Pristimantis thyellus</i> *	X					
<i>Pristimantis tubernasus</i>	X					
<i>Pristimantis turik</i> *	X					
<i>Pristimantis turumiquirensis</i> *		X				
<i>Pristimantis vanadisae</i> *	X					
<i>Pristimantis vilarsi</i>					X	
<i>Pristimantis yaviensis</i> *					X	
<i>Pristimantis yukpa</i> *	X					

Catalogue of the amphibians of Venezuela

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Pristimantis yuruaniensis</i> *					X	
<i>Pristimantis yustizi</i> *	X					
<i>Pristimantis zeuctotylus</i>				X		
<i>Pristimantis</i> sp. 1*	X					
<i>Pristimantis</i> sp. 2*	X					
<i>Pristimantis</i> sp. 3*	X					
<i>Pristimantis</i> sp. 4*					X	
<i>Pristimantis</i> sp. 5*					X	
<i>Pristimantis</i> sp. 6*					X	
<i>Pristimantis</i> sp. 7*					X	
<i>Pristimantis</i> sp. 8*					X	
<i>Tachiramantis lentiginosus</i>	X					
<i>Tachiramantis prolixodiscus</i>	X					
<i>Strabomantis biporcatus</i> *		X				
" <i>Prostherapis</i> " <i>dunni</i> *		X				
<i>Allobates algorei</i> *	X					
<i>Allobates bromelicola</i> *		X				
<i>Allobates caribe</i> *		X				
<i>Allobates femoralis</i>					X	
<i>Allobates humilis</i> *	X					
<i>Allobates mandelorum</i> *		X				
<i>Allobates</i> aff. <i>marchesianus</i>				X		
<i>Allobates pittieri</i> *	X	X				
<i>Allobates sanmartini</i> *					X	
<i>Allobates undulatus</i> *					X	
<i>Anomaloglossus ayarzaguenai</i> *					X	
<i>Anomaloglossus breweri</i> *					X	
<i>Anomaloglossus guanayensis</i> *					X	
<i>Anomaloglossus moffetti</i> *					X	
<i>Anomaloglossus murisipanensis</i> *					X	
<i>Anomaloglossus parimae</i> *					X	
<i>Anomaloglossus parkerae</i> *					X	
<i>Anomaloglossus praderioi</i>					X	
<i>Anomaloglossus roraima</i>					X	
<i>Anomaloglossus rufulus</i> *					X	
<i>Anomaloglossus shrevei</i> *					X	
<i>Anomaloglossus tamacuarensis</i>					X	
<i>Anomaloglossus tepuyensis</i> *					X	
<i>Anomaloglossus triunfo</i> *					X	
<i>Anomaloglossus verbeeksnyderorum</i> *					X	
<i>Anomaloglossus wothuja</i> *					X	

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Aromobates alboguttatus</i> *	X					
<i>Aromobates cannatellai</i> *	X					
<i>Aromobates capurinensis</i> *	X					
<i>Aromobates duranti</i> *	X					
<i>Aromobates ericksonae</i> *	X					
<i>Aromobates haydeae</i> *	X					
<i>Aromobates inflexus</i> *	X					
<i>Aromobates leopardalis</i> *	X					
<i>Aromobates mayorgai</i> *	X					
<i>Aromobates meridensis</i> *	X					
<i>Aromobates molinarii</i> *	X					
<i>Aromobates nocturnus</i> *	X					
<i>Aromobates ornatissimus</i> *	X					
<i>Aromobates orostoma</i> *	X					
<i>Aromobates serranus</i> *	X					
<i>Aromobates saltuensis</i> *	X					
<i>Aromobates tokuko</i> *	X					
<i>Aromobates walterarpi</i> *	X					
<i>Aromobates zippeli</i> *	X					
<i>Aromobates</i> sp. 1*	X					
<i>Mannophryne caquetio</i> *		X				
<i>Mannophryne collaris</i> *	X					
<i>Mannophryne cordilleriana</i> *	X					
<i>Mannophryne herminae</i> *		X				
<i>Mannophryne lamarcai</i> *		X				
<i>Mannophryne larandina</i> *	X					
<i>Mannophryne leonardo</i> *		X				
<i>Mannophryne molinai</i> *		X				
<i>Mannophryne neblina</i> *		X				
<i>Mannophryne oblitterata</i> *		X				
<i>Mannophryne orellana</i> *	X					
<i>Mannophryne riveroi</i> *		X				
<i>Mannophryne speeri</i> *	X					
<i>Mannophryne trujillensis</i> *	X					
<i>Mannophryne urticans</i> *	X					
<i>Mannophryne venezuelensis</i> *		X				
<i>Mannophryne vulcano</i> *		X				
<i>Mannophryne yustizi</i> *	X					
<i>Mannophryne</i> sp. 1*		X				
<i>Mannophryne</i> sp. 2*		X				
<i>Ameerega picta</i>						X

Catalogue of the amphibians of Venezuela

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Ameerega trivittata</i>					X	
<i>Dendrobates leucomelas</i>				X	X	
<i>Minyobates steyermarki</i> *					X	
<i>Eleutherodactylus johnstonei</i>		X				
<i>Adelophryne gutturosa</i>					X	
<i>Cryptobatrachus remotus</i> *	X					
<i>Flectonotus fitzgeraldi</i>		X				
<i>Flectonotus pygmaeus</i>	X	X				
<i>Gastrotheca helenae</i>	X					
<i>Gastrotheca nicefori</i>	X					
<i>Gastrotheca ovifera</i> *		X				
<i>Gastrotheca walkeri</i> *		X				
<i>Gastrotheca williamsoni</i> *		X				
<i>Gastrotheca yacambuensis</i> *	X					
<i>Stefania breweri</i> *					X	
<i>Stefania ginesi</i> *					X	
<i>Stefania goini</i> *					X	
<i>Stefania marahuaquensis</i> *					X	
<i>Stefania oculosa</i> *					X	
<i>Stefania percristata</i> *					X	
<i>Stefania riae</i> *					X	
<i>Stefania riveroi</i> *					X	
<i>Stefania satelles</i> *					X	
<i>Stefania scalae</i>					X	
<i>Stefania schuberti</i> *					X	
<i>Stefania tamacuarina</i>					X	
<i>Aparasphenodon venezolanus</i>				X		
<i>Dendropsophus amicornum</i> *		X				
<i>Dendropsophus battersbyi</i> *		X				
<i>Dendropsophus luteoocellatus</i>	X	X				
<i>Dendropsophus marmoratus</i>				X	X	
<i>Dendropsophus meridensis</i> *	X					
<i>Dendropsophus microcephalus</i>			X			X
<i>Dendropsophus minusculus</i>		X	X	X	X	
<i>Dendropsophus aff. minutus</i>	X	X		X		
<i>Dendropsophus parviceps</i>				X	X	
<i>Dendropsophus pelidnus</i>	X					
<i>Dendropsophus sarayacuensis</i>				X	X	
<i>Dendropsophus yaracuyanus</i> *		X				
<i>Hyloscirtus jahni</i> *	X					
<i>Hyloscirtus japreria</i>	X					

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Hyloscirtus lascinius</i>	X					
<i>Hyloscirtus platydactylus</i>	X					
<i>Boana alemani</i> *		X				
<i>Boana benitezi</i> *					X	
<i>Boana boans</i>	X	X	X	X	X	
<i>Boana calcarata</i>				X	X	
<i>Boana cinerascens</i>				X	X	
<i>Boana geographica</i>				X	X	
<i>Boana hobbsi</i>				X		
<i>Boana jimenezi</i> *					X	
<i>Boana lanciformis</i>	X	X	X	X		
<i>Boana lemai</i>					X	
<i>Boana multifasciata</i>					X	
<i>Boana ornatissima</i>					X	
<i>Boana pugnax</i>	X		X			X
<i>Boana punctata</i>			X		X	
<i>Boana roraima</i>					X	
<i>Boana rhythmica</i> *					X	
<i>Boana sibleszi</i>					X	
<i>Boana tepuiana</i>					X	
<i>Boana wavrini</i>				X		
<i>Boana xerophylla</i>	X	X	X	X	X	X
<i>Boana</i> sp. (cf. <i>rufitelus</i>)		X				
<i>Myersiohyla aromatica</i> *					X	
<i>Myersiohyla chamaeleo</i> *					X	
<i>Myersiohyla inparquesi</i> *					X	
<i>Myersiohyla loveridgei</i> *					X	
<i>Myersiohyla neblinaria</i> *					X	
<i>Osteocephalus helenae</i>					X	
<i>Osteocephalus leprieurii</i>				X	X	
<i>Osteocephalus</i> aff. <i>planiceps</i> (Ca1)				X		
<i>Osteocephalus taurinus</i>				X	X	
<i>Osteocephalus</i> aff. <i>taurinus</i> (sp 1; Ca2)				X		
<i>Osteocephalus</i> aff. <i>taurinus</i> (sp 2; Ca3)				X		
<i>Phytotriades auratus</i>		X				
<i>Pseudis paradoxa</i>		X	X	X	X	X
<i>Scarthyla vigilans</i>	X	X	X			X
<i>Scinax baumgardneri</i> *				X		
<i>Scinax boesemani</i>					X	
<i>Scinax danae</i> *					X	
<i>Scinax exiguus</i> *					X	

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Scinax fuscomarginatus</i>					X	
<i>Scinax garbei</i>				X		
<i>Scinax kennedyi</i>				X		
<i>Scinax manriquei</i>	X					
<i>Scinax nebulosus</i>					X	
<i>Scinax rostratus</i>		X	X	X		X
<i>Scinax ruber</i>		X			X	
<i>Scinax wandae</i>	X		X			
<i>Scinax x-signatus</i>		X	X	X	X	X
<i>Sphaenorhynchus lacteus</i>					X	
<i>Tepuihyla aecii*</i>					X	
<i>Tepuihyla edelcae*</i>					X	
<i>Tepuihyla exophthalma</i>					X	
<i>Tepuihyla luteolabris*</i>					X	
<i>Tepuihyla obscura*</i>					X	
<i>Tepuihyla rodriguezii</i>					X	
<i>Trachycephalus resinifictrix</i>				X	X	
<i>Trachycephalus typhonius</i>	X	X	X	X	X	X
<i>Agalychnis medinae*</i>		X				
<i>Callimedusa tomopterna</i>				X	X	
<i>Phyllomedusa bicolor</i>				X	X	
<i>Phyllomedusa neildi*</i>		X				
<i>Phyllomedusa tarsius</i>	X		X			
<i>Phyllomedusa trinitatis</i>		X				
<i>Phyllomedusa venusta</i>						X
<i>Phyllomedusa vaillanti</i>				X		
<i>Pithecopus hypochondrialis</i>			X	X	X	
<i>Engystomops pustulosus</i>	X	X	X	X	X	X
<i>Physalaemus cuvieri</i>					X	
<i>Physalaemus ephippifer</i>					X	
<i>Physalaemus fisheri</i>	X	X	X	X	X	
<i>Pleurodema brachyops</i>		X	X			X
<i>Pseudopaludicola boliviana</i>				X		
<i>Pseudopaludicola llanera</i>				X		
<i>Pseudopaludicola pusilla</i>						X
<i>Adenomera andreae</i>				X	X	
<i>Adenomera hylaedactyla</i>				X	X	
<i>Adenomera cf. simonstuarti</i>	X					
<i>Adenomera</i> sp. 1				X		
<i>Leptodactylus bolivianus</i>				X		
<i>Leptodactylus colombiensis</i>	X					

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Leptodactylus diedrus</i>				X	X	
<i>Leptodactylus fragilis</i>		X	X			X
<i>Leptodactylus fuscus</i>		X	X	X	X	X
<i>Leptodactylus guianensis</i>					X	
<i>Leptodactylus insularum</i>		X	X	X		X
<i>Leptodactylus knudseni</i>				X	X	
<i>Leptodactylus leptodactyloides</i>					X	
<i>Leptodactylus lithonaetes</i>				X	X	
<i>Leptodactylus longirostris</i>					X	
<i>Leptodactylus</i> aff. <i>macrosternum</i>		X	X			
<i>Leptodactylus magistris</i> *		X				
<i>Leptodactylus mystaceus</i>				X	X	
<i>Leptodactylus pentadactylus</i>				X	X	
<i>Leptodactylus petersii</i>				X	X	
<i>Leptodactylus poecilochilus</i>		X	X			X
<i>Leptodactylus rhodomystax</i>					X	
<i>Leptodactylus riveroi</i>				X		
<i>Leptodactylus rugosus</i>					X	
<i>Leptodactylus sabanensis</i>					X	
<i>Leptodactylus turimiquensis</i>		X				
<i>Leptodactylus validus</i>		X	X	X	X	X
<i>Leptodactylus</i> sp. 1*	X					
<i>Lithodytes lineatus</i>	X			X	X	X
<i>Adelastes hylonomos</i>				X		
<i>Chiasmocleis hudsoni</i>				X		
<i>Ctenophryne geayi</i>					X	
<i>Elachistocleis ovalis</i>		X	X			
<i>Elachistocleis pearsei</i>						X
<i>Elachistocleis surinamensis</i>				X	X	
<i>Hamptophryne boliviana</i>					X	
<i>Otophryne pyburni</i>				X		
<i>Otophryne robusta</i>					X	
<i>Otophryne steyermarki</i>					X	
<i>Synapturanus mirandaribeiroi</i>					X	
<i>Synapturanus salseri</i>				X	X	
<i>Pipa arrabali</i>					X	
<i>Pipa parva</i>		X				X
<i>Pipa pipa</i>	X		X	X		
<i>Lithobates catesbeianus</i>	X					
<i>Lithobates palmipes</i>	X	X		X	X	
<i>Bolitoglossa</i> cf. <i>altamazonica</i>	X					

Appendix 3 (continued). List of amphibian species of Venezuela by biogeographic areas. 1. Andes (including Cordillera de Mérida, Venezuelan part of Cordillera Oriental de Colombia, and Sierra de Perijá); 2. Coastal Range (including eastern and western sections); 3. Llanos; 4. Amazon lowlands; 5. Guiana shield (including lowlands, uplands, and highlands); and 6. Maracaibo basin. An asterisk after name indicates species is endemic for Venezuela.

<i>Bolitoglossa borburata</i> *		X				
<i>Bolitoglossa guaramacalensis</i> *	X					
<i>Bolitoglossa leandrae</i>	X					
<i>Bolitoglossa mucuyensis</i> *	X					
<i>Bolitoglossa orestes</i> *	X					
<i>Bolitoglossa tamaense</i>	X					
<i>Caecilia flavopunctata</i> *		X				
<i>Caecilia subnigricans</i>	X	X				
<i>Caecilia tentaculata</i>	X	X		X		
<i>Epicrionops niger</i>					X	
<i>Microcaecilia rabei</i>					X	
<i>Siphonops annulatus</i>	X					
<i>Nectocaecilia petersii</i>				X		
<i>Potomotyphlus kaupii</i>			X	X	X	
<i>Typhlonectes compressicauda</i>				X		
<i>Typhlonectes natans</i>						X
Total (381)	126	89	30	71	166	24

Appendix 4. Addition of species for Venezuela between 2009 and 2018 (not including those in Appendix 1).

Species added	Reference
<i>Amazophrynella minuta</i>	Rojas-Runjaic et al. 2013
<i>Rhinella beebei</i>	Murphy et al. 2017
<i>Rhinella merianae</i>	Narvaes and Rodrigues 2009
<i>Rhinella nattereri</i>	Narvaes and Rodrigues 2009
<i>Allobates algorei</i>	Barrio-Amorós and Santos 2009
<i>Allobates femoralis</i>	Barrio-Amorós and Santos 2010
<i>Anomaloglossus veerbeeksnyderorum</i>	Barrio-Amorós et al. 2010
<i>Aromobates cannatellai</i>	Barrio-Amorós and Santos 2012
<i>Aromobates ericksonae</i>	Barrio-Amorós and Santos 2012
<i>Aromobates inflexus</i>	Barrio-Amorós and Santos 2012; this work, by implication
<i>Aromobates ornatissimus</i>	Barrio-Amorós et al. 2011
<i>Aromobates tokuko</i>	Rojas-Runjaic et al. 2011
<i>Aromobates walterarpi</i>	La Marca and Otero 2012
<i>Aromobates zippeli</i>	Barrio-Amorós and Santos 2012
<i>Mannophryne molinai</i>	Rojas-Runjaic et al. 2018
<i>Mannophryne orellana</i>	Barrio-Amorós et al. 2010b
<i>Mannophryne speeri</i>	La Marca 2009
<i>Mannophryne urticans</i>	Barrio-Amorós et al. 2010b
<i>Mannophryne vulcano</i>	Barrio-Amorós et al. 2010b
<i>Centrolene daidalea</i>	Rojas-Runjaic et al. 2010
<i>Centrolene notosticta</i>	Rojas-Runjaic et al. 2012
<i>Boana roraima</i>	Barrio-Amorós et al. 2011

Appendix 4 (continued). Addition of species for Venezuela between 2009 and 2018 (not including those in Appendix 1).

<i>Hyloscirtus japreria</i>	Rojas-Runjaic et al. 2018
<i>Myersiohyla chamaeleo</i>	Faivovich et al. 2013
<i>Myersiohyla neblinaria</i>	Faivovich et al. 2013
<i>Osteocephalus helenae</i>	Jungfer et al. 2013
<i>Phytotriades auratus</i>	Rivas and De Freitas 2015
<i>Scinax fuscomarginatus</i>	Brusquetti et al. 2014
<i>Tepuihyla exophthalma</i>	Barrio-Amorós et al. 2010h
<i>Tepuihyla obscura</i>	Kok et al. 2015
<i>Leptodactylus guianensis</i>	Heyer and De Sá 2011
<i>Leptodactylus pentadactylus</i>	De Sá et al. 2014
<i>Leptodactylus rhodomystax</i>	Camargo et al. 2016
<i>Ceuthomantis duellmani</i>	Barrio-Amorós 2010
<i>Pristimantis abakapa</i>	Rojas-Runjaic et al. 2013
<i>Pristimantis aureoventris</i>	Jablonsky et al. (2017)
<i>Pristimantis ameliae</i>	Barrio-Amorós 2011
<i>Pristimantis conservatio</i>	Barrio-Amorós et al. 2013
<i>Pristimantis geminus</i>	Kaiser et al. 2015
<i>Pristimantis gryllus</i>	Barrio-Amorós et al. 2012
<i>Pristimantis hoogmoedi</i>	Kaiser et al. 2015
<i>Pristimantis imthurni</i>	Kok 2013
<i>Pristimantis jamescameroni</i>	Kok 2013
<i>Pristimantis lassoalcalai</i>	Barrio-Amorós et al. 2010
<i>Pristimantis longicorpus</i>	Kaiser et al. 2015
<i>Pristimantis muchimuk</i>	Barrio-Amorós et al. 2010
<i>Pristimantis nubisilva</i>	Kaiser et al. 2015
<i>Pristimantis pariagnomus</i>	Kaiser et al. 2015
<i>Pristimantis rivasi</i>	Barrio-Amorós et al. 2010
<i>Bolitoglossa mucuyensis</i>	García et al. 2013
<i>Bolitoglossa leandrae</i>	Barrio-Amorós et al. 2015
<i>Bolitoglossa tamaense</i>	Barrio-Amorós et al. 2015
Genus added	Reference
<i>Tachiramantis</i>	Heinicke et al. 2015

Appendix 5. Species deleted from previous list (Barrio-Amorós 2009c) or reported after and deleted herein.

Species and reason of deleting	References
<i>Rhinella granulosa</i> (taxonomic review reveals that the former subspecies must be elevated to full species rank and <i>R. granulosa</i> is not present in Venezuela)	Narvaes and Rodrigues 2009
<i>Rhinella humboldti</i> (confused with <i>R. beebei</i> , the latter recovered from synonymy of <i>R. humboldti</i>), could be present in the Maracaibo lake basin	Murphy et al. 2017
<i>Cochranella oyampiensis</i> (confused with <i>C. helenae</i>)	Señaris 1997; Kok and Castroviejo 2008
<i>Hyalinobatrachium crurifasciatum</i> (synonym of <i>H. cappellei</i>)	Castroviejo-Fisher et al. 2011

Appendix 5 (continued). Species deleted from previous list (Barrio-Amorós 2009c) or reported after and deleted herein.

<i>Hyalinobatrachium eccentricum</i> (synonym of <i>H. cappellei</i>)	Castroviejo-Fisher et al. 2011
<i>Hyalinobatrachium ibama</i> (confused with and probably synonym of <i>H. pallidum</i>)	This work
<i>Hyalinobatrachium igniocolus</i> (synonym of <i>H. cappellei</i>)	Castroviejo-Fisher et al. 2011
<i>Allobates</i> aff. <i>brunneus</i> (confused with <i>A. aff. marchesianus</i>)	This work
<i>Hyloscirtus estevesi</i> (confused with a described <i>Hyloscirtus</i> ; synonym of <i>H. jahni</i>)	This work
<i>Hypsiboas angelicus</i> (synonym of <i>Boana roraima</i>)	Barrio-Amorós et al. 2011
<i>Hypsiboas pulidoi</i> (synonym of <i>Boana benitezi</i>)	This work
<i>Boana rosenbergi</i> (confused with <i>B. boans</i>)	Chacón et al. 2005; see comment under <i>H. boans</i>
<i>Osteocephalus buckleyi</i> (confused with <i>O. helenae</i>)	Jungfer et al. 2013
<i>Osteocephalus cabrerai</i> (confused with <i>O. helenae</i>)	Jungfer et al. 2013
<i>Scinax trilineatus</i> (synonym of <i>S. fuscomarginatus</i>)	Brusquetti et al. 2014
<i>Tepuihyla celsae</i> (synonym of <i>T. luteolabris</i>)	Jungfer et al. 2013
<i>Tepuihyla galani</i> (synonym of <i>T. rodriguezii</i>)	Jungfer et al. 2013
<i>Tepuihyla rimarum</i> (synonym with <i>T. rodriguezii</i>)	Kok et al. 2015
<i>Osteocephalus buckleyi</i> (confused with <i>O. helenae</i>)	Jungfer et al. 2013
<i>Leptodactylus ocellatus</i> (confused with <i>L. aff. macrosternum</i> in Venezuela; synonym of <i>L. latrans</i>)	Heyer 2014
<i>Bolitoglossa spongai</i> (synonym of <i>B. orestes</i>)	Fermin et al. 2012
<i>Pristimantis anonymus</i> (<i>nomen nudum</i>)	This work
<i>Pristimantis terraebolivaris</i> (synonym of <i>P. incertus</i>)	This work
<i>Pristimantis stegolepis</i> (synonym of <i>P. vilarsi</i>)	Kok and Barrio-Amorós 2013
<i>Pristimantis tepuiensis</i> (synonym of <i>P. guaiquinimensis</i>)	Kok and Barrio-Amorós 2013

Appendix 6. Taxonomic changes at the genus and species levels, along with emendations that occurred since the last systematic list by Barrio-Amoros (2009c), including changes to new species added in that list.

Former name	Current name	Current family	Reference
<i>Dendrophryniscus minutus</i>	<i>Amazophrynella minuta</i>	Bufonidae	Fouquet et al. 2012a,b
<i>Allobates rufulus</i>	<i>Anomaloglossus rufulus</i>	Dendrobatidae	Barrio-Amorós and Santos 2010
<i>Trachycephalus venulosus</i>	<i>Trachycephalus typhonius</i>	Hylidae	Lavilla et al. 2010
<i>Rhinella nasica</i>	<i>Rhaebo nasicus</i>	Bufonidae	Pramuk 2006
<i>Centrolene altitudinale</i>	<i>Centrolene altitudinalis</i>	Centrolenidae	This work

Appendix 6 (continued). Taxonomic changes at the genus and species levels, along with emendations that occurred since the last systematic list by Barrio-Amoros (2009c), including changes to new species added in that list.

<i>Centrolene daidaleum</i>	<i>Centrolene daidalea</i>	Centrolenidae	This work
<i>Centrolene notostictum</i>	<i>Centrolene notosticta</i>	Centrolenidae	This work
<i>Centrolene venezuelense</i>	<i>Centrolene venezuelensis</i>	Centrolenidae	This work
<i>Hyalinobatrachium crurifasciatum</i>	<i>H. cappellei</i>	Centrolenidae	Castroviejo-Fisher et al. 2011
<i>Hyalinobatrachium guairarepanensis</i>	<i>H. guairarepanense</i>	Centrolenidae	This work
<i>Pristimantis cavernibardus</i>	<i>Ceuthomantis cavernibardus</i>	Craugastoridae	Heinicke et al. 2007, Padial et al. 2014
<i>Pristimantis aracamuni</i>	<i>Ceuthomantis aracamuni</i>	Craugastoridae	Heinicke et al. 2007, Padial et al. 2014
<i>Pristimantis lentiginosus</i>	<i>Tachiramantis lentiginosus</i>	Craugastoridae	Heinicke et al. 2015
<i>Pristimantis prolixodiscus</i>	<i>Tachiramantis prolixodiscus</i>	Craugastoridae	Heinicke et al. 2015
<i>Osteocephalus exophthalmus</i>	<i>Tepuihyla exophthalma</i>	Hylidae	Jungfer et al. 2013; this work.
<i>Leptodactylus andreae</i>	<i>Adnomera andreae</i>	Leptodactylidae	Frost et al 2006; De Sá et al. 2014
<i>Leptodactylus hylaedactyla</i>	<i>Adnomera hylaedactyla</i>	Leptodactylidae	Frost et al 2006; De Sá et al. 2014
<i>Leptodactylus lineatus</i>	<i>Lithodytes lineatus</i>	Leptodactylidae	Frost et al 2006; De Sá et al. 2014
<i>Hypsiboas</i>	<i>Boana</i>	Hylidae	Dubois 2017
<i>Hypsiboas alemani</i>	<i>Boana alemani</i>	Hylidae	Dubois 2017
<i>Hypsiboas benitezi</i>	<i>Boana benitezi</i>	Hylidae	Dubois 2017
<i>Hypsiboas boans</i>	<i>Boana boans</i>	Hylidae	Dubois 2017
<i>Hypsiboas calcaratus</i>	<i>Boana calcarata</i>	Hylidae	Dubois 2017
<i>Hypsiboas cinerascens</i>	<i>Boana cinerascens</i>	Hylidae	
<i>Hypsiboas crepitans</i>	<i>Boana xerophylla</i>	Hylidae	Orrico et al. 2017; Dubois 2017
<i>Hypsiboas geographicus</i>	<i>Boana geographica</i>	Hylidae	Dubois 2017
<i>Hypsiboas hobbsi</i>	<i>Boana hobbsi</i>	Hylidae	Dubois 2017
<i>Hypsiboas jimenezi</i>	<i>Boana jimenezi</i>	Hylidae	Dubois 2017
<i>Hypsiboas lanciformis</i>	<i>Boana lanciformis</i>	Hylidae	Dubois 2017
<i>Hypsiboas lemai</i>	<i>Boana lemai</i>	Hylidae	Dubois 2017
<i>Hypsiboas multifasciatus</i>	<i>Boana multifasciata</i>	Hylidae	Dubois 2017
<i>Hypsiboas ornatissimus</i>	<i>Boana ornatissima</i>	Hylidae	Dubois 2017
<i>Hypsiboas pugnax</i>	<i>Boana punax</i>	Hylidae	Dubois 2017
<i>Hypsiboas punctatus</i>	<i>Boana punctata</i>	Hylidae	Dubois 2017
<i>Hypsiboas roraima</i>	<i>Boana roraima</i>		Dubois 2017
<i>Hypsiboas rhythmicus</i>	<i>Boana rythmica</i>	Hylidae	Dubois 2017
<i>Hypsiboas sibleszi</i>	<i>Boana sibleszi</i>	Hylidae	Dubois 2017
<i>Hypsiboas tepuianus</i>	<i>Boana tepuiana</i>	Hylidae	Dubois 2017

Catalogue of the amphibians of Venezuela

Appendix 6 (continued). Taxonomic changes at the genus and species levels, along with emendations that occurred since the last systematic list by Barrio-Amoros (2009c), including changes to new species added in that list.

<i>Hypsiboas wavrini</i>	<i>Boana wavrini</i>	Hylidae	Dubois 2017
<i>Hypsiboas</i> sp. (aff. <i>albomarginatus</i> ; cf. <i>rufitelus</i>)	<i>Boana</i> sp. (aff. <i>albomarginata</i>)	Hylidae	Dubois 2017
<i>Osteocephalus cabrerai</i>	<i>Osteocephalus helenae</i>	Hylidae	Jungfer et al. 2013
<i>Scinax trilineatus</i>	<i>S. fuscomarginatus</i>	Hylidae	Brusquetti et al. 2014
<i>Hylomantis medinai</i>	<i>Agalychnis medinae</i>	Hylidae	Faivovich et al. 2010
<i>Phyllomedusa tomopterna</i>	<i>Callimedusa tomopterna</i>	Phyllomedusidae	Duellman et al. 2016
<i>Phyllomedusa hypochondrialis</i>	<i>Pithecopus hypochondrialis</i>	Phyllomedusidae	Duellman et al. 2016
<i>Chiasmocleis hudsoni</i>	Passed to <i>Syncope</i> by De Sá et al. 2012; recovered as <i>Chiasmocleis</i> by Peloso et al. 2014	Microhylidae	De Sá et al. 2012; Peloso et al. 2014
<i>Relictivomer pearsei</i>	<i>Elachistocleis pearsei</i>	Microhylidae	De Sá et al. 2012