ZOOTAXA

1942

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Magnolia Press
Auckland, New Zealand

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(*Zootaxa* 1942)

68 pp.; 30 cm.

26 Nov. 2008

ISBN 978-1-86977-269-7 (paperback)

ISBN 978-1-86977-270-3 (Online edition)

FIRST PUBLISHED IN 2008 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)
ISSN 1175-5334 (Online edition)

Zootaxa 1942: 1–68 (2008)
www.mapress.com/zootaxa/

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Herpetological results of the 2002 expedition to Sarisariñama, a tepui in Venezuelan Guayana, with the description of five new species

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Accepted by M. Vences: 4 Aug. 2008; published: 26 Nov. 2008

Abstract

Sarisariñama is a pink sandstone plateau with a total area (summit and slope) of 832 km^2 located about 600 km SE of Caracas, in Estado Bolívar, Venezuela. It includes diverse environments along an elevational gradient from 400 m up to an elevation of 2100 m at its western cliffs. Sarisariñama is well known among spelunkers for its sinkholes (simas), among which Sima Mayor is the largest on earth. Herpetofaunal surveys at four camps in the uplands and two at the base of the massif revealed 32 species, four of which are here described as new taxa. These include three frogs in the genera *Hyalinobatrachium*, *Anomaloglossus*, and *Pristimantis*, and one gecko (genus *Gonatodes*). In addition to these new species, we name a fifth based on evidence that populations hitherto known as *Hypsiboas benitezi* from east of the Maigualida-Parima Mountains, including our Sarisariñama sample, are distinct species. Our sample of *Stefania riae* contained individuals with four different color patterns. Two aquatic species of lizards, *Neusticurus racenisi* and *N. tatei*, were found to occur microsympatrically and we provide a diagnosis for the poorly known *N. tatei*. *Norops ortonii* is reported for the second time from Venezuela. *Dendrobates leucomelas* was abundant in lowland areas around the massif. The significance of this frog for the indigenous Ye'kwana is commented upon, including its iconographic importance in basket weaving. We also include data on three other species of interest collected at Sarisariñama by a 1988 expedition from Simón Bolívar University and Radio Caracas Televisión. Throughout, we reference common names for most species in the indigenous Ye'kwana language, and we provide information on local legends and cultural anecdotes involving some of the local species. We comment on the zoogeography of the Sarisariñama herpetofauna by comparing it with that of other known tepuis.

Key words: Venezuela; Guiana Shield; Sarisariñama; tepui; herpetofauna; new species; *Anomaloglossus*; *Hyalinobatrachium*; *Pristimantis*; *Gonatodes*; *Hypsiboas benitezi*; *Stefania riae*; *Neusticurus*; *Norops ortonii*; biogeography

Resumen

Sarisariñama es una meseta de piedra arenisca rosada con una área de 832 km^2, localizada aproximadamente a 600 km al SE de Caracas, en el Estado Bolívar, Venezuela. Incluye ambientes diversos a lo largo de un gradiente elevacional que abarca desde los 400 hasta los 2100 m en sus riscos occidentales. Sarisariñama es bien conocido entre los espeleólogos por su simas, entre ellas la Sima Mayor, la más voluminosa del planeta. La herpetofauna se inspeccionó en cuatro campamentos en tierras elevadas y dos en la base del macizo, revelando 32 especies, cuatro de las cuales son descritas aquí como nuevos taxa. Éstos incluyen tres ranas en los géneros *Hyalinobatrachium*, *Anomaloglossus* y *Pristimantis*, y un gecko del género *Gonatodes*. Además de estas nuevas especies, nombramos un quinto taxon, basados en la evidencia de que las poblaciones conocidas como *Hyla benitezi* al este de las Montañas de Maigualida-Parima, incluyendo nuestra muestra de Sarisariñama, es distinto al nivel específico. Nuestra muestra de *Stefania riae* contiene cuatro patrones diferentes de coloración. Dos especies acuáticas de lagartos, *Neusticurus racenisi* y *N. tatei*, fueron encontrados en microsimpatría; ofrecemos una diagnosis del poco conocido *N. tatei*. *Norops ortonii* es reportado por segunda vez en Venezuela. *Dendrobates leucomelas* era abundante en tierras bajas alrededor del macizo. Se describe la importancia de esta rana para los indígenas Ye'kwana, incluyendo su importancia para la iconografía tejida. También incluimos datos de tres otras especies de interés coleccionadas en 1988 en Sarisariñama por una expedición de la Universidad Simón Bolívar y Radio Caracas Tele Visión. Ofrecemos los nombres comunes para la mayoría de las especies en el idioma indígena Ye'kwana, proporcionando información sobre las leyendas locales y las anécdotas culturales que involucran algunas de estas especies. Finalmente, comentamos la zoogeografía de la herpetofauna de Sarisariñama, comparándola con la de otros tepuyes conocidos.

"Islands in time" is a term introduced by Brewer-Carías (1974) to describe the isolation among plants and animals living on remote tabletop mountain summits in the Venezuelan Guayana. These tabletop mountains are known as tepuis, a term derived from the local Pemón language. Their foreboding vertical cliffs, their near inaccessibility, and their isolation led Arthur Conan Doyle to make tepuis the landscape model for his novel, *The Lost World*. Tepuis are the result of erosion of a formerly extensive sandstone plateau (Gansser 1974), leading to their position as biogeographic islands in a surrounding sea of lowland forest and/or grassland savanna.

In terms of the evolutionary history of tepui biotas, their isolation makes them island-like with high rates of speciation and endemicity observed on each tepui (Steyermark 1986). The biotas isolated on most of these mountains are unique to each (Chapman 1931; Mayr and Phelps 1967). Even though the herpetofauna of tepuis is depauperate in comparison with that of the surrounding Guiana Shield lowlands, which includes mixed elements of mostly Amazonian but also Orinoco llanos origin (Barrio-Amorós 1998*a*; Hoogmoed 1979*a*; Rivero-Blanco and Dixon 1979), the higher elevations of each tepui usually harbor strange endemic species.

A brief history of tepui exploration

Expeditions to these remote table mountains, especially to their summits, are logistically difficult, expensive and, as a consequence, quite infrequent. Early explorations, although not primarily herpetological, began in the last decade of the 19th Century (1894 and 1898), when E. im Thurn and H. Perkins, followed later by F.V. McConnell and J.J. Quelch, accessed Mount Roraima and made zoological and botanical collections; the discovered reptiles and amphibians were later described by Boulenger (1900). During the Phelps Venezuelan Expedition of the American Museum of Natural History (1937–38), the first specimens from Auyan-tepui were collected (Tate 1938*a,b*; Roze 1958*a*). Juan Rivero succeeded in reaching some of the most inaccessible parts of the Venezuelan Guayana in his search for amphibians in 1950. Especially his collecting in the uplands of the Duida-Marahuaka region contributed many new species, even though he never reached the summit of either tepui (Rivero 1961). The Chimantá massif was first explored by the Chicago Natural History Museum during February 1955, resulting in a herpetological report by Roze (1958*b*).

Modern exploration of tepuis, beginning at the time when helicopters became available to transport scientists, intensified in the 1960s. The Guiana Shield and its tepuis were explored in earnest when the second author (CBC) directed several multifaceted expeditions to explore the summits of tepuis such as Autana, Neblina, Marahuaka, Sarisariñama, Jaua, Kukenán, Aprada, Ptari, Ilu, and several others whose biota was explored for the first time. The result was a better understanding of the special botany and geology of the region and, in the case of Sarisariñama, the origin of the sinkholes. These so-called *simas* are sinkholes that penetrate deeply into the world's most ancient sandstone system (Colveé 1973). The western edge of the tepui that was later named Sarisariñama was first explored in 1967 via helicopter, under the leadership of William Phelps and Julian Steyermark, who collected the first herpetological sample (*Euspondylus phelpsi*; Lancini 1968). At that time, the mountain was considered part of Jaua-tepui, with which it was long confused (Steyermark and Maguire 1972).

During 1974, CBC directed the expedition of the Sociedad Venezolana de Ciencias Naturales to the Sarisariñama massif to explore the *simas*. This 40-member expedition established a significant botanical and ornithological collection (Brewer-Carias 1976; Steyermark and Brewer-Carias 1976). Unfortunately, only an unpublished report exists for the herpetological samples from this expedition, with the material remaining unstudied at the National Museum of Natural History in the United States. Only one new amphibian was described based on specimens from that expedition, the frog *Stefania riae* (Duellman and Hoogmoed 1984). Two additional expeditions explored the bottom of Sima Mayor, one led by CBC for a Japanese film crew and the other organized by Venezuelan and Polish spelunkers who mapped other sinkholes in the same mountain and gathered some additional herpetological specimens (Zawidzki *et al*. 1976:110); we were unable to locate these specimens. In 1988, a team of nature filmmakers from Radio Caracas Television accompanied a party of scientists from Universidad Simón Bolívar to Sarisariñama. During this trip another small collection of amphibian and reptiles was made, and some of them will be treated below.

Most recently (March 2002), the Instituto Geográfico de Venezuela Simón Bolívar (IGSB) of the Ministerio del Ambiente authorized an expedition to Sarisariñama by the Japanese documentary production company NHK to document the biodiversity at the summit of the plateau and at the bottom of Sima Mayor. This expedition was led by CBC, and a herpetofaunal survey was conducted by the authors, Javier Mesa, and Mark Moffett. The results of this latest Sarisariñama expedition are presented herein.

Material and methods

We report on a collection of 66 specimens representing 32 species, made during March 2002. All specimens have been deposited at the Estación Biológica Rancho Grande, Maracay, Venezuela (EBRG). Coordinates and elevations were obtained with a Garmin II+ global positioning system. We did not collect large numbers of specimens but only representative samples of apparently new or rare species, and individuals for which field identification was uncertain. Additional institutional abbreviations used are: Colección de Vertebrados, Facultad de Ciencias, Universidad de Los Andes, Mérida, Venezuela (CVULA); The Natural History Museum, The University of Kansas, Lawrence, Kansas, USA (KU); Museo de Biología de la Universidad Central de Venezuela, Caracas, Venezuela (MBUCV); Museu Paraense Emilio Goeldi, Belém, Brazil (MPEG); National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (USNM). Photographs were taken by the senior author unless otherwise stated.

Diagnostic morphology

We follow the current systematic arrangement for all amphibians (Faivovich *et al*. 2005; Frost *et al*. 2006, Grant *et al*. 2006; Heinicke *et al*. 2007; Hedges *et al*. 2008; Guayasamin *et al*. in press). The foot webbing formulae follow Myers and Duellman (1982). For the description of *Hyalinobatrachium* we follow the format suggested by Myers and Donnelly (1997, 2001); comparative data were taken from Ayarzagüena (1992), Lescure and Marty (2000), Noonan and Bonett (2003), and Señaris and Ayarzagüena (2001, 2005). The diagnosis of *Anomaloglossus* includes 13 characters of Duellman and Simmons (1988) and two additional characters (dorsal and ventral skin texture, size and shape of tympanum). Comparative data for *Anomaloglossus* are from Barrio-Amorós *et al*. 2004; Barrio-Amorós 2006; La Marca (1996), Lescure and Marty (2000), Meinhardt and Parmalee (1996), Myers and Donnelly (1997, 2001) and Rivero (1961). The diagnosis and description of *Hypsiboas* is based on Barrio-Amorós *et al*. (2004*b*); literature comparisons were made to ascertain species identifications, using Donnelly and Myers (1991), Duellman and Hoogmoed (1992), Heyer (1994*a*), Myers and Donnelly (1997), Rivero (1961, 1971), and Señaris and Ayarzagüena (2002) as references. Comparative data for *Stefania* are from Barrio-Amorós and Fuentes (2003), Duellman and Hoogmoed (1984), Myers and Donnelly (1997), and Señaris *et al*. (1996). Morphological terms for *Pristimantis* follow Lynch and Duellman (1997) and Myers and Donnelly (1996, 1997), modified to include Myers and Donnelly's (2001) "axillary tubercle". Comparative data on *Pristimantis* are from Duellman (1997), Lescure and Marty (2000), Lynch (1971, 1976), Lynch and Duellman (1997), Lynch and Hoogmoed (1977), Myers and Donnelly (1996, 1997, 2001), and Parker (1940). Diagnosis, description, and comparative data for *Gonatodes* are of Avila-Pires (1995); subcaudal scale patterns used for *Gonatodes* are those of Rivero-Blanco (1979).

Measurements

All measurements were taken to the nearest 0.1 mm using calipers. Abbreviations of amphibian measurements are: (SVL): straight length from tip of snout to vent; (TL): tibia length from outer edge of flexed knee to heel; (FeL): femur length from vent opening to flexed knee; (FL): foot length from inferior edge of the inner metatarsal tubercle to tip of fourth toe disc; (HeL): head length from tip of snout to the posterior border of skull (posterior edge of prootic, noted through the skin); (HW): head width between widest angle of jaws; (Ind): internarial distance between centers of nares; (UEW): upper eyelid maximum width; (IOD): interorbital distance between proximal edges of eyelids; (EN): distance of anterior edge of eye to nostril; (ED): horizontal eye diameter; (TD): horizontal tympanum diameter; (FD): disc width of finger III; (4TD): disc width of toe IV; (ETS): distance between the anterior edge of the eye to the tip of snout; (1FiL): length of finger I from inner edge of thenar tubercle to tip of disc; (2FiL): and length of finger II from the junction of finger I and III to the tip of finger disc. Fingers are abbreviated (F) and toes (T) wherever are followed by a number in Romans. Measurements of lizards are those of Avila-Pires (1995), and they are snout-vent length (SVL; also applicable to snakes); tail length (TL; also applicable to snakes); right hind limb length (RHL); head length (HL); head width (HW); length of finger IV (L4F); and length of toe IV (L4T). Lengths of snakes are given in mm and are measured as SVL+TL, except when otherwise stated.

Sound

Recordings were made with a Sony TCM-353V cassette tape recorder and microphone Sony F-V5, and analyzed with Cool Edit Pro 1.0 for Windows. Tapes are deposited at Fundación AndigenA's Servicio Fotográfico y Fonográfico at Mérida, Venezuela.

Language

Interviews with the Ye'kwana people were conducted by CBC in their native language, following standard anthropological parameters (Hammersley and Atkinson 1994). Outside of the Pemón language area tepuis have several other local names. In the Ye'kwana language they are called *jidi*, and the name *Sarisariñama-jidi* should be recognized as a valid local name for this tepui. In Spanish, some of these mountains have been called *cerro* (simply meaning *mountain*), and this would lead to the name *Cerro Sarisariñama*. However, we here refer to Sarisariñama and neighboring mountains as tepuis, the universally best understood term to describe these characteristic tabletop mountains.

Sarisariñama-tepui

Sarisariñama-tepui is a massif of pink sandstone, situated between 4º27' and 4º45' N, and 64º04' and 64º22' W (Fig. 1A), with a maximum elevation of 2100 m (Steyermark and Maguire 1972). The summit comprises an area of 546 km^2 and its slopes an area of 286 km^2, totaling 832 km^2 (Fig. 2). The principal vegetation communities (following Huber and Alarcón 1988) found are: (1) medium, evergreen montane forests, from 600 m to at least 1000 m in altitude; (2) medium, evergreen, upper montane forests, from 1000–1400 m in altitude; (3) tall, upland scrub, on rock, at altitudes between 1400 and 2000 m; and (4) tubiform, shrubby highland meadows on rock and peat, from 2000–2100 m in altitude, all surrounded by medium to tall, evergreen, basimontane and lower montane forest, below an altitude of 600 m. Whereas the southern side of the mountain has forested slopes, the other sides are steep cliffs with many high waterfalls (see Fig. 1B for a three-dimensional interpretation of the mountain).

The origin and exploration of this mountain and its striking simas (Fig. 3) have been described by various authors (Brewer-Carias 1973, 1974, 1976, 1983; Nott 1975; Steyermark and Brewer-Carias 1976; Zawidzki *et al*. 1976). Sima Mayor, also known as Sima Brewer, is the volumetrically largest sima in the world (Fig. 1C). It is a massive depression in the summit area at 350 m depth and 350 m diameter (Fig. 1D). There are several smaller simas, concentrated in the northeastern area of the tepui (Fig. 1B). These sinkholes are home to endemic plants of which only 36% were also found on the summit plateau of Sarisariñama-tepui or on the neighboring, botanically similar Jaua-tepui plateau (Steyermark and Brewer-Carias 1976). However, CBC has

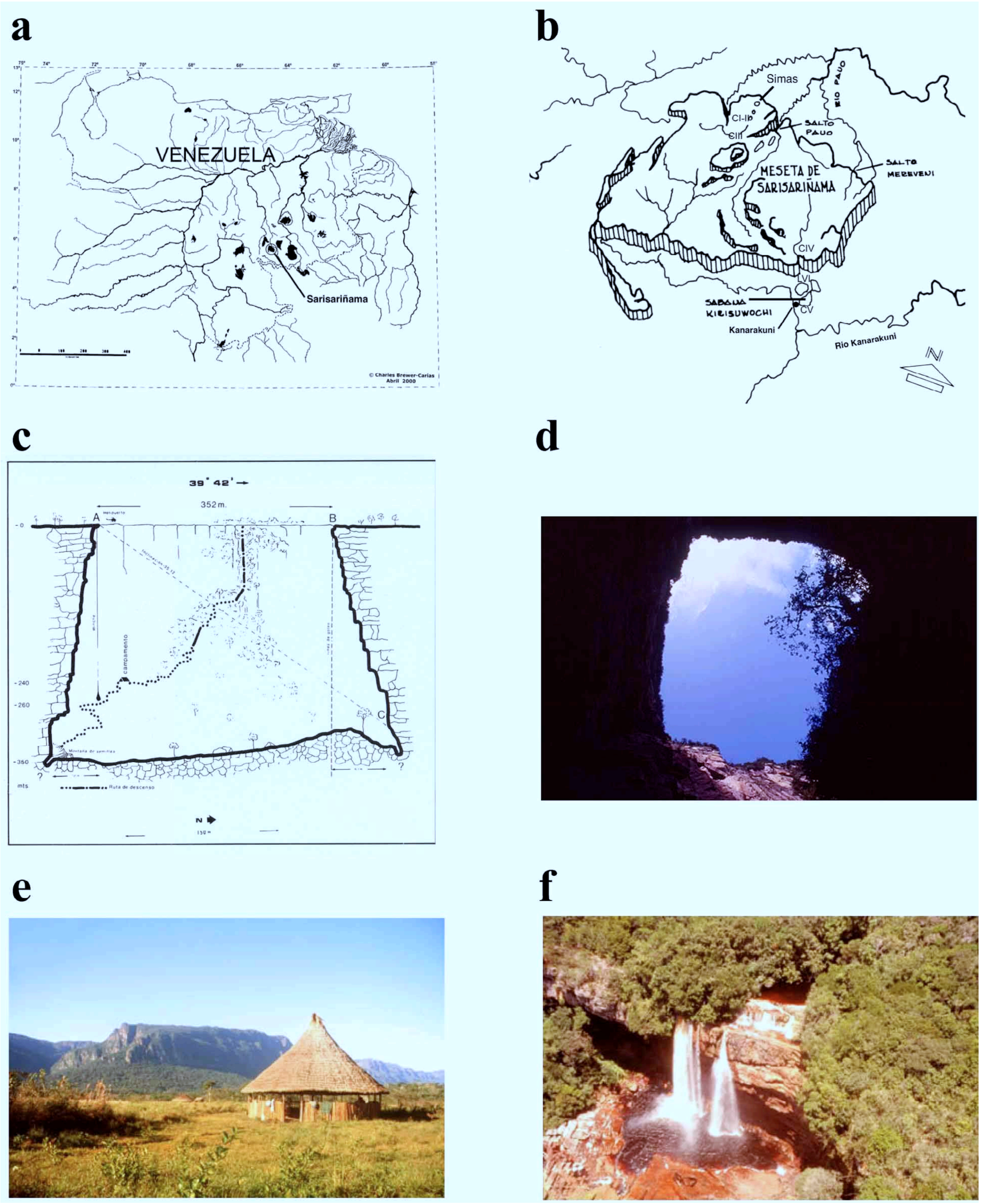

FIGURE 1. (a) location of the Sarisariñama massif in Venezuela. The scale bar represents a distance of 400 km. **(b)** three-dimensional interpretation of Sarisariñama to provide a simplified view of the massif. **(c)** Longitudinal cut through the center of Sima Mayor (from Brewer-Carías 1983). **(d)** view from inside Sima Mayor towards its rim, illustrating depth and light conditions inside of this gigantic sinkhole. **(e)** view of the southern slopes of Sarisariñama from the settlement at Canaracuni (Camp V). **(f),** aerial view of the waterfall at Camp IV, the type locality for two of the species described herein as new (genera *Anomaloglossus*, *Hypsiboas*). At this locality we also found *Stefania riae* and *Neusticurus tatei*.

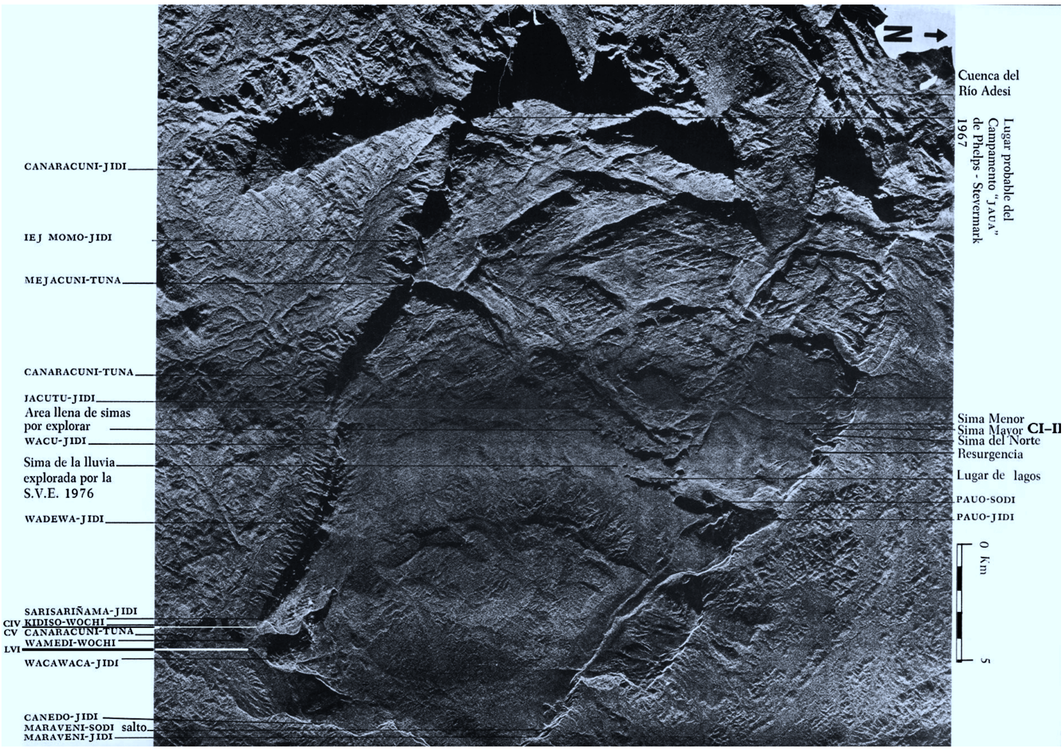

FIGURE 2. Side Looking Airborne Radar image of the Sarisariñama massif taken in 1970 (Brewer-Carías 1983). Our research camps (C) and localities (L) are marked by lines.

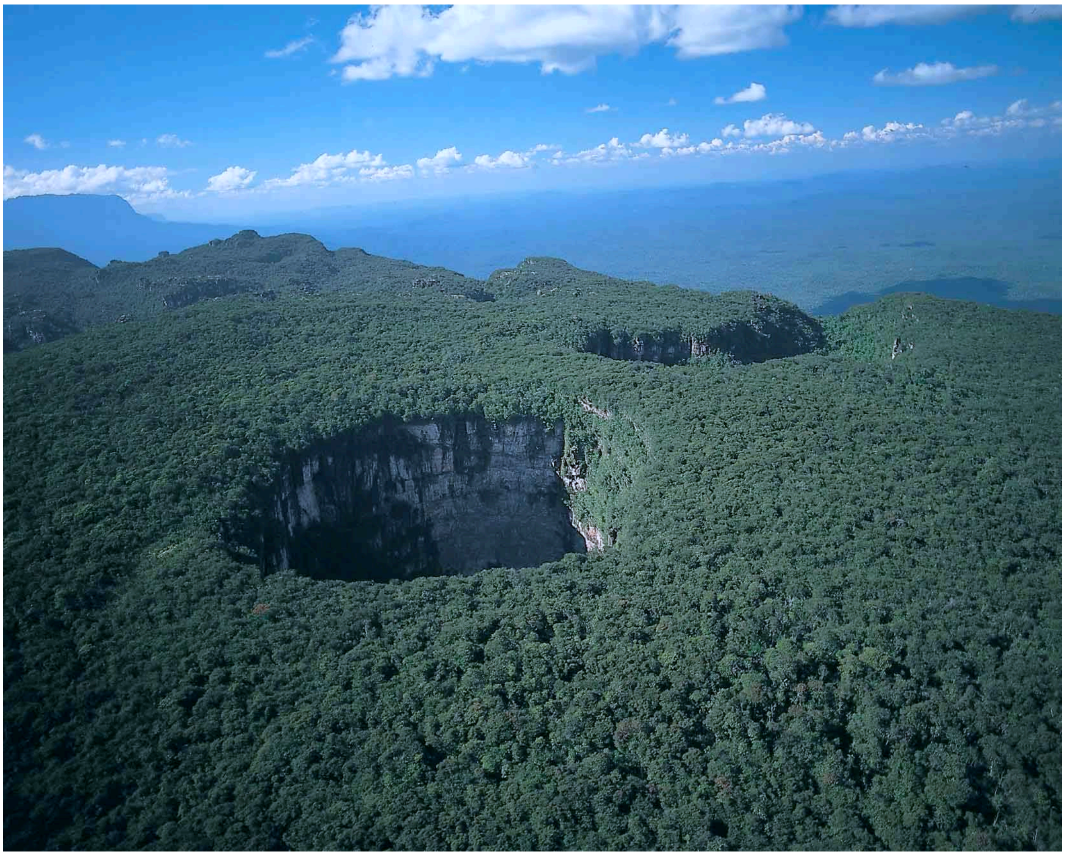

FIGURE 3. Aerial view of the Sarisariñama simas (sinkholes), including Sima Mayor (middle) and Sima Menor (top). Photo by Charles Brewer-Carías.

identified many of the trees inside the simas as common to more distant mountains surrounding the lower altitude rain forest visible from the Sarisariñama plateau. Oilbirds (*Steatornis caripensis*), scarlet macaws (*Ara chloroptera*), and several frugivorous bats that dwell in caves and crevices inside the simas probably transport seeds to the simas. Under the oilbirds' nesting crevices, which are 20 m above the bottom of Sima Mayor (Steyermark 1976:209), there is a 30-m-high mountain of seeds of diverse origins (mainly palm seeds, e.g. *Socratea exorrhiza, Jessenia bataua, Oenocarpus bacaba, Euterpe oleracea, E. precatoria, Mauritia* sp., among others). The rest of the bottom of the sima is filled with large loose boulders of pink sandstone that have fallen from above and have not yet been totally covered by roots and leaves. Falling into these crevices is a constant risk when exploring tepuis (Nott 1975). No herpetological collection had previously been made inside Sima Mayor.

Human Inhabitants

The Ye'kwana indigenous people (also known as Makiritare) inhabit riverine rainforest habitats in the Caura, Ventuari, Cunucunuma, Padamo, and upper Orinoco river basins. We found them still living at a site along the Canaracuni River that they have inhabited at least since 1912 (Koch-Grumberg 1924). These indigenous people speak a Carib stock language, cultivate manioc (*Manihot utilissima*) as their main staple, and have attained fame as the best canoe-makers of the Orinoco river basin (Coppens 1981). They are also good hunters and fishermen, and their flat baskets (called *wapa*) are considered the best woven among the Guayana region's indigenous people (Guss 1994). Their spiritual world commands their lives and helps maintain highly respected clan rules. As a consequence, most of the villages have been very successful in rejecting the presence of missionaries.

The name Sarisariñama is derived from the name of an evil bird spirit that used to perch on one of the many cliffs at the southern edge of the plateau (Brewer-Carias 1983: 21). This evil spirit was similar to the giant bird Dimoshi whose feathers gave birth to the blowgun canes found nowadays along the Marahuaka-tepui mountain base (Civrieux 1970). This mythological giant bird, whose name nowadays is also used to refer to the large harpy eagle (*Harpia harpija*), used to make the noise "*sari*" when eating humans. Thus, *sarisari* is a repetitive, onomatopoeic name. The suffix -*ña* means place, and -*ma* is indicative of a house, or place. The complete name of the tepui in the indigenous language, *Sarisariñama-jidi,* defines a mountainous place where the Dimoshi evil spirit perches or lives and eats humans.

Collecting localities

Our collections were made at six sites, five camps and one additional locality as follows.

Camp I.—Camp I (4º41.77' N, 64º13.190' W) was located at the edge of Sima Mayor at an altitude of 1375 m. It was the base camp on the Sarisariñama plateau, with a makeshift heliport and 12 individual sleeping accommodations consisting of hammocks with mosquito nets that were covered by nylon tarpaulins. The landscape around Camp I supports evergreen, upper montane forest with a maximum canopy height of 10 m (considered to be dwarf forest by Steyermark and Brewer-Carías 1976:190). The area is humid and supports many epiphytes (mosses, ferns, bromeliads). No streams exist nearby. Surveying consisted of searching for specimens around camp by day and night, hearing frogs calling, and exploring all suitable habitats. This site was surveyed from 9–10 March 2002 and again from 15–19 March 2002.

Camp II.—This camp was established adjacent to the base camp but inside Sima Mayor (4º41.66' N, 64º13.162' W; Figs. 1C, 1D, 3) at an altitude of 1100 m and at a depth of nearly 275 m from the edge of the plateau (the deepest point of the sima is at 350 m from the edge); by air, this camp was only 60 m away from the heliport at Camp I. We spent six days at this camp, using only sleeping bags on groundsheets under the natural overhang of the bell-shaped hole. There was no permanent stream or water other than that contained in bromeliads, and some moisture runoff from the walls provided enough water for drinking, washing, and bathing. Searching consisted of exploring crevices, searching through leaf litter, and turning rocks and logs by day.

At night, we searched for calling frogs and found others (*Stefania*, *Osteocephalus*) by eye shine. This site was surveyed from 9–14 March 2002.

Camp III.—This campsite (4º40’ N, 64º13’ W) was established at the edge of a field of bromeliads (*Brochinnia*) in an open area at an altitude of 1328 m, on the plateau. Mark Moffett and the senior author spent one day and one night at this site (16 March 2002).

Camp IV.—This camp on the southern slope of Sarisariñama (4º29’ N, 64º8’ W; Fig. 1F) was at the edge of a 20-m-high waterfall at an elevation of 1108 m. The vegetation is medium, evergreen, upper montane forest. Mark Moffett, Javier Mesa, and the senior author spent one day and one night there (21 March 2002).

Camp V.—This camp was established at Canaracuni (4º25.900’ N, 64º7.727’ W; Fig. 1E), a small village of about 200 Ye’kwana inhabitants with an airstrip at an altitude of 406 m. The habitat consists of savanna surrounded by evergreen rainforest. The village was established along the Río Canaracuni, and near an additional small stream apparently with the same name; both are black water streams. Canaracuni served as our base camp while staging the expedition to the mountain. This site was surveyed from 7–9 March 2002 and from 20–25 March 2002.

Locality VI.—This locality is on the southern slope of Sarisariñama (4º25’ N, 64º7’ W), at elevations between 450 and 600 m. Here, mountain creeks arrive directly from the massif. Several excursions were made from Canaracuni by the senior author with M. Moffet, J. Mesa, and Ye’kwana guides on 23 and 24 March 2002.

Species accounts

Species are listed alphabetically within genera, and among families alphabetically by genus. The original author and year of description are provided following the species name. Below the Linnaean name we provide names for the species in English, Spanish, and Ye’kwana. English names, when available, follow Frank and Ramus (1995), although we are clear that they are usually not appropriate; *Stefania* common names follow Barrio-Amorós and Fuentes (2003); Spanish names follow Barrio-Amorós (1998a); Ye’kwana names, when available, were determined during our interviews. The first line of each species account provides collecting localities, collection date(s), and specimen number(s).

Frogs

Family Aromobatidae

Only one species of dendrobatoid was found. We assign the new species to the genus *Anomaloglossus* following Grant *et al*. (2006), as it has the most striking synapomorphy of the genus, a median lingual process (MLP).

Anomaloglossus moffetti sp. nov.

(Fig. 4A, B, C, D, E)
Sarisariñama Rocket Frog, Sapito niñera de Sarisariñama

Holotype. EBRG 4645, an adult female from southern slope of Sarisariñama-tepui, Camp IV, Estado Bolívar, Venezuela (4º29’ N, 64º8’ W), elev. 1108 m, collected on 23 March 2002 by César L. Barrio-Amorós.

Paratopotypes. EBRG 4646–51, with the same data as the holotype.

Etymology. The species name is a patronym for Mark Moffett, entomologist and probably the best ant photographer in the world, in recognition of his excellent macrophotography and for his help and encouragement during this trip.

Diagnosis. (1) A medium sized *Anomaloglossus* (max. 26.9 mm SVL); (2) disc on FIII wider than diameter of finger; (3) FI slightly longer than FII; (4) fringes on fingers absent; (5) disc on TIV slightly wider than diameter of toe; (6) narrow, indistinct fringe along outer free edges of TI and TV; (7) inner tarsal keel straight; (8) toe webbing formula **I**1–2**II**1–3**III**2–3**IV**4–2**V**; (9) dorsolateral stripe absent; (10) oblique lateral stripe pale whitish from groin to middle of flank; (11) ventrolateral stripe absent; (12) diffuse irregular spotting on chest, but not collar-like; (13) belly uniformly pale or marked with diffuse melanophores; (14) no sexual dimorphism in ventral pattern; (15) dorsal and ventral skin smooth; (16) tympanum indistinct, TD < 50% ED. *Anomaloglossus moffetti* is distinguishable from other Guianan *Anomaloglossus* by the following characters (those of *A. moffetti* in parentheses). *Anomaloglossus ayarzaguenai*, the geographically closest known species, has FI slightly shorter than FII (longer), fingers with lateral fringes (absent), toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV), a snout rounded in dorsal view (nearly truncate), and much more webbing (less webbing; see formula above). *Anomaloglossus breweri* has FI and II equal (FI longer than II), a different webbing formula, I 1–2 II 1½–3 III 2½–3½ IV 3½–1½ V (I1-2II1-3III2-3IV4-2V). *Anomaloglossus degranvillei* from French Guiana has a granular dorsum (smooth), FI < FII (FI > FII), no oblique lateral stripe (present), a post-tympanic white bar (absent), and ventral brown surfaces with white spots (whitish with small brown melanophores). *Anomaloglossus guanayensis* is smaller, female SVL 23.5 mm (up to 26.9 mm), has a dorsal skin with flat tubercles (smooth), FI < FII (FI > FII), fingers with lateral fringes (absent), toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV), and a dark ventral coloration (pale white to mottled with brown melanophores). *Anomaloglossus murisipanensis* has Finger FI < FII (FI > FII), toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV), no oblique lateral stripe (present), and dark ventral coloration (pale white to mottled with brown melanophores). *Anomaloglossus parimae* has tuberculate dorsal skin (smooth), FI < FII (FI > FII), fingers with lateral fringes (absent), and toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV). *Anomaloglossus parkerae* has a rounded snout in dorsal view (truncate), fingers with lateral fringes (absent), toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV), and no oblique lateral stripe (present). *Anomaloglossus praderioi* has small tubercles on the posterior part of the dorsum (skin smooth), FI = FII (FI > FII), weak lateral fringes on fingers (absent), no oblique lateral stripe (present), and very little toe webbing (see formula above). *Anomaloglossus praderioi* is similar to *A. moffetti* in having an orange-reddish belly and lower thigh surfaces. *Anomaloglossus roraima* has tuberculate skin on dorsum (smooth), a snout rounded in dorsal view (truncate), almost no toe webbing (moderately webbed, see formula above), and no oblique lateral stripe (present). *Anomaloglossus shrevei* is larger with SVL up to 36 mm (up to 26.9 mm), FI < FII (FI > FII), fingers with lateral fringes (absent), and toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV). *Anomaloglossus tamacuarensis* has granular skin (smooth), possesses anal tubercles (absent), an inconspicuous tympanum (conspicuous although not very distinct), FIII slightly swollen (not swollen), and fringes on fingers (absent). *Anomaloglossus tepuyensis* has a snout that appears rounded in dorsal view (truncate), FI < FII (FI > FII), lateral fringes on FII and FIII (absent), toes with lateral fringes (only a narrow fringe along outer free edges of TI and TV), and no oblique lateral stripe (present); see Remarks below. *Anomaloglossus triunfo* is smaller with SVL up to 20 mm (up to 26.9 mm), has fringes on all toes (a narrow fringe along outer free edges of TI and TV), and is sexually dimorphic in ventral pattern, white in males, brown in females (no sexual dimorphism in ventral pattern). *Anomaloglossus wothuja* is smaller with SVL up to 22 mm (up to 26.9 mm), fringes on fingers present (absent), fringes along toes (a narrow fringe along outer free edges of TI and TV), and diffuse markings on the chest (absent).

Description. Dorsal and ventral skin smooth in all specimens except EBRG 4647, which is finely spiculate. Dorsal skin forming a well-defined, rounded, posteriorly projecting flap well above vent, which opens at upper level of thighs; anal tubercles absent. HW = HeL or slightly wider than long, HW between angles of

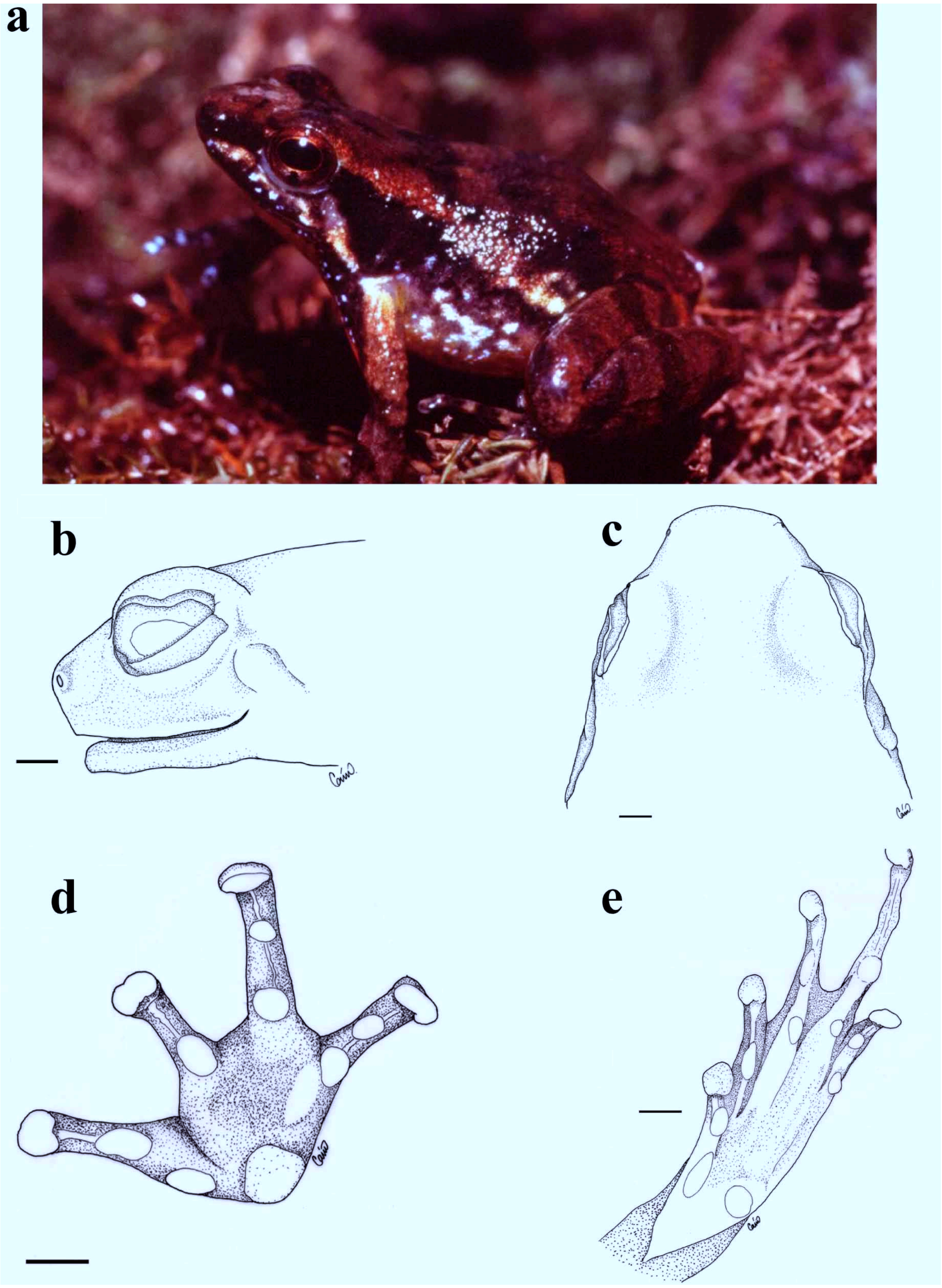

FIGURE 4. (a) adult female individual of *Anomaloglossus moffetti* **sp. nov.** Details of external characteristics drawn from the paratype of *Anomaloglossus moffetti* **sp. nov.** EBRG 6465, including lateral **(b)** and dorsal **(c)** views of the head, a palmar view of the left hand **(d)** and a plantar view of the left foot **(e)**. Scale bars are 1 mm long. Note that the discs on the tips of fingers III and IV and toe V are curved, giving the impression of a finger shorter than it actually is. In the artist view, the tarsal keel seems to fuse on an acute angle with a nonexistent color delimitation. This was artificially created by the shadow of the light of the microscope.

jaws about 33% SVL. Snout sloping, blunt in lateral view (Fig. 4B) (except EBRG 4651, in which the snout is truncate), nearly truncate in dorsal and ventral view (Fig. 4C); nares directed slightly posterolaterally near tip of snout; nares visible from front, barely or not visible from above, but well visible from below; canthus rostralis straight, indistinct; loreal region nearly flat, sloping slightly outward to lip; IOD>UEW; snout much longer than ED; tympanum indistinct, posterodorsal fourth to third concealed; TD more than one third and less than one half of ED; tympanum close to posterior edge of eye, low, nearly reaching jaw symphysis.

Hand moderate in size (Fig. 4D), its length 25% SVL and 66% HW; relative lengths of adpressed fingers III > IV > I > II; tip of FII reaching disc of FI; discs of all fingers moderately expanded; disc on FIII 1.6 times wider than distal end of adjacent phalanx; base of palm with large, round, median metacarpal tubercle; inner metacarpal tubercle on base of FI elliptical to rounded; one subarticular tubercle on FI and FII, two on FIII and FIV; all tubercles low, largest on FI, but smaller and rounded in EBRG 4649 and 4651; keel-like lateral fringes on fingers, ulnar tubercles, and ulnar fold absent.

Hind limbs moderately long; heel of adpressed limb reaching or slightly surpassing eye; tibia length 42–50% of SVL; relative lengths of adpressed toes IV > III > V > II > I; first toe reaching to base, or distal edge, of subarticular tubercle of second toe; discs on toes moderately expanded; toes with moderate webbing, distally continuous as a narrow fringe on TII–V; webbing formula **I**1–2**II**1–3**III**2–3**IV**4–2**V** (EBRG 4648 with **IV**3–1**V**; EBRG 4649 and 4651 with **IV**3–2**V**); narrow fringe along outer free edges of TI and TV; nonprotuberant subarticular tubercles on toes; small, round outer metatarsal tubercle; elliptical inner metatarsal tubercle slightly larger (EBRG 4646 with faint median metatarsal tubercle on right foot; Fig. 4E); narrow tarsal keel, straight to proximally curved distally, sometimes reaching the distal half of tarsus, but usually somewhat shorter, continuous with narrow fringe on free edge of first toe; without tubercle at proximal end.

Teeth present on maxillary arch. Tongue longer than wide; free posteriorly; median lingual process wider than long (barely visible, almost indistinguishable in EBRG 4651); vocal slits large, extending from near tongue insertion nearly to angles of jaws.

Color, pattern, and variation. In life, the dorsum is brown with inconspicuous darker irregular spots or band-like markings. The flank is black, bordered in some individuals by brown-orange stripes (not distinct in preservative). The oblique lateral stripe is yellow or dirty white, and the spots low in the flank are silvery white. The venter and ventral surfaces of the thighs are yellow or orange, independent of sex. The subocular region is pale brown to orange with small blue spots on the upper lips.

In preservative, the dorsum is dark to pale brown with no definite pattern. This varies from no pattern in EBRG 4648, to a somewhat conspicuous pattern consisting of three irregular marks (chevrons, M-shaped mark, or irregular spots) on the dorsum in EBRG 4646 and 4649 (both males); the latter also has an inverted triangle connected to the interorbital bar. In EBRG 4645 (holotype), 4647, 4650, and 4651, the dorsal pattern is diffuse. An ill-defined black stripe across the tip of the snout continues along side of snout, through eye, and over arm to groin; the stripe is most distinct above the tympanum and arm, and is diffuse in the groin. In all specimens (except EBRG 4648 and 4651) there is an irregular row of white spots below the black lateral stripe. A pale white oblique lateral line is present in all specimens, although it varies from a distinct line extending to mid-flank in both males (EBRG 4646 and 4649) and EBRG 4647 and 4650 to a linear row of white spots in the others. The arms are pale to dark gray with darker transverse bars. Two symmetrical narrow white bars on the posterior surfaces of the thighs surround the anal opening; these bars are most distinct in the two males and EBRG 4650. The fingers and toes are pale gray with darker gray rings. The discs on the fingers of EBRG 4646 are distinctly white, whereas white is far less apparent on the discs in the rest of the series; also in EBRG 4646 the axilla is white. The throat is dirty white in two individuals (EBRG 4649 and 4651) and white with variable pale brown mottling, from a minimum in EBRG 4647 to a maximum in EBRG 4650. EBRG 4645 has a collar-like band extending medially from the posterior parts of the jaws. The venter is uniform white in the holotype, EBRG 4647, 4649 and 4651, brown in EBRG 4646,and white with brown marbling especially laterally and on the chest in the others. The upper lips are dark brown with small white spots.

Measurements of holotype. SVL 26.0; TL 12.3; FeL 12.2; FL 11.0; HeL 8.5; HW 8.7; Ind 3.2; UEW 2.5; IOD 3.2; EN 2.0; ED 2.6; TD 1.3; FD 1.0; 4TD 1.1; ETS 4.0; 1FiL 3.1; 2FiL 3.1.

Natural history. This species lives in cascading streams, in the spray zone of waterfalls, and in streams in the forest. No calls were heard. Tadpoles are unknown.

Remarks. Myers and Donnelly (2001) predicted that most, if not all, of the web-footed highland species of Guayanan dendrobatoids (formerly in *Colostethus*) would be found to have a median lingual process (MLP). Barrio-Amorós (2006) also assumed that all Guayanan *Colostethus* with a MLP will have no palatine bones and will form a monophyletic group. Grant *et al*. (2006) subsequently described the genus *Anomaloglossus* for all dendrobatoids with MLP. The presence of an oblique lateral stripe is shared with *A. ayarzaguenai, A. breweri, A. guanayensis, A. parimae, A. shrevei, A. tamacuarensis*, *A. triunfo*, and *A. wothuja*. La Marca (1996) did not clearly state whether this stripe is present or absent in *A. tepuyensis*, although in the description of the holotype he stated: "no hay banda inguinal, aunque sí una serie irregular de manchas claras cerca de la ingle, sin formar un diseño definido" (there is no inguinal stripe, although there is a series of irregular spots near the groin, without forming any definite pattern). Inguinal stripe is another name for the oblique lateral stripe (Duellman and Simmons 1988). The specimens of *A. tepuyensis* we examined are variable in this aspect. EBRG 2701 has poorly defined lateral stripes and EBRG 2702 has large irregular white spots and a lateral stripe only on the left side, whereas EBRG 2694 also has irregular large spots on the flanks and a poorly defined lateral stripe.

Material examined. *Allobates undulatus*.—VENEZUELA: Estado Amazonas, Cerro Yutajé (5°46' N, 66º8' W), elev. 1750 m, EBRG 3040–42.

Anomaloglossus breweri.—VENEZUELA: Estado Bolívar, Cueva del Fantasma, northwestern slope of Aprada tepui, elev. 660 m, MHNLS 17044-47.

Anomaloglossus parkerae.—VENEZUELA: Estado Bolívar, La Escalera, Paso el Danto, MBUCV 6642.

Anomaloglossus shrevei.—VENEZUELA: Estado Amazonas, Cerro Duida, elev. 1000 m, MBUCV 6687–68.

Anomaloglossus tepuyensis.—VENEZUELA: Estado Bolívar, Auyantepui, Camp 4 (5º 58' N, 62º33 W), elev. 1600 m, EBRG 2694, 2701–02.

Anomaloglossus triunfo—VENEZUELA: Estado Bolívar, slopes of the Cerro Santa Rosa, Serranía del Supamo, Estado Bolívar, Venezuela (6°40'39'' N, 62°24' 26'' W), EBRG 4756–59, CVULA 6521–22.

Anomaloglossus wothuja—VENEZUELA: Estado Amazonas, base of Cerro Sipapo, Tobogán del Cuao (5°5'9" N, 67°27'7" W), elev. 150 m, MBUCV 6689–90, EBRG 4760–61.

Bufonidae

Rhaebo guttatus Schneider 1799

Smooth-sided toad, Sapo dorado, Kawau

Camp V, Locality VI. 7 March 2002. EBRG 4641 (juvenile).

Rhaebo guttatus is an Amazonian and Guayanan species whose range extends as far south as Bolivia (Lötters *et al*. 2000). This species is common in Venezuela south of the Orinoco, but also is present in at least one Amazonian locality north of the Orinoco (Barrio *et al*. 2001). These toads are common in Canaracuni, where the voucher specimen was collected along the river under a log. Several males were heard calling on 24–26 March on a riverbank at Locality IV. The species is eaten by the Ye'kwana, but we do not have details about its preparation.

***Chaunus marinus* (Linnaeus 1758)**
Cane Toad, Sapo común, Tururu

Camp V. 7–9 March 2002, 26 March 2002. No specimens collected.

At least in Venezuela, this widespread species is highly variable in adult size. We observed several females in southern Venezuela (Santa María de Erebato, Canaracuni) of at least 220 mm SVL, whereas in northern Venezuela (the Coastal Range, the Andes, the Llanos) females seldom exceed an SVL of 160 mm. This toad is common in Canaracuni, where males were calling on dry nights. Reproductive activity ceased during a week of rains and resumed after the rains. We observed amplectant pairs, females laying eggs, and recently metamorphosed toadlets. The Ye'kwana name is onomatopoeic. The ye'kwana name of *R. guttatus* is *Kawau*, as noted previously, and that of *C. marinus* is *Tururu*, in contrast to the names noted by La Marca (in Gorzula and Señaris 1999), who probably confused both terms, naming *Cawau* to *C. marinus* and *Tududu* to *R. guttatus*.

***Rhinella margaritifer* complex**
Crested forest toad, Sapo crestado, Cro-cro (for males) / Wa-sa-wa (for females)

Camp V. 20 March 2002. EBRG 4642 (adult male).

Locality VI. 22 March 2002. EBRG 4643 (adult female).

FIGURE 5. Female individual of the *Rhinella margaritifer* complex (EBRG 4643).

Rhinella margaritifer comprises a complex of species (Hoogmoed 1986, 1989). In Venezuela, four species of the complex (including what was known as *R. margaritifer* sensu stricto) are known: *R. ceratophrys* Boulenger, *R. margaritifer* (Laurenti), *R. nasica* Werner, and *R. sclerocephala* Mijares-Urrutia and Arends. *Rhinella ceratophrys* and *R. nasica* occur south of the Orinoco but are known only from a few localities in Venezuela (Barrio-Amorós 1998a). The *R. margaritifer* complex is known from rainforests and cloud forests throughout Venezuela (Barrio-Amorós 1998a) and most of South America. Populations in northern Venezuela have been referred to *Bufo alatus* without explanation by La Marca (1997); we believe this to be an unjustified action. Lowland populations south of the Orinoco are apparently less variable than northern relatives, some of which may deserve specific status, as in the case of the recently described *R. sclerocephala* (Mijares-Urrútia and Arends 2001). In Colombia, at least 13 species are recognized under the name *Bufo typhonius* (Vélez 1995).

After a week of rain, we found several males calling sporadically in a creek close to Canaracuni on 20 March. We also collected a female from a creek in the foothills of Sarisariñama (LVI). The male (EBRG 4642, 49.0 mm SVL) is uniformly gray dorsally. All males observed were small compared with those of other southern Venezuelan populations. The female (EBRG 4643, 68.3 mm SVL) was uniformly yellow-orange with some darker crossbars on the limbs (Fig. 5). Females have prominent cephalic crests (supraorbital, supratympanic, parietal), but no neural spines. The male has prominent supraorbital crests, but low supratympanic and parietal crests. Ye'kwanas have at least two different names for this species. The gray male was recognized as a *cro-cro*, an onomatopoeic name reflecting the call. The orange female was called *wa-sa-wa*.

Family Centrolenidae

The assignation of the following new species to the genus *Hyalinobatrachium* is not definitive. It has a bulbous liver, which is the synapomorphy of the genus, but also presents several characteristics which are not shared by the rest of *Hyalinobatrachium* (except *H. taylori*, see below). It could be closely related with this last species. Guayasamin *et al*. (2008) already announced a deep change within the family Centrolenidae that probably will help in assigning the new species into a monophyletic genus.

Hyalinobatrachium mesai sp. nov.

(Figs. 6A, C, D, E, F)
Sarisariñama Glass Frog, Ranita de Cristal de Sarisariñama

Holotype. EBRG 4644, an adult male from Locality VI on the southern slope of Sarisariñama-tepui, Estado Bolívar, Venezuela (4º25' N, 64º7' W), elevation 420 m, collected on 22 March 2002 by César L. Barrio-Amorós.

Etymology. The specific name is a patronym in genitive honoring Javier Mesa, a participant of critical importance to the success of our expedition, whose constant help, advice on specimens' locations, and ability to find good collecting places were always appreciated. It is also to recognize Javier's long stated love of nature and exploration, particularly of the Venezuelan "Lost World".

Diagnosis. A species unassigned to any group within the genus *Hyalinobatrachium*, characterized by the following combination of characters (following Ruiz Carranza and Lynch 1991; Myers and Donnelly 1997, 2001): (1) vomerine teeth absent; (2) bones pale green in life; (3) pericardium transparent; hepatic and visceral peritoneum white; parietal peritoneum transparent; (4) in life head and dorsum pale green with large lime-green spots, dotted with homogeneous black melanophores, and larger black flecks, also present on limbs; in preservative, dorsum cream with white large spots, black melanophores and flecks; (5) no webbing between inner fingers; webbing formula for outer fingers **III**2 1/3–1**IV**; (6) foot webbing formula **I**1–1 2/3**II**1–1 1/2**III**1–2**IV**2–1**V**; (7) snout rounded in dorsal view, truncate in lateral view; (8) dorsal skin smooth in preservative, finely granular in life; ventral skin areolate; (9) ulnar and tarsal folds absent; (10) humeral spine absent in male; (11) tympanum not visible; tympanic region oriented almost vertically; (12) known size (male) 20 mm SVL; nuptial excrescences absent or inconspicuous.

Hyalinobatrachium mesai can be distinguished easily from other Guayanan species of *Hyalinobatrachium* (except *H. taylori*) by having its bones green in life. The following diagnosis is mostly based in characters seen in preservative and/or in the original descriptions (characters of *H. mesai* in parentheses). *Hyalinobatrachium crurifasciatum* has part of the pericardium visible (all visible), its melanophores are purple in preservative (black), its webbing is basal between inner fingers (absent), the webbing formula for outer fingers is **III**2–2**IV** (**III**2 1/3–1**IV**), a bulla (see explanation in Myers and Donnelly 2001) is present in the webbing of the outer fingers (absent), and weak ulnar and tarsal folds are present (absent). *Hyalinobatrachium eccentricum* has a bicolored iris with a brown circumpupillary zone concealing the pupil (iris white with a profusion of black melanophores), it has a bulla in the outer finger webbing (absent), it possesses very weak ulnar and tarsal folds (absent), and the tympanum is concealed but visible through the skin (not visible). *Hyalinobatrachium iaspidiense* is similar in general appearance, but it has no thenar tubercle (present), smooth ventral skin (areolate), trilobate choanae (oval), a well-defined canthus rostralis (not well defined), both ulnar and tarsal folds present (absent), discs on fingers slightly wider than, or equal in width, to that of the proximal phalanx (always wider), and its toes are approximately two-thirds webbed (three-fourths). *Hyalinobatrachium mondolfii* has a snout that slopes in profile (truncate), granular dorsal skin (smooth), and a dorsum without black flecks (present). *Hyalinobatrachium orientale* has a fringe on the interior side of FII (absent), and its dorsal skin is shagreeneded (smooth). *Hyalinobatrachium nouraguensis* from French Guiana has a dark green dorsum in life with some black flecks (large lime-green spots and black flecks). *Hyalinobatrachium ignioculus* from Guyana has both ulnar and tarsal folds (absent), and has a distinctive red wide ring around the iris (absent).

Hyalinobatrachium taylori is the only other species with greenish bones. It has a sloping snout when viewed in lateral view (truncate), FI = FII (FI > FII), it has fringes between FII and FIII (absent), is dark green in life (pale green) with small white spots (large lime-green spots and black flecks), appears yellowish in preservative with a dense profusion of arachnoid purple chromatophores (whitish with large white spots and black flecks), and has calls consisting of 5–7 notes (1 or 2).

Hyalinobatrachium mesai is unique among the Guayanan species of *Hyalinobatrachium* by the following combination of characters: bones pale green in life (character only shared with *H. taylori*), white in preservative, parietal peritoneum transparent, pericardium transparent; color in life pale green with large lime-green spots and black arachnoid flecks; dorsal skin smooth and ventral skin areolate, absence of ulnar and tarsal folds.

Description of the holotype. Size small (20 mm SVL); liver bulbous; head wider than long, wider than body; HW about 40% SVL; snout short, rounded in dorsal view, with projecting nares (Fig. 6C), truncate in profile (Fig. 6D), canthus rostralis indistinct; loreal region sloping towards lip; lips not flared; nostrils terminal, protuberant, directed anterolaterally; internarial region slightly concave. Eyes large, directed anterodorsally, length > EN; UEW about 92% IOD; supratympanic fold absent; tympanum indistinct; tympanic region oriented almost vertically. Vomerine teeth absent; choanae small, oval; tongue round, notched posteriorly, barely free; vocal slits extending from lateral base of tongue toward angle of jaw; distensible subgular vocal pouch.

Humeral spines absent; forearm distinctly broader than upper arm; relative lengths of adpressed fingers III > IV > I > II; webbing absent between inner fingers; webbing formula for outer fingers **III**2 1/3–1**IV**; bulla (sensu Myers and Donnelly 2001) absent between FIII and FIV; discs on fingers oval, distinctly wider than adjacent phalanx, those on FIII and FIV wider than those on inner fingers; thenar tubercle elliptical, low; palmar tubercle small, oval, low; supernumerary palmar tubercles indistinct; subarticular tubercles small, indistinct, low, round (Fig. 6F). Hind limbs slender; tibia length 56% SVL; inner metatarsal tubercle elliptical, low; outer metatarsal tubercle round, small; supernumerary tubercles indistinct, aligned at the base of toe IV; subarticular tubercles low, round, entire. Feet about three-fourths webbed; webbing formula for foot **I**1–1 2/3**II**1–1 1/2**III**1–2**IV**2–1**V**. Discs on toes rounded to truncate, smaller than those on fingers (Fig. 6E).

Skin on dorsal surfaces smooth; that on venter areolate; vent directed posteriorly at upper level of thighs; cloacal opening concealed by a short anal flap; anal ornamentation consisting of inconspicuous folds and enlarged whitish tubercles.

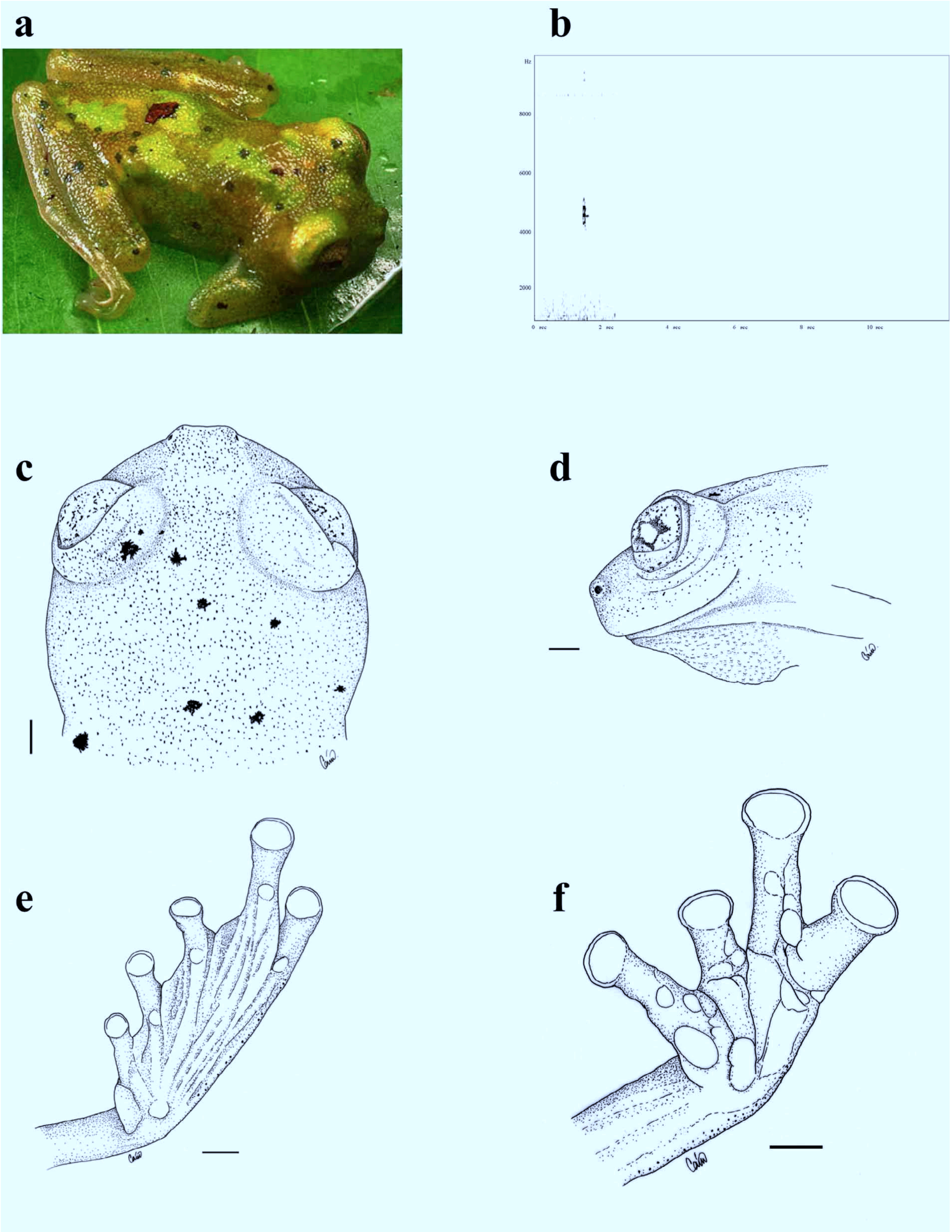

FIGURE 6. (a) Male holotype of *Hyalinobatrachium mesai* **sp. nov.** (EBRG 4644). Photograph by Mark Moffett. **(b)** advertisement call of *Hyalinobatrachium mesai* **sp. nov.** Details of external characteristics of *Hyalinobatrachium mesai* **sp. nov. (c)** dorsal view of the head. **(d)** lateral view of the head. **(e)** plantar view of the left foot. **(f)** palmar view of the left hand. Scale bars are 1 mm long.

In life (CLBA field notes from 22 March 2002) skin transparent; general color lime-green (Fig. 6A). Dorsum of head, body, forearms, and legs with irregular large, lime-green spots, irregularly spread smaller black arachnoid flecks. Ulnar and tarsal white stripes (but not folds) present, ulnar stripe from elbow to FIV; tarsal stripe from heel to edge of toe V. Ventrally, parietal peritoneum transparent; bones pale green; iris white with profusion of black arachnoid melanophores.

In preservative, dorsum cream with minuscule black melanophores (not seen in life but distinct under the microscope), and large white spots; flecks black; ventral surfaces uniform whitish; skin opaque; internal organs not easily discernible; iris dirty white with black melanophores.

Measurements of holotype. SVL 20.0; TL 11.2; FeL 10.8; FL 9.0; HeL 7.0; HW 8.0; Ind 1.4; UEW 2.6; IOD 2.8; EN 2.0; ED 2.7; FD 1.3; 4TD 1.0; ETS 3.0; 1FiL 3.8; 2FiL 2.4.

Natural history. The holotype (EBRG 4644) is a male that was calling on the upper surface of a *Heliconia* leaf 2 m aboveground and 2 m from a small stream in the forest. We heard additional males calling away from the stream, and high in the trees and bushes but we did not collect additional specimens. The tadpoles are unknown. The specimen died almost immediately after capture probably by a direct contact with a hand with insect repellent. Mark Moffett was able to photograph the specimen a few minutes after death (Fig. 6A).

Vocalization. The recorded call (Fig. 6B) is a high-pitched, single note, with a dominant frequency of 4700 Hz (fundamental frequency of 4300 Hz), and duration of 0.17 s. The interval between two calls is 9.3 s. Males call commonly with one note, and sometimes with two. Two-note calls were not recorded.

Remarks. Ruíz-Carranza and Lynch (1991) defined *Hyalinobatrachium* as having a bulbous liver covered by white peritoneum. They recognized three species groups: (1) the *H. pulveratum* group (Central America and northern South America) with pale green bones in life, presence of vomerine teeth, and presence of guanophores on pericardium and digestive tract; (2) the *H. parvulum* group (Atlantic forests of Brazil) with green or white bones, vomerine teeth present or absent, and guanophores on the pericardium and urinary bladder but not on the digestive tract; (3) and the *H. fleischmanni* group (species-rich and widespread in Central America and in northern and western South America) with white bones, guanophores on the digestive tract but not on the urinary bladder, variable guanophores on pericardium, and no vomerine teeth. Ruíz-Carranza and Lynch (1998) added a life history synapomorphy for the *H. fleischmanni* group (females laying a single layer of eggs on the undersides of leaves). They also commented that the heart is visible in the *H. chirripoi* subgroup. Cisneros-Heredia and McDiarmid (2006) considered the *pulveratum* group (*H. antisthenesi* and *H. pulveratum*) as *Cochranella*.

Hyalinobatrachium taylori was assigned tentatively to the *H. fleischmanni* group, but recently Señaris and Ayarzagüena (2005) concluded that due to its unique bioacoustic and morphological characters, such an assignment would be inappropriate. *Hyalinobatrachium taylori* and *H. mesai* are the only species of the genus in the Venezuelan Guayana that have pale green bones in life, a character shared with some species in the *H. parvulum* group. Furthermore, Ruíz-Carranza and Lynch (1991, 1998) did not consider the possibility of green bones in life for the *H. fleischmanni* group. Unfortunately, *H. taylori* is poorly known; and the name possibly involves more than one species. Lescure and Marty (2000) noted that *H. taylori* in French Guiana has white bones in life and a visible heart, whereas Ayarzagüena (1992) explicitly stated that in Venezuelan animals the bones are green in life and the heart is not visible. However, it is clear than Lescure and Marty's (2000) *H. taylori* is actually *H.* aff. *crurifasciatum* (C. Señaris and S. Castroviejo, pers. comm.). Noonan and Bonett (2003) also showed inconsistencies in the use of the name *H. taylori*.

Material examined. *Hyalinobatrachium crurifasciatum*.—VENEZUELA: Pico Tamacuari, Sierra Tapirapecó, Amazonas, MBUCV 6428 (paratopotype).

Hyalinobatrachium ignioculus.— VENEZUELA: Campamento YaKoo, Santa Elena de Uairén, Bolívar, MHNLS 18056. La Laja, río Uei, Sierra de Lema, 480–490 m, MHNLS 18057-58 (males), 18059 (female). Creek at la Escalera, 470 m, MHNLS 18060-61.

Hyalinobatrachium orientale.—VENEZUELA: Serranía de Turimiquire, cerca de la Piedra (10°00´20” N, 64°27´50” W), elev. 1600 m, EBRG: 3688, 3690–91.

Family Dendrobatidae

Dendrobates leucomelas Steindachner 1864
Yellow banded poison frog, Sapito minero, Wanadi Jiñamohidi

Camp V, Loc. VI. 22 March 2002. EBRG 4652 (adult female).

This species is endemic to the Guiana Shield and is widely distributed in the lowlands of southern Venezuela (Barrio-Amorós and Fuentes 1999). It was included in the Red Book of the Venezuelan Fauna (Rodríguez and Rojas-Suárez 1995, 1999). Barrio-Amorós and Fuentes (1999) and Barrio-Amorós (2001a,b) commented on the improper inclusion of this species in the Red Book, because it is commonly bred in captivity and wild populations are not at risk. *Dendrobates leucomelas* is locally abundant at almost all sites that we sampled in southern Venezuela. We saw dozens of these frogs in a few days, in the foothills of Sarisariñama, in the creek close to Canaracuni, and even in the village itself. Males called during the day in forests, especially after rains. One individual was pale yellow; all others observed were bright orange (Fig. 7).

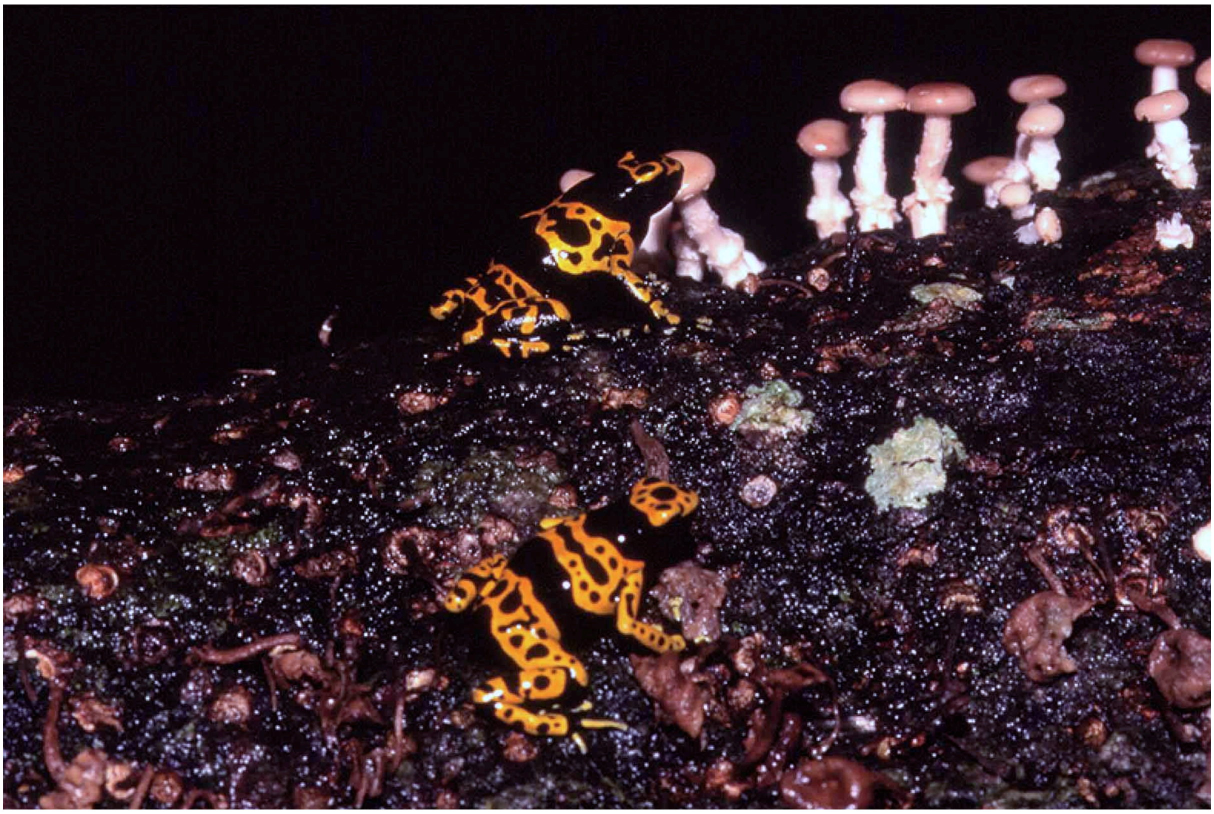

FIGURE 7. Two individuals of *Dendrobates leucomelas*, photographed near Canaracuni (Camp V).

This frog plays an important role in Ye'kwana mythology. It is named "Wanadi Jiñamohidi". The tale is that Wanadi (the main Yek'wana God) was sitting in front of a canwa (hand-made basket) with several frogs as ornaments. Contemplating a good and proper wife, he transformed one of the frog motifs into a live frog in order to make it his wife. She was his fourth wife for a while, until Wanadi rejected her because she spent most of her time painting herself (Civrieux 1991; Barrio-Amorós, unpubl. data). Another version (from Padamo, upper Orinoco) is that Wanadi was looking for a proper wife among all animals, and he loved a brown frog, but she escaped and hid between the leaves of the forest. This happened at least three times, until Wanadi painted the frog with bright yellow and black, thereby precluding her from concealing herself.

Dendrobates leucomelas also is an important motif in Yek'wana handicrafts (Fig. 8). Apart from this motif, we are aware of at least three other frog motifs that we were unable to identify, but clearly they were not *Dendrobates* (Guss 1994; Barrio-Amorós, unpubl. data).

FIGURE 8. Representation of Wanadi Jiñamojidi (= *Dendrobates leucomelas*) on a Yek'wana basket (= *canwa*). From the personal collection of C. Brewer-Carias.

Family Hemiphractidae

Marsupial frogs have been the subject of recent discussion on its phylogenetic classification. See a resumé in Guayasamin *et al.* (2008). Guayasamin *et al.* (2008) recovered the family Hemiphractidae for the five genera *Cryptobatrachus, Flectonotus, Gastrotheca, Hemiphractus* and *Stefania*, placing the families Amphignathodontidae and Cryptobatrachidae into the synonymy of Hemiphractidae.

Stefania riae Duellman and Hoogmoed 1984

Sarisarinama carrying frog, Rana Stefania del Sarisariñama, Müdü Wënäwësiye

Camps II (EBRG 4533–35; 4537–42) and IV (EBRG 4536).

The description of *Stefania riae* was based on three specimens collected by P. Bermúdez during the 1974 Sarisariñama expedition. We collected a sample of 12 individuals, and comment on morphological variation (Table 2), coloration in life, and pattern variability.

Color patterns. *Pattern types*.—Duellman and Hoogmoed (1984) described two different color patterns for *Stefania riae*, one for the holotype (KU 174688) and USNM 212331, consisting of an irregular pattern of indistinct dark brown spots (Duellman and Hoogmoed 1984:Fig. 21), whereas KU 174689 has two pale dorsolateral stripes that fade on the posterior part of the back. These authors also recognized three color patterns among *S. scalae* (their *S. evansi*; Duellman and Hoogmoed 1984:Fig. 9): (A) unpatterned; (B) with pale dorsolateral stripes; and (C) with chevrons or spots on the dorsum. We observed these three patterns plus an additional pattern (here called Pattern D) in *S. riae*; there is no consistent sexual dimorphism in color patterns.

Pattern A (Fig. 9A).—This pattern occurs in the holotype (KU 174688), USNM 212331, and EBRG 4537, 4541–42, 4662. The dorsum of the body is mostly pale brown with or without a few indistinct darker spots; the limbs have dark brown transverse bars (nearly indistinct in EBRG 4662). All have a dirty white to pale brown interorbital bar and a dark brown supratympanic stripe. The ventral coloration varies from pale brown with darker brown spots in EBRG 4662 and EBRG 4537 to white with pale brown spots in EBRG 4541 and uniformly white in EBRG 4542. In life, EBRG 4542 had a pale brown dorsum with a few, scattered small, black small spots, pale orange interorbital bar, and black canthal and supratympanic stripes; the tympanum was brown, darker than the surrounding area, with a pale yellow annulus. Irregular dark brown spots were present on the upper lips. The flanks were pink. Upper surfaces of hands, feet and concealed surfaces of hind limbs also pink.

Pattern B.—This pattern is seen in KU 174689 and in EBRG 4533–36, 4663. This is a variable pattern, in which the only consistent feature is the presence of paler than dorsal background dorsolateral stripes. The dorsum can be dark brown to yellowish brown, separated from the flanks by paler dorsolateral stripes that are distinct (EBRG 4533–34, 4663), nearly indistinct (EBRG 4536), or present only on the anterior part of the body and fading posteriorly (EBRG 4535, KU 174689). In EBRG 4533–34, the dorsolateral stripes extend nearly to the cloacal opening. All individuals have a distinctive pale interorbital bar of the same color as the dorsolateral stripes, and all, except EBRG 4536, have transverse bars on the limbs. The venter is pale brown in EBRG 4533, and 4536, 4663; it is white with irregular brown spots and reticulations in EBRG 4535 and uniform 4534 white in EBRG 4535. In life, EBRG 4535 had a brown dorsum, darkest on the back, with small dark brown and yellow spots and rather indistinct orange dorsolateral stripes, blending into the dorsal ground color in the scapular region. The anterior part of the head and the upper lips were yellow with distinct dark brown labial bars; the flanks were violet. Dorsolateral stripes are common among *Stefania*; the only specimen of *S. breweri* and some individuals of *S. evansi, S. goini, S. marahuaquensis, S. roraimae,* and *S. scalae* have dorsolateral stripes (Barrio-Amorós and Fuentes 2003).

Pattern C (Fig. 9B).—This pattern only occurs in EBRG 4539–40. These two specimens have a dorsal pattern similar to that of Morph C of *S. scalae* (Duellman and Hoogmoed 1984:Fig. 9). A complete interorbital bar is present only in EBRG 4539, but it is incomplete in EBRG 4540. The dorsum is pale brown (EBRG 4539) or yellowish brown (EBRG 4540), with dark brown markings of different sizes on the head and body; in EBRG 4539 the markings consist in complete or incomplete chevrons, whereas in EBRG 4540 the head and anterior part of the body have reticulations and chevrons across the posterior part of the body. Both individuals have distinct dark brown transverse bars on the limbs, a white venter with pale brown mottling, and pale brown ventral surfaces of the legs. In life, the dorsum of EBRG 4540 was bright golden yellow with black markings (Fig. 9B). The groin is purple grayish. Dorsal surfaces of discs dirty yellow and purple gray, all looking much paler.

Pattern D (Fig. 9C).—This pattern is seen only in EBRG 4538. This specimen has a brown dorsum lacking dorsolateral stripes and chevrons but possessing several dark brown spots and golden spots scattered irregularly on the head, body, and limbs. These give the appearance of the frog being dusted with gold. The venter is pale brown. In life, the dorsum of the head, body, and limbs were brown with many irregular black spots, and many yellow golden spots of different sizes. The head was marked with black canthal and supratympanic stripes and yellow labial bars; the fingers and toes were gray, and the iris was bronze.

Morphology. *Stefania riae*, along with *S. tamacuarina*, is the only species exhibiting one or more knobs on the canthus rostralis, a character that separates them from other *Stefania* species. *Stefania riae* can be differentiated from *S. tamacuarina* by its slightly larger discs on fingers and toes, almost indistinct supernumerary tubercles on hands (small, round, and distinct in *S. tamacuarina*), and shagreeneded dorsal skin (weakly granular in *S. tamacuarina*). The easiest distinction is via the dorsal color pattern, consisting in *S. tamacuarina* of a dark rectangular blotch on the anterior dorsum, with the anterior corner of the blotch reaching onto the upper eyelid, and with one or two dorsal blotches posterior to first (Myers and Donnelly 1997), although this probably will vary when a wider sample of individuals will be available.

Natural history. All individuals except for one were found on successive nights in and around the most humid places inside Sima Mayor, where they were especially abundant on mossy walls soaked by water, on

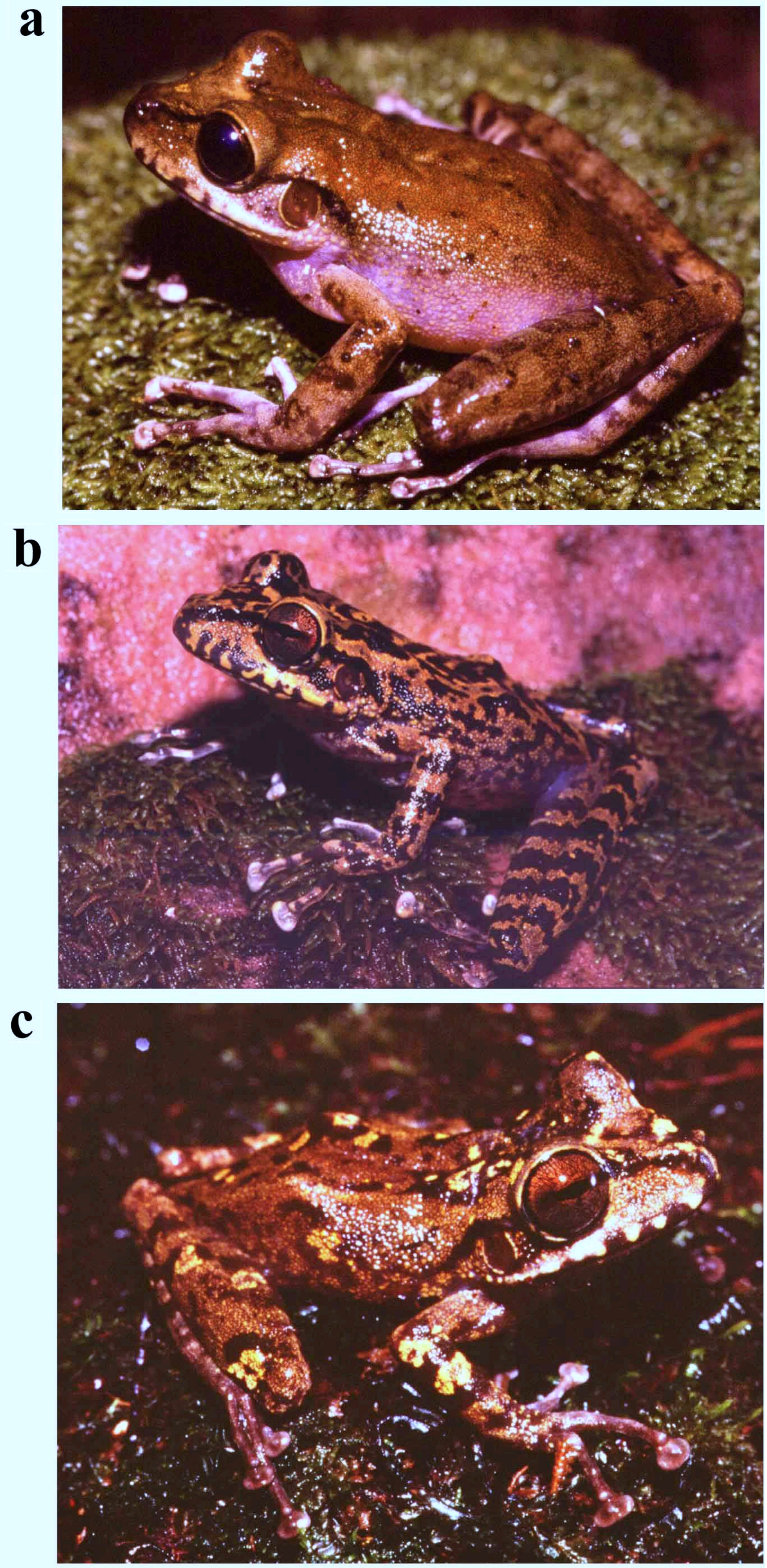

FIGURE 9. Three pattern types of *Stefania riae*. **(A)** pattern type A (see text), **(B)** pattern type C, and **(C)** pattern type D.

bushes and plants 0.3–1.5 m above the ground, and on sandstone walls inside caves or crevices. No *Stefania* were seen at Camp I, at the edge of Sima Mayor. One individual was seen at Camp IV on a mossy wall near a small, slow creek, but 100 m distant from a large cascade with a spray zone.

One female (EBRG 4542) contained fat bodies but no oviducal eggs. No reproductive activity, nor females carrying eggs or juveniles, were observed at Sarisariñama, as was noted for members of this genus at other localities by Gorzula *et al*. (1983), Jungfer and Böhme (1991), Mägdefrau (1991), MacCulloch and Lathrop (2002), Kok and Benjamin (2007), and Kok *et al.* (2006). Observations of reproductive activity in the dry season at Ayanganna, Guyana, led MacCulloch and Lathrop (2002) to suggest that reproduction in *Stefania* is not seasonally constrained. These authors also commented on the few individuals of *Stefania* usually encountered at any one locality, with the exception of *S. ayangannae*, which is the most abundant amphibian at 1400 m altitude on Ayanganna. *Stefania riae* was also fairly abundant inside Sima Mayor, where we collected ten individuals on the first and second nights; although several more were observed on the succeeding six nights, only two more were collected.

A male (EBRG 4535) contained a large insect (Homoptera) in its stomach. No advertisement calls of *Stefania riae,* as were reported for *S. riveroi* by Mägdefrau (1991), were heard, although a release call was emitted by some frogs upon being captured.

Remarks. The head of *Stefania riae* is slightly wider than long (Table 2). In the original description, Duellman and Hoogmoed (1984) stated that the head is as long as wide or slightly longer than wide. In our sample, the head is slightly wider than long in nine individuals and as wide as long in three individuals, but this parameter can vary depending on the methodology used to measure it. Relative head width has been used to distinguish between the *S. evansi* group (head longer than wide or as long as wide) and the *S. goini* group (head distinctly wider than long). According to Rivero (1970), the former group inhabits lowlands to uplands (up to 1500 m), and the latter inhabits highlands above 1500 m. There are few cases of species of different groups living sympatrically, for example *S. percristata* (*S. evansi* group) occurs sympatrically with *S. oculosa* (*S. goini* group) on Jaua-tepui at 1600 m, and *S. goini* (*S. goini* group) occurs syntopically on Duida with *S. marahuaquensis* (*S. evansi* group). Myers and Donnelly (1997) mentioned that *S. tamacuarina* has a slightly wider than long head in the diagnosis as well as in the description of the species, but later, in their Remarks section they stated that “the head of *Stefania tamacuarina* is barely longer than wide.” They stated further that “head length/head width values (0.985 in holotype, 0.994 in paratopotype), are intermediate between values reported for members of the two species groups by Duellman et Hoogmoed (1984:Table 1), but closer to the *evansi* group.” Barrio-Amorós and Fuentes (2003) assigned *S. breweri* to the *S. evansi* group. The three species, *S. riae, S. tamacuarina,* and *S. breweri* occur on uplands in different mountains in the Venezuelan Guiana Shield, and their head proportions are clearly closer to species in the *S. evansi* group than those of the *S. goini* group, which have much wider heads and moderate to well-developed frontoparietal crests. However, the use of head width to distinguish between the two groups of *Stefania* needs to be re-evaluated; these species groups are phenetic and therefore probably mean very little in evolutionary terms.

Although is unlikely that *Stefania riae* occurs outside of the Sarisariñama massif, some Ye’kwanas who had never been to the summit of the massif (due to mythological taboos), recognize this species and call it müdü wënäwësiye.

Family Hylidae

During the course of several excursions to creeks in the foothills of Sarisariñama, as well as to the southern slopes, we found a distinctive population of stream-inhabiting *Hypsiboas* of the *H. benitezi* group (*sensu* Faivovich *et al*. 2005), which approximates the description of *H. benitezi* Rivero 1961 (as *Hypsiboas benitezi*). *Hypsiboas benitezi* is known from a few localities on the slopes of several tabletop mountains in the Venezuelan Guiana Shield (Donnelly and Myers 1991; Myers and Donnelly 1997; Rivero 1961, 1971) and from one locality in Brazil, near the Venezuelan border (Heyer 1994*a*). It has also been reported from Jaua-tepui, Auyan-tepui, and Quebrada de Jaspe in the Gran Sabana (Gorzula and Señaris 1999). Upon comparing specimens from Guaquinima and from Tamacuari, Myers and Donnelly (1997) suggested the possibility of a complex of at least two species.

TABLE 1. Measurements (in mm) of *Hypsiboas tepuianus* **sp. nov.** from Sarisariñama and Jaua. Abbreviations are described in the Material and Methods.

Character	Males (n = 4)		Females (n = 4)	
	Range	Mean ± SD	Range	Mean ± SD
SVL	31.8–36.0	33.8±2.25	38.7–47.7	42.8±4.22
TL	17.0–19.0	17.5±0.97	19.0–23.6	21.3±2.19
FeL	15.6–17.4	16.2±1.13	16.0–21.5	19.1±2.32
FL	12.0–14.0	13.1±0.88	15.8–18.3	16.9±1.26
HeL	11.0–12.3	11.5±0.67	12.5–15.8	14.3±1.42
HW	11.0–12.5	11.9±0.66	13.5–16.6	14.8±1.50
InD	2.5–2.8	2.6±0.17	2.8–3.5	3.3±0.35
UEW	3.3–4.0	3.7±0.35	3.3–4.5	4.0±0.51
IOD	4.0–4.5	4.1±0.25	5.0–5.8	5.4±0.43
EN	3.2–4.0	3.9±0.33	3.8–5.0	4.4±0.59
ED	3.6–4.2	3.2±0.44	4.0–5.5	4.6±0.64
TD	(indistinct)	(indistinct)	1.5–1.8	1.6±0.15
FD	1.3–1.8	1.5±0.21	1.8–2.6	2.1±0.34
4TD	1.1–1.7	1.3±0.27	1.3–2.2	1.8±0.38
ETS	5.5–6.0	5.8±0.23	6.6–7.2	6.8±0.30
1FiL	5.0–6.0	5.3±0.47	6.0–7.5	6.8±0.70
2Fil	4.5–5.5	5.5±0.14	5.0–7.6	6.4±1.12

Among the known specimens of *H. benitezi*, we were also able to recognize two populations. One of these ranges to the west of the Sierras de Maigualida and Parima (specimens from Duida-Marahuaka, upper Orinoco and Tapirapecó) and this population is referable to *H. benitezi*. The other ranges to the east of that range (including the areas of Jaua-Sarisariñama, Auyan-tepui, Gran Sabana, Guaiquinima, and Vila Pacaraima). The specimens from Guaiquinima (Donnelly and Myers 1991) and Vila Pacaraima, Brazil (Heyer 1994a) are smaller (males SVL 31–36 mm, females 36–47 mm in Guaiquinima; 32.1–36.5 mm for males, 43.6 mm in one Brazilian female) than individuals from Tamacuari (males 38.4–43.5 mm, females 44.9–51.4 mm; Myers and Donnelly 1997), or from Duida (males to 42.5 mm, females to 47.0 mm; Rivero 1971). Based on the size of specimens from Sarisariñama these are most like specimens from eastern populations (Table 1). Furthermore there is a discrete ridge of ulnar tubercles in the specimens from Duida and Tamacuari, which is absent in the specimens from Guaiquinima and Sarisariñama. The calls from Guaiquinima and Brazil are virtually identical and consist of 3–5 notes with frequencies always higher than 2000 Hz. Those from Tamacuari produce 2 or 3 notes with frequencies lower than 2000 Hz; furthermore, note duration of Tamacuari recordings are longer (Myers and Donnelly 1997). Thus, we are confident that the specimens from Guaquinima, Sarisariñama, and Vila Pacaraima constitute an unnamed taxon and that the larger frogs from Duida-Marahuaka and Tamacuari are indeed *H. benitezi*. The division of *H. benitezi* into two taxa follows a pattern of vicariance associated with an axis following the Maigualida-Parima Mountains, in which the headwaters of the upper Orinoco and Ventuari rivers are separated from the Caura, Paragua, and Caroní drainages. Other examples following the same biogeographic pattern are *Oreophrynella* (to the east) and *Metaphryniscus* (to the west; Señaris *et al*. 1994), *Leptodactylus rugosus* (to the east) and *L. lithonaetes* (to the west; Heyer 1995; Heyer and Heyer, 2001; Heyer and Thompson 2000), *Otophryne robusta* (to the east) and *O. pyburni* (to the west; Barrio-Amorós 1998*a*), *Bothriopsis bilineata bilineata* to the east, and *B. b. smaragdina* to the west (Campbell and Lamar 2004), and by the absence of certain other species of *Hypsiboas* (e.g., *H. lemai* and *H. sibleszi*) west of Maigualida and Parima (although a *H.* cf. *sibleszi* is mentioned from cerro Guanay, west of Maigualida, by Señaris and Ayarzagüena 2006, this must be confirmed).

TABLE 2. Measurements (in mm) of *Stefania riae* from Sarisariñama. Abbreviations are described in the Material and Methods.

Character	Males (*n* = 6)		Females (*n* = 5)	
	Range	Mean ± SD	Range	Mean ± SD
SVL	40.0–58.0	51.4 ± 6.49	51.5–59.5	55.8± 3.01
TL	26.0–36.0	31.4 ± 3.23	33.5–38.0	35.8 ± 1.60
FeL	21.0–32.0	28.1 ± 3.97	29.0–36.0	32.6 ± 2.62
FL	18.8–28.8	20.4 ± 3.71	25.5–29.4	27.0 ± 1.44
HeL	15.2–21.0	19.2 ± 2.56	19.0–21.0	20.3 ± 0.86
HW	15.0–22.8	19.7 ± 2.79	19.0–22.8	21.0 ± 1.44
InD	3.0–4.3	3.5 ± 0.52	3.4–4.3	3.9 ± 0.32
UEW	4.0–6.8	5.8 ± 0.93	5.0–7.0	6.3 ± 0.77
IOD	4.5–6.2	5.2 ± 0.73	5.0–6.8	6.3 ± 0.86
EN	4.7–7.3	6.0 ± 1.02	6.0–7.8	6.7 ± 0.71
ED	5.0–7.0	6.6 ± 0.78	6.0–7.0	6.6 ± 0.4
TD	2.8–4.0	3.5 ± 0.46	3.4–4.0	3.7 ± 0.28
FD	2.1–4.0	3.1 ± 0.69	3.1–3.8	3.4 ± 0.33
4TD	1.2–3.0	2.2 ± 0.68	2.2–2.8	2.5 ± 0.28
ETS	7.7–10.0	9.0 ± 0.4	9.0–10.0	9.7 ± 0.3
1FiL	8.5–12.0	10.6 ± 1.25	12.0–13.8	10.0 ± 0.76
2Fil	7.2–11.0	9.0 ± 1.20	9.0–11.0	9.8 ± 0.90

***Hypsiboas tepuianus* sp. nov.**

(Figs. 10A, B, C)
Tepui tree frog, Rana tepuyana

"*Hyla benitezi*: Donnelly & Myers, 1991:11; Heyer, 1994a:497; Gorzula & Señaris, 1999:27; *Hypsiboas benitezi*: Faivovich *et al*. 2005: 86."

Holotype. EBRG 4653, an adult female from the southern slope of Sarisariñama-tepui, Locality VI, Estado Bolívar, Venezuela (4º25' N, 64º7' W), elev. 420 m, collected by César L. Barrio-Amorós on 22 March 2002.

Paratypes. Four paratypes (all males, EBRG 4654–56, 4877) with the same collection data as the holotype. EBRG 20–21 from Río Marajano, Jaua-tepui, Estado Bolívar, Venezuela, elev. 1800 m, collected by P.A. Bermúdez on 27 February 1974; EBRG 3435 from Jaua-tepui, Estado Bolívar, Venezuela, elev. 1600 m, collected by J.C. Señaris, between 9 and 12 June 1994; MBUCV 6701–06 (formerly AMNH 133849–54), from

Summit Camp I (elev. 1030 m), Guaiquinima, Estado Bolívar, Venezuela, collected by M.A. Donnelly and C.W. Myers on 24 February 1990.

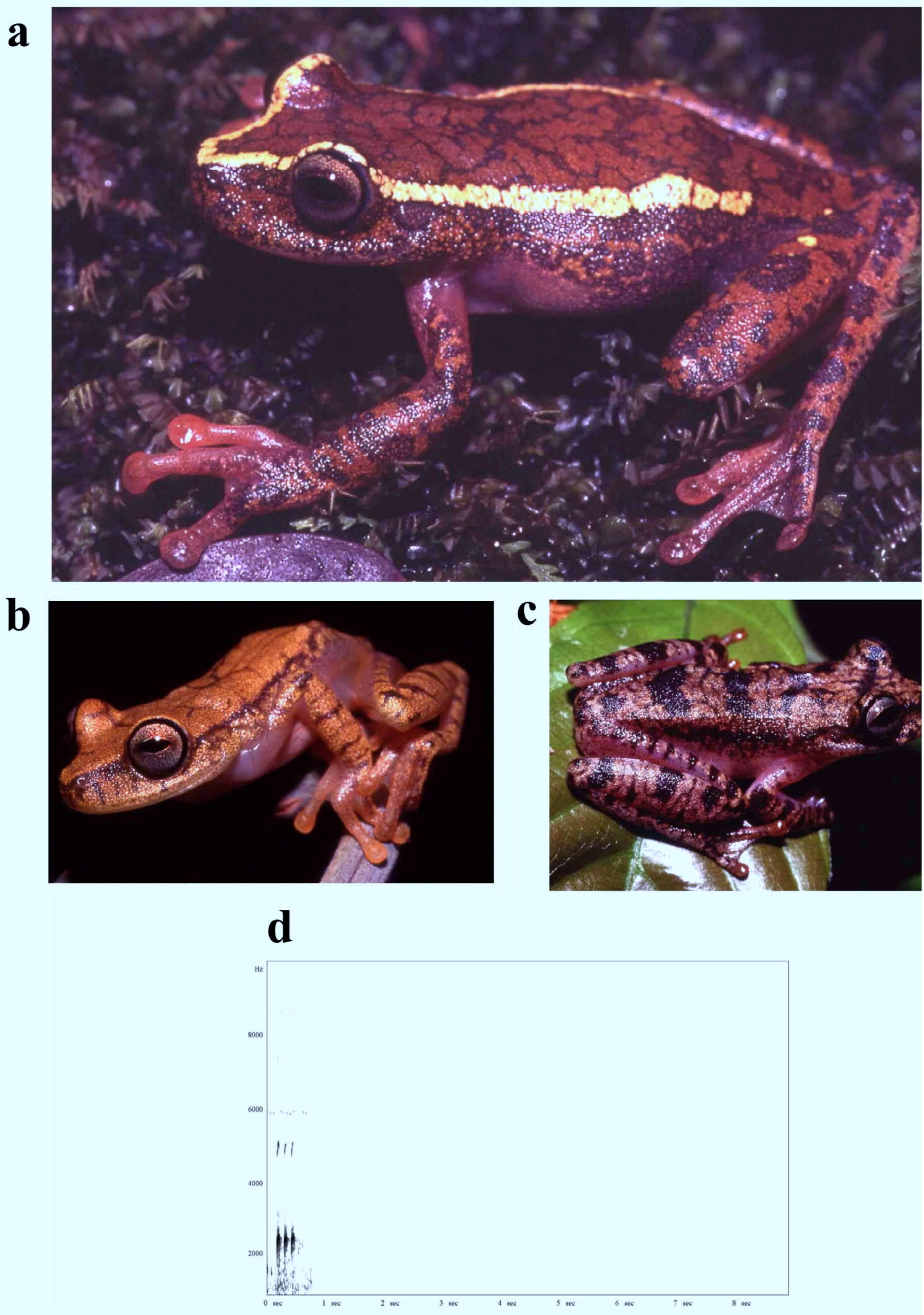

FIGURE 10. Three individuals of *Hypsiboas tepuianus* sp. nov., showing color variation of the species. Shown are **(a)** the female holotype (EBRG 4653), and two male paratypes, EBRG 4654 **(b)** and EBRG 4655 **(c)**. **(d)**, advertisement call, recorded at 23 ºC.

Etymology. The specific name is an adjective derived from *tepui* + *-anus* (*tepui* is a Pemon word meaning mountain, and applied to those table mountains typical from southern Venezuela; and *–anus* is the suffix meaning "belongig to").

Diagnosis. *Hypsiboas* of the *H. benitezi* group (sensu Faivovich *et al*. 2005) with (1) dorsal skin smooth to weakly shagreeneded, ventral skin smooth to weakly granular; (2) tympanum indistinct, barely evident in some individuals; (3) snout rounded to truncate in dorsal view, rounded in profile; canthus rostralis distinct, rounded; (4) choanae moderately large, elliptical; dentigerous processes of the vomers distinct, / \ -shaped to arched, with 7–16 teeth on each process; tongue not free, wide, round, slightly cordiform; (5) vocal slits reaching from midlength of tongue to the posterior edge of jaw; (6) FI = FII; (7) fingers lacking lateral fringes; (8) ulnar tubercles absent or almost indistinct; (9) calcars absent; (10) two metatarsal tubercles, inner elliptical, outer minute, almost indistinct; (11) toes lacking lateral fringes; (12) in preservative, dorsal ground color pale yellow to gray and various shades of brown (holotype darkest specimen), with transverse dark brown lines or bars, or reticulum, or dorsolateral stripes; venter immaculate white; in life, dorsum bright yellow with brown markings, or brown with gray markings, or dark brown with yellow dorsolateral stripes; fingers, toes, and webbing reddish orange; (13) SVL 30–36 mm in males, 34.5–47.7 mm in females.

Among the *Hypsiboas* inhabiting the Guayanan region, *H. tepuianus* may be confused with similar, brown-colored species but can be distinguished from them as follows (characters of *H. tepuianus* in parentheses). *Hypsiboas benitezi*, which most closely resembles *H. tepuianus*, is larger in size, has a ridge of discrete ulnar tubercles (absent or almost indistinct), and has a different advertisement call. *Hypsiboas lemai* has a yellow dorsal ground color, but can be brown during the day (yellow to dark brown), FI < FII (FI = FII), and all of its fingers are basally webbed (webbing absent between FI and FII). *Hypsiboas rhythmicus* has cream fingers, toes, and webbing (reddish orange), a golden iris in life (grayish to bronze), small discs on fingers and toes (large), an advertisement call consisting of a single note with dominant frequency at 3260–3450 Hz (2–5 notes at 2500 Hz; Fig. 10D), and it calls from undersides of leaves (calls from over leafs and sticks). *Hypsiboas jimenezi* and *H. sibleszi* are both mainly green in life (brown to yellow). *Myersiohyla loveridgei* has a distinct tympanum, 50% ED (indistinct, 33% ED), a distinct supratympanic fold (indistinct), a distinct transverse fold on the heel (absent), flanks mottled with white, and an orange coloration in life (mottling absent). *Hyla warreni*, a species *incertae sedis* among South American hylid frogs in view of the revision of Hylidae by Faivovich *et al*. (2005), has a distinct tympanum (almost indistinct), an axillary membrane (absent), and a cream venter with brown spots (immaculate white; Duellman and Hoogmoed 1992).

Description. Size moderate, with SVL in four males 31.8–36.0 mm (mean 33.8 mm), in four females 38.7–47.7 mm (mean 42.8 mm). Body relatively robust; head large (HeL = 31–35% SVL), slightly wider than long, slightly wider than body; IOD = 34–36% HW; upper eyelid broad (UEW = 68–82% IOD); snout rounded in dorsal view, sometimes truncate, rounded in profile, long (distance from anterior border of eye to tip of snout 48–52% HeL); interorbital and internarial areas flat, canthus distinct, rounded; loreal region slightly concave; lips not flared; supratympanic fold weakly defined; tympanum indistinct, TD = 32–39% ED; palpebral membrane unpigmented; tongue round, slightly cordiform, not free; vocal slits present, extending from midlength of tongue to posterior edge of jaw; dentigerous process of vomers / \ -shaped to arched, with 7–16 teeth on each, depending on individual size.

Forearms moderately robust; axillary membrane absent; ulnar tubercles absent (very weak protuberances in some specimens); fingers long with round, broad (wider than fingers) terminal discs; disc on FII slightly wider than that on FI, in both cases more than twice of TD; FI = FII (FI just slightly longer than FII in holotype, EBRG 4654–55, EBRG 4877, EBRG 21; FII slightly longer than FI in EBRG 20, 4656; FI = FII in EBRG 3435); webbing between FI and FII basal (e.g., MBUCV 6704) or absent (e.g., holotype), webbing formula for the rest of the hand **II**2–3**III**2 2/3–2**IV**; fingers with or without lateral fringes; subarticular tubercles round, prominent, distal ones on FIII and FIV weakly and conspicuously bifid, respectively; subarticular tubercle on FI is weakly bifid in some specimens; supernumerary tubercles and palmar tubercle indistinct;

thenar tubercle large, elliptical; enlarged pollex with hidden prepollical spine, larger and more prominent in males than in females.

Hind limbs long (heels extending beyond snout in males and smaller specimens but only reaching the eyes in females); tarsal fold absent; toes long; extensively webbed; modal webbing formula **I**1–1**II**1–1**III**1–1½**IV**1½–1**V**; inner metatarsal tubercle flat, oval; outer metatarsal tubercle nearly indistinct, round, or absent; subarticular tubercles moderately large, round, simple; supernumerary tubercles absent.

Skin of sides of the head and flanks granular to smooth, that on dorsum of head and body smooth to shagreened; chest and throat smooth; belly finely to coarsely granular; ventral surfaces of limbs granular; cloacal opening directed posteriorly at upper level of thighs; supracloacal flap short; anal ornamentation consists of a series of white tubercles on both sides of the vent opening in males.

In life, the flanks and dorsal surfaces of the head, body, and limbs of the female holotype were brown with dark brown reticulations; distinct yellow dorsolateral stripes, extending from the tip of the snout almost to the groin, and the fingers and toes were reddish orange (Fig. 10A). The dorsum in a male (EBRG 4654; Fig. 10B) was bright yellow with a fine dark brown reticulation; dark brown canthal and supratympanic stripes were continuous with a narrow brown dorsolateral stripe, that was not as conspicuous as the yellow stripe in the holotype; the fingers and toes were pale orange. Another male (EBRG 4655; Fig. 10C) was brown dorsally, with black wide transverse stripes, and narrow lines; its venter was pink.

In preservative, the holotype is reddish brown with darker brown reticulations on the dorsum; the dorsolateral stripes are dirty white, and the fingers and toes are pale yellow. A specimen from Guaiquinima (MBUCV 6701) is a small male with the same pattern as the holotype. A female (EBRG 3435) from Jaua-tepui has bright white canthal stripes that continue onto the edges of the upper eyelids. Conspicuous or indistinct brown transverse bars are present on the arms and hind limbs in all specimens, except in MBUCV 6704 from Guiaquinima, in which the dorsum is pale brown dorsum with indistinct transverse bars on the body. Somewhat more distinct transverse bars are present on the dorsum in MBUCV 6702. The dorsum in EBRG 4654, MBUCV 6703, and 6706 is pale yellow with dark brown reticulations. The dorsum in MBUCV 6705 is brown with many melanophores and indistinct darker brown transverse bars, whereas EBRG 4655–56 and EBRG 4877 are gray with dark gray transverse bars. Variation is independent of geography.

Natural history. *Activity*.—All specimens collected were active at night; calling males were sitting on branches and leaves about 0.5 m above the water. One female was in the spray zone of a waterfall. In Guaiquinima, Donnelly and Myers (1991) also report the species (as *Hyla benitezi*) to be perched at night 1–2 m above water or on rock faces near small waterfalls. The absence of the right foot in EBRG 4877 may be the result of predation.

Vocalization.—Males called from perches in bushes, 0.5–1.5 m above streams. Our recording, made beetwen 1900–2000 h, temperature 23ºC, are of low quality because of the background noise from the stream. Several males produced calls with three notes. The illustrated call (Fig. 10D) has duration of 269 ms, and the first note is 50 ms long. The dominant frequency is 2500 Hz (fundamental 1700 Hz). The call show harmonics at 4900 and 7500 Hz; these are not evident in the audiospectrograms in Donnelly and Myers (1991) or Heyer (1994*a*). Another call of five notes (not illustrated) had a frequency of 2500 Hz. As noted by Myers and Donnelly (1997), the calls of frogs from Tamacuari (western part of the Venezuelan Guayana Shield), Guaiquinima, and Pacaraima, and now from Sarisariñama (eastern part), can be well differentiated. The only recording from a western population (Tamacuari; frequency mainly at 1880 Hz) has a lower dominant frequency that lies 300–480 Hz lower than recordings from Guaiquinima and Pacaraima (2360 Hz and 2000–2180 Hz respectively). The recording from Sarisariñama has the highest dominant frequency at 2500 Hz and also has two harmonics at higher frequencies.

At an elevation of 1600 m on Jaua-tepui, *Hypsiboas tepuianus* occurs sympatrically with *H. rhythmicus* (Señaris and Ayarzagüena 2002). The advertisement call of *H. rhythmicus* is a series of rhythmically repeated single notes 111–162 ms in duration with a dominant frequency of 3260–3450 Hz.

Distribution. *Hypsiboas tepuianus* ranges through lowlands and uplands (400–1600 m) of the Venezuelan Guayana and extreme northern Brazil (Vila Pacaraima, Heyer 1994a) east of the Sierra de Maigualida-Parima. The known localities (Fig. 11) include Auyan-tepui (C. Señaris, pers. comm.) and the upper Río Ambutuir (Gorzula and Señaris 1999), Guaiquinima (Donnelly and Myers 1991), Sarisariñama-tepui (this paper), Jaua-tepui (Gorzula and Señaris 1999; Señaris and Ayarzagüena 2002), and Quebrada de Jaspe (Gorzula and Señaris 1999). *Hypsiboas benitezi* is known from several localities (Fig. 11), all west of Sierra de Maigualida-Parima, including Duida (Rivero 1961), Marahuaka (Rivero 1971), Tamacuari (Myers and Donnelly 1997), and Apepada, upper Río Ventuari (EBRG 1897).

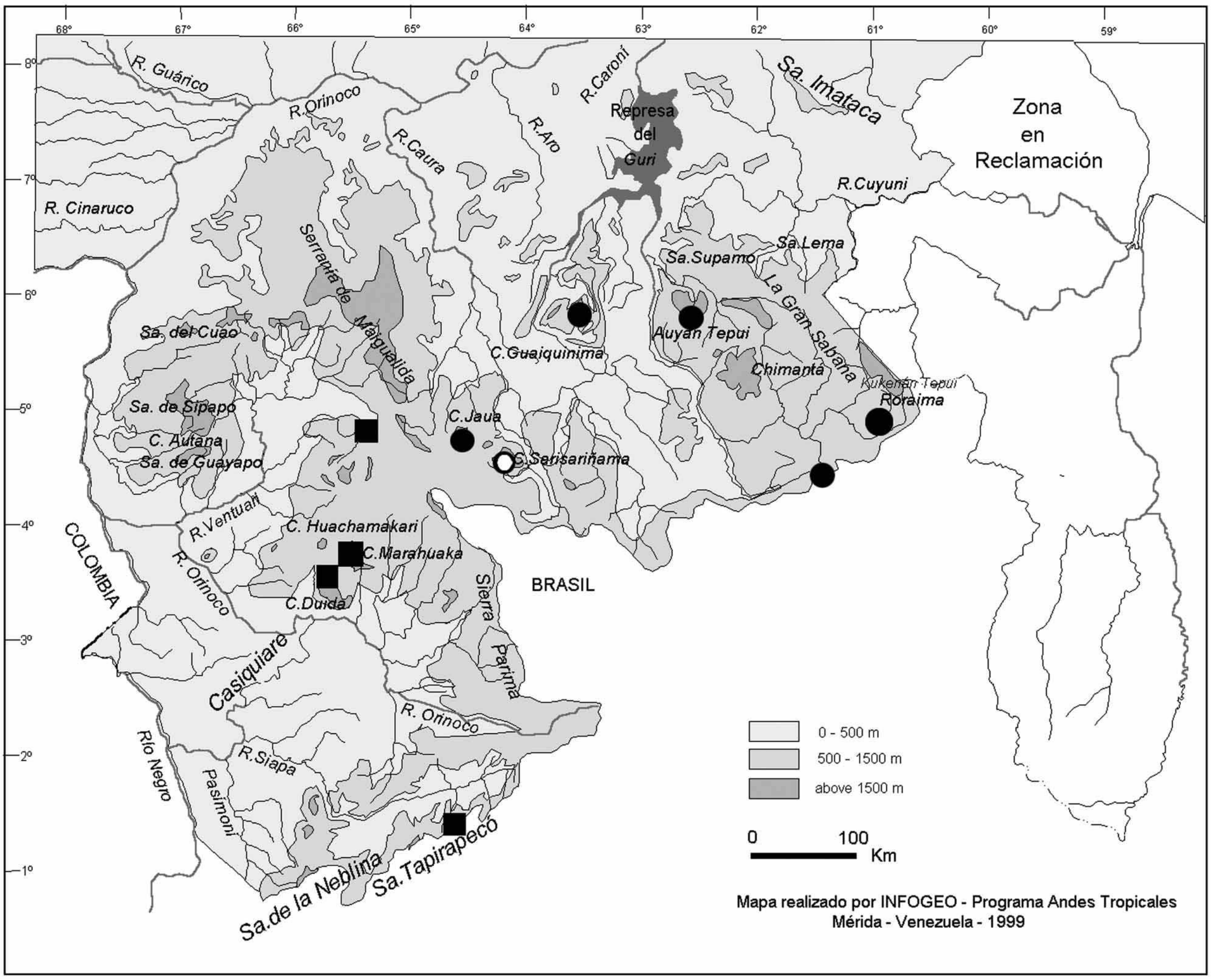

FIGURE 11. Distribution of *Hypsiboas tepuianus* sp. nov. (dots) and *H. benitezi* (squares) in southern Venezuela. The circle indicates Sarisariñama, the type locality of *H. tepuianus*.

Remarks. *Hypsiboas tepuianus* apparently has a mental gland (sensu Faivovich *et al*. 2006). We did not consider this character in the diagnosis or description, however, because we consider that it is very subjective, and not easy to determine. For instance, while it is easily identificable in *Hyloscirtus colymbus, H. palmeri* and *H. albopunctulatus* (see Fig 4 in Faivovich *et al*. 2006), it is much less obvious in *Hypsiboas nympha* and *H. lemai* (same Fig 4; Faivovich *et al*. 2006), and to us, an object of subjective appreciation. In two specimens of *H. lemai* examined (to be deposited in EBRG), the senior author could not distinguish the mental gland. In two more specimens of *H. jimenezi*, he either could see any gland (in accordance with Señaris and Gorzula 2006). Examining the mental zone of male paratypes of *H. tepuianus*, is possible to discern a whitish quadrangular area, but it is also present in the female. For this reason, we cannot conclude with confidence that this is the mentioned mental gland of Faivovich *et al*. (2006).

Examined material. *Hypsiboas benitezi*.—VENEZUELA: Estado Amazonas, Apepada, upper Río Ventuari, EBRG 1897.

Hypsiboas tepuianus.—VENEZUELA: Estado Bolívar, Río Marajano, meseta de Jaua, EBRG 20–21; Jaua (4º49’55’’N, 64º25’64’’W), elev. 1600 m, EBRG 3435; Guaiquinima, MBUCV 6701–06 (former AMNH 133849–54).

Hypsiboas boans (Linnaeus 1758)

Gladiator tree frog, Rana arbórea común, Kï-tó

Camp V. 7 March 2002. EBRG 4657 (adult male).

Hypsiboas boans is common in the lowlands and uplands of the Guayana Shield. Males were calling from bushes and trees near the Río Canaracuni and in its tributaries on 7 March 2002. They ceased calling during a week of rains, but recommenced calling immediately after the rains ceased. In a creek near Canaracuni, we saw a surface film egg mass in the water close to a rocky shore. Only *H. boans* and *Chaunus marinus* were calling and breeding at that time. We observed no typical excavated nests of *H. boans*, but we suspect that the egg mass belonged to that species (Caldwell 1992). Gorzula (in Duellman 1997) stated that *H. boans* in the Gran Sabana uplands does not make nests. However, the Sarisariñama population lives at an altitude of 400 m and 200 km west of the Gran Sabana, in a tributary of the Caura River, which is a typical lowland region. *Hypsiboas boans* is a facultative nest-builder in some places (e.g., Santa Cecilia, Ecuador; Duellman 1978), as are *H. crepitans* (Caldwell 1992) and *H. pugnax* (Chacón 2001) in Venezuela. The senior author also observed clutches of *H. boans* in Parque Nacional Manu, Peru (Barrio-Amorós and Chaparro 2004), and at Sierra de Lema (Barrio-Amorós and Duellman, in press) with no nests associated. *Hypsiboas boans* is an important protein source in dry season for the Ye’kwana people. We do not know the details of its preparation.

Hypsiboas cf. *crepitans* (Wied-Neuwied, 1824).

Emerald-eyed tree frog, Rana platanera; Kuhaka

Camp V. 26 March 2002. EBRG 4658 (adult male).

Hypsiboas crepitans is common in open habitats in northern South America. In Venezuela, it is known from savannas, forest edges, and mountains up to 2000 m (Andes and Cordillera de la Costa) and in human settlements (Barrio-Amorós 1998a). Duellman (1997) stated that frogs from La Gran Sabana are different from the “typical” morph. Distinct populations are known throughout the range (Barrio-Amorós 2004). Populations differ in size, color, call, and calling sites. One of these is represented by forest-dwelling *H. crepitans*, which during the day are bluish tan with white spots, whereas at night they are brown with dark brown to black vertical bars on the flanks, as is typical for most populations of *H. crepitans*. The senior author found this same pattern to be widespread in lowland rainforests in southern Venezuela; it also is known in French Guiana (Lescure and Marty 2000). We saw only one non-calling male on the riverbank. In March 1997 at Santa Maria de Erebato (a nearby Ye’kwana community), females and several calling males were observed in a small water channel at night close to the Ye’kwana village.

Osteocephalus taurinus Steindachner 1862

Common casque-headed frog, Rana de casco común, Ko-maka

Camp II. 12 March 2002. EBRG 4659 (adult female).

Locality VI. 23 March 2002. EBRG 4660–61 (adult males).

This species is widespread in southern Venezuelan lowlands and uplands, where it breeds in ponds, lakes and streams in primary and secondary rainforest (Donnelly and Myers 1991; Duellman 1978; Lescure and Marty 2000; Trueb and Duellman 1971). Two males were on the bank of a stream, about 8 m apart from each other, on the southern slope of Sarisariñama. Trueb and Duellman (1971) stated that this species is wary and escapes quickly, but our specimens were captured without difficulty. A female of this species was collected inside Sima Mayor, and its presence there was unexpected. In Sima Mayor there is no standing water other than that contained in bromeliads. We never observed other *O. taurinus* in bromeliads there nor in other places, although many other *Osteocephalus* are known to inhabit and reproduce in bromeliads (Jungfer and Schiesari 1995; Jungfer *et al*. 2000; Faivovich *et al*. 2005). This species is often encountered in bushes and trees at night in the middle of the forest, especially adult females, both in Venezuela and Peru (CLBA, unpubl. data). The unexpected discovery of a female of this species inside Sima Mayor, and the fact that we never heard males calling there, suggests an accidental presence. It is likely that certain lowland species capable of climbing into crevices, such as *O. taurinus* or *Norops ortonii*, may find and follow one of the subterranean water channels that undermine the entire massif (Brewer-Carías 1983). A search for a water source during the dry season may provide sufficient incentive for such a journey, and it may lead a few of these animals to unusual habitats, such as Sima Mayor.

This species is eaten by the Ye’kwanas. We have no data about how this species is prepared in this area, but we have observed the Yanomamo people at the Padamo River in the upper Orinoco gathering a similarly-sized species, *Trachycephalus venulosus*, by stringing up hundreds of live frogs on a single liana.

Family Leptodactylidae

Leptodactylus cf. *andreae* Müller 1923

Lowland tropical bullfrog[1]

Locality VI. 20 March 2002. EBRG 4664–65 (adult male and adult female, respectively).

Species assignment. The taxonomy of the former genus *Adenomera* is confusing (Heyer 1973, 1977; De la Riva 1995). In Venezuela, two species were reported in that genus, *A. andreae* and *A. hylaedactyla*, which are difficult to distinguish morphologically. Frost et al (2006) place *Adenomera* in the synonymy of *Leptodactylus*. We tentatively assign our specimens to *L. andreae* because of habitat (rainforest versus open areas typical of *A. hylaedactyla*), and expanded toe tips (slender toes in *A. hylaedactyla*). Gorzula and Señaris (1999) pointed out that black bones are visible through the skin on the toes in *A. hylaedactyla*, although J.D. Lynch (in litt.) is confident that this character does not correspond with that species; the black bones are also visible in our specimens.

Vocalization. We heard calls from 1700 h to dusk in the foothills of Sarisariñama. Males called from forest litter near a creek in rainforest. The call, recorded at 26ºC, consists of one note, repeated approximately every second; the notes have duration of 60 ms, a dominant frequency of 5200 Hz, and a lower harmonic with the fundamental frequency at 1400 Hz (Fig. 12). Recordings of this species from French Guiana (Lescure and Marty 2000) and from Bolivia (Márquez *et al*. 1995) agree with our recording, but disagree with that from Peru (Angulo and Icochea 2003), in which the dominant and fundamental frequencies are the same, at 2370 Hz. In contrast, the call of *A. hylaedactyla* consists of three notes per second (Márquez *et al*. 1995).

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[1] As one reviewer of the work stated, the name bullfrog is not proper to such small frog as *Adenomera andreae*, as it has been widely used for centuries to big North American frogs (*Lithobates catesbeianus*). We just follow Frank and Ramus (1995) although are clear that many of the proposed names by these authors are not proper.

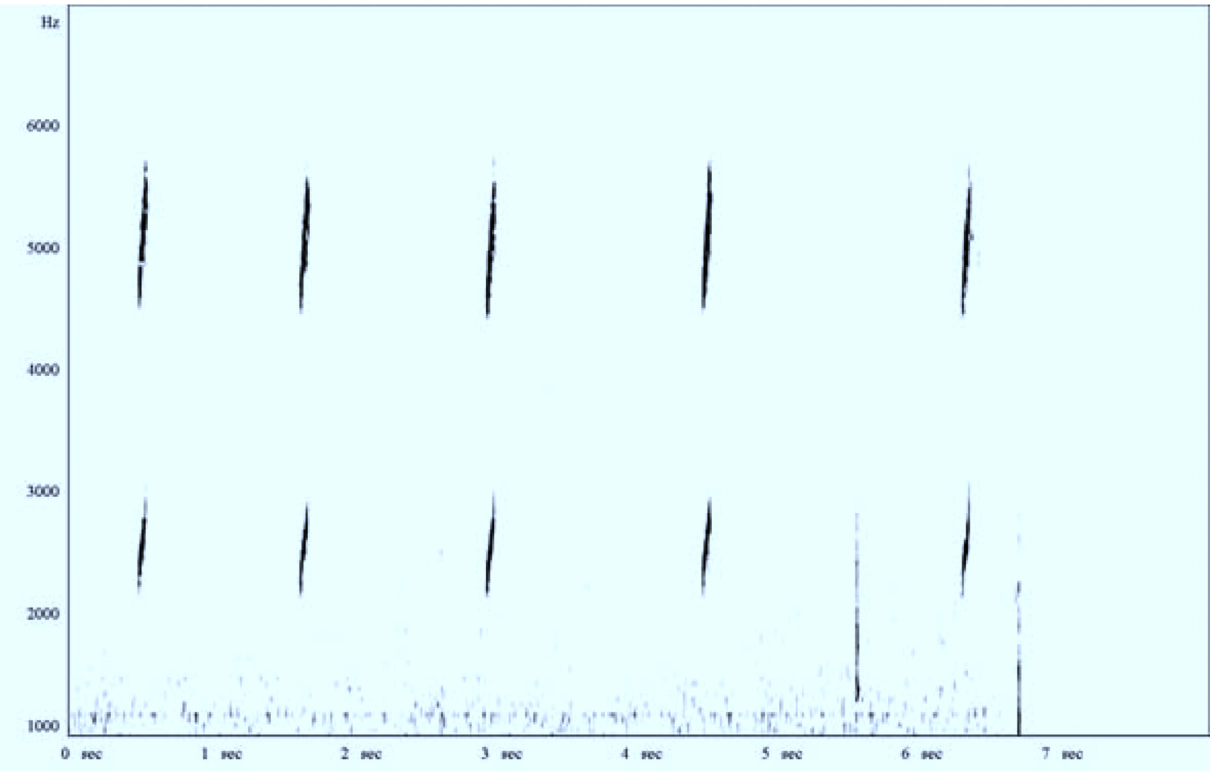

FIGURE 12. Advertisement call of *Adenomera andreae*, taken at 26ºC, from the foothills of Sarisariñama.

Leptodactylus diedrus Heyer 1994

Smooth jungle frog, Sapito confuso, Wa-wa

Camp V. 19 March 2002. EBRG 4666 (adult male).

The specimen fits the description of *Leptodactylus diedrus* given by Heyer (1994b) in lacking dorsolateral folds, having an unpatterned belly, and by the presence of slightly enlarged toe tips lacking discs. It also has a rounded canthus rostralis, large tympanum (about 2/3 diameter of eye diameter), weak fringes on interior edges of FII and FIII, two moderately large black thumb spines, dorsum with many small tubercles (spicules) that are more numerous posteriorly, smooth venter, posteroventral surfaces of thighs areolate, no spines on the chest, fringes well developed on toes, distinct pale metatarsal and tarsal folds, and posterior surfaces of tarsus and plantar surfaces with diminutive tubercles. Heyer (1998) noted that specimens of *L. diedrus* usually have a groove on the superior part of the expanded toe tip; this is not apparent in EBRG 4666.

Leptodactylus diedrus was reported from Venezuela by a single record from Cerro Neblina (McDiarmid and Paolillo 1988) as *Vanzolinius discodactylus*. Heyer (in litt.) subsequently positively identified these specimens (USNM 307105–06) as *L. diedrus*. *Vanzolinius discodactylus* is then not yet known from Venezuela. Our specimen was found at the edge of Canaracuni stream at night. Small *Leptodactylus* are called wa-wa by the Ye'kwanas.

Leptodactylus riveroi Heyer et Pyburn 1983

Rivero's white-lipped frog, Sapo-rana rugoso de Rivero, Jujüku

Camp V. 19 March 2002. EBRG 4667 (adult female).

This species is known in Venezuela from scattered localities in the states of Amazonas and Bolívar (Barrio-Amorós 1998a). It also occurs in the northern Brazilian and Colombian Amazon (Heyer and Pyburn 1983; Lynch and Vargas Ramírez 2001). Our specimen has a SVL of 54 mm and it conforms to the original description (Heyer and Pyburn 1983). The dorsolateral folds are bordered laterally by an indistinct darker gray stripe. The flanks are gray with symmetrical supra axillary black spots. A dark gray canthal stripe begins on the tip of the snout but does not reach the eye. A black supratympanic fold extends from the eye to the rear of the tympanum. A distinct white stripe extends posteriorly to the scapular region from a point below the eye. The venter is white with small brown dots on the throat, and larger spots on the chest and belly (unlike the striking reticulated pattern seen in Rivero 1968). Our specimen was sitting 0.5 m from the edge of Canaracuni stream at night. Medium-sized *Leptodatylus* are known as jujüku by the local inhabitants.

Family Ranidae

Lithobates palmipes **Spix 1824**

Neotropical green frog, Rana verde verdadera, Murunashi

Camp V. 7 March 2002. EBRG 4679 (recent metamorph).

Locality VI, several observed.

Large tadpoles (some with hind limbs) agreeing with the descriptions by Acosta (1999) and Hillis and De Sá (1988) were seen by day and night feeding on algae or resting on the litter in Canaracuni Creek. Three adults and juveniles were observed along 1 km of the creek. *Lithobates palmipes* is a highly appreciated food by Ye'kwanas.

Family Strabomantidae

Recently Hedges *et al.* (2008) erected this new family to locate most of the former South American *Eleutherodactylus*, already transferred to the genus *Pristimantis* Jiménez de la Espada, by Heinicke *et al*. (2007). The assignation of the new species below to the genus *Pristimantis* accomplish the generic diagnosis by Hedges et al. (2007) for the genus.

Pristimantis **cf.** ***cavernibardus*** **Myers and Donnelly 1997**

(Fig. 13)

Ranita tamacuarina cantora

Camps I, II, and IV. 15 and 16 March 2002. EBRG 4676–78 (adult males).

These specimens fall within the variation of *Pristimantis cavernibardus* described by Myers and Donnelly (1997) in the original description. Because of a lack of adequate comparative material, we are unable to refer our specimens to *P. cavernibardus* with complete confidence beyond comparisons with the original species description. We recognize the need for a more comprehensive study of this species. This is an abundant species on the summit of Sarisariñama, where it calls during the rainy or cloudy days from roots and moss. Barrio-Amorós and Molina (2006) described *Pristimantis aracamuni* from the summit of Aracamuni, a granitic mountain about 380 km SSW from Sarisariñama, but sharing some especial features that clearly indicate its common origin. Both species show diurnal activity, a trill call, lack of vomerine teeth, notched discs, and a green lichen color and pattern.

FIGURE 13. Individual of *Pristimantis* cf. *cavernibardus* (EBRG 4678).

Pristimantis sarisarinama sp. nov.

(Figs. 14A, B, C, E, F)

Sarisariñama Rain Frog, Ranita de Neblina de Sarisariñama

Holotype. EBRG 4668, an adult male from Sima Mayor, Sarisariñama-tepui, Estado Bolívar, Venezuela (4°41' N; 64°13' W), elevation 1100 m, collected on 15 March 2002 by César L. Barrio-Amorós and Javier Mesa.

Paratypes. EBRG 4669–75 with the same data as holotype.

Etymology. The specific name is a noun in apposition and refers to the tabletop mountain where the species occurs.

Diagnosis. A small species of *Pristimantis* of the *P. unistrigatus* group as defined by Myers and Donnelly (1996, 1997) and Lynch and Duellman (1997), with the following characteristics. (1) dorsal skin shagreeneded, ventral skin areolate; (2) tympanum distinct to barely distinct, superficial, round, one third ED in diameter; (3) snout subovoid in dorsal view, rounded to subacuminate in profile; canthus rostralis distinct, rounded; (4) UEW approximately equal to IOD, upper eyelid without tubercles; cranial crests absent; (5) dentigerous processes of the vomer small, with three teeth on each; processes positioned between and behind, small, round choanae; tongue rounded; (6) males with vocal slits; nuptial pads apparently absent; (7) FI < FII; FIII and FIV bearing enlarged discs; (8) fingers without lateral keels; (9) axillary tubercle absent; (10) ulnar tubercles absent; (11) calcars and tarsal fold absent; (12) two metatarsal tubercles, inner oval, three times size of round, indistinct, outer; (13) toes lacking webbing and fringes; TV with relatively broad disc, smaller than those on FIII and FIV; (14) in life, dorsum gray or dark brown, with a reddish reticulation, a distinctive W-shaped orange outlined by black mark behind head and orange outlined by black interorbital bar; in preservative, dorsum brown, pink or orange with pale brown reticulations, pink to gray W-shaped mark, dark gray to brown interorbital bar, labial bars, and transverse black bars on limbs; iris silvery gray with black reticulations; venter pale gray (white with profusion of melanophores under microscope); (15) SVL 22.7–25.8 mm.

Pristimantis sarisarinama is easily distinguished from other species inhabiting the Guayana Shield by the following characters (characters for *P. sarisarinama* in parenthesis). In *P. pruinatus* and *P. cavernibardus*, the discs of adpressed TIII and TV extend just beyond the penultimate subarticular tubercle of TIV (disc of TIII reaches penultimate subarticular tubercle; disk of TV reaches distal subarticular tubercle on TIV). *Pristimantis cantitans* and *P. yaviensis* have toes that are webbed basally (webbing absent). In *P. avius*, *P. cantitans*, *P. memorans*, *P. pruinatus*, and *P. yaviensis* there are weak calcars (calcars absent). *Pristimantis inguinalis* (from the Guianas) has granular dorsal skin (shagreened), tubercles on eyelids (absent), basal webbing on toes (no webbing), and a yellow-orange ocellus in cloacal region (absent) (Lescure and Marty 2001; Parker 1940). *Pristimantis marmoratus* has tubercular dorsal skin (shagreened). *Pristimantis pulvinatus* has a smooth dorsum with scattered small tubercles (shagreened), ulnar tubercles are present (absent), and paired nuptial pads are present in males (pads absent). *Pristimantis marahuaka* has a truncate snout in profile (rounded to subacuminate), males do not have vocal slits (vocal slits present), fingers and toes have weak fringes (without), and the color pattern is different (Fuentes and Barrio-Amorós 2006). *Pristimantis vilarsi* and *P. zeuctotylus* (both in the *P. conspicillatus* group) have FI > FII (shorter); *Pristimantis vilarsi* has shagreeneded dorsal skin with scattered enlarged warts (without warts), a gray to brown venter (dirty white to gray), and short limbs (relatively long) (Lynch 1975), whereas *P. zeuctotylus* has a rounded palmar tubercle (bifid). *Pristimantis sarisarinama* is unique among other *Pristimantis* known from the tepuis by having the following combination of characters: absence of calcars, shagreened dorsal skin, distinct iris color, and distinct dorsal pattern.

Description. Size small, SVL in eight adult males 22.6–25.8 mm. Head slightly longer than wide, equal to, or slightly wider than, body, HW about 38% SVL; snout subovoid in dorsal view, rounded to subacuminate in profile (Fig. 14C); EN about 90% of ED; nostrils barely protuberant, directed dorsolaterally; canthus rostralis distinct, rounded; loreal region slightly concave. Upper eyelid without tubercles or warts (except small wart on each eyelid in EBRG 4674, Fig. 14B), slightly narrower than, or equal to IOD. Tympanum barely distinct or indistinct, round, TD about 30% ED; small conical warts posteroventral to tympanum in some specimens; supratympanic fold barely distinct. Choanae small, rounded; dentigerous processes of vomers small, medial and posterior to choanae, each bearing three teeth. Tongue rounded, posterior half free; males with vocal slits posterolateral to tongue; single large, distensible, subgular vocal sac; its fold forming semicircle behind chin.

Dorsal skin shagreened; middorsal raphe and dorsolateral folds absent; throat smooth, belly areolate; ulnar tubercles and calcars absent.

Relative length of adpressed fingers III > IV > II > I; FI slightly shorter than FII. Finger discs and subdigital pads broader than long; disc on thumb slightly expanded, smaller than those on FII–FIV; fingers without lateral keels; nuptial pads absent. Palmar tubercle flat, bifid, larger than oval thenar tubercle. Subarticular tubercles large, protuberant, round, single; supernumerary tubercles absent (Fig. 14E). Axillary tubercles (as described in *P. cantitans* by Myers and Donnelly 2001) absent.

Hind limbs relatively long, heels of adpressed limbs reaching nostrils; TL about 52.7% SVL; relative lengths of adpressed toes IV > V > III > II > I. Toe discs narrower than that on FIII; toes lacking lateral keels and webbing (Fig. 14F). Tarsal fold and calcars absent; inner metatarsal tubercle elongate, oval, much larger than small, indistinct, rounded outer metatarsal tubercle, indistinct in some individuals; subarticular tubercles large, round to conical, single; supernumerary tubercles small, low.

In life, dorsum greenish gray to brown or reddish brown with distinct dark brown to orange, W-shaped mark outlined by black in scapular region (poorly defined in EBRG 4674) and dark brown interorbital bar; dark brown to garnet-red bars on flanks and limbs in most individuals; white ring just proximal to discs in

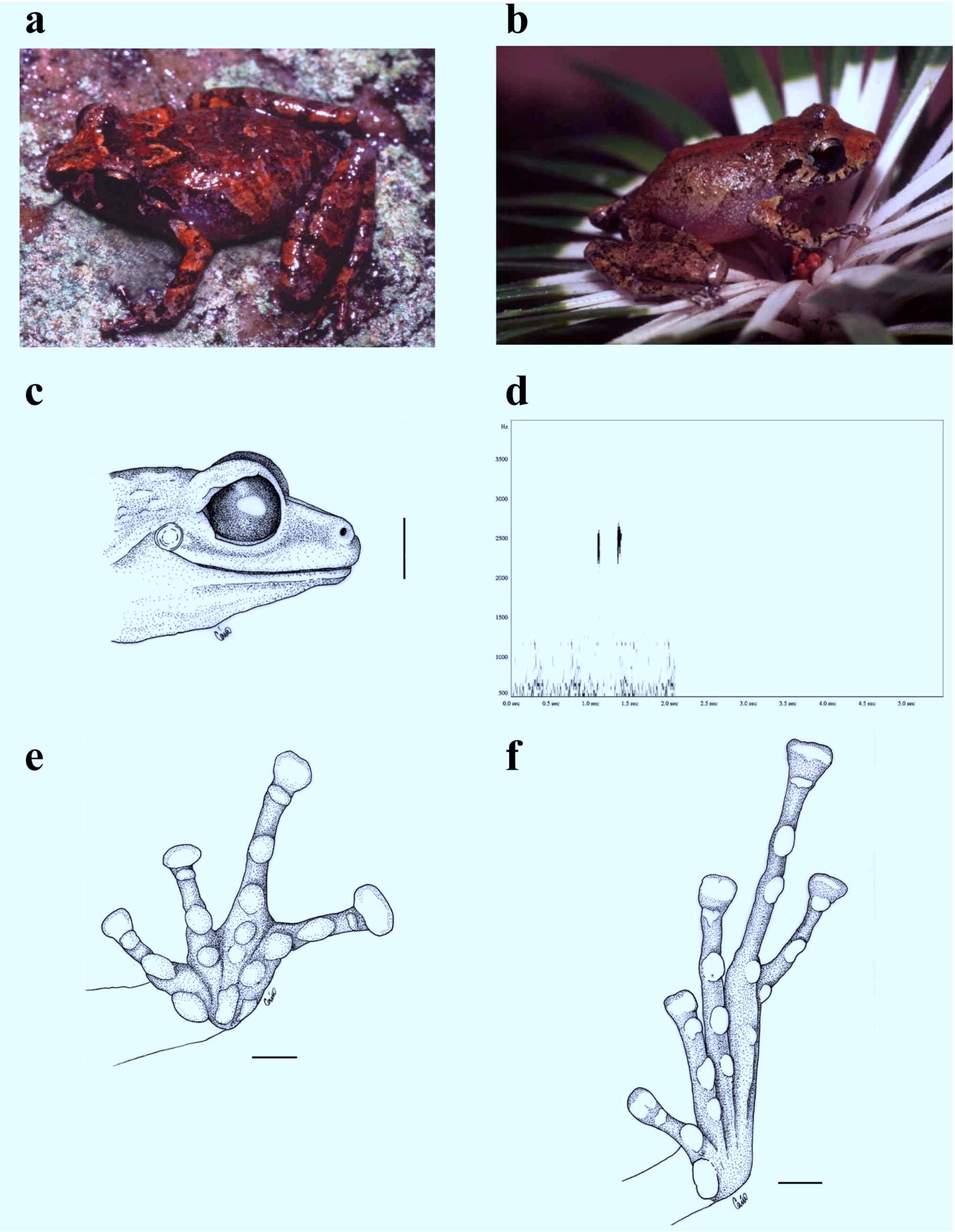

FIGURE 14. Two specimens of *Pristimantis sarisarinama* **sp. nov.**, showing characteristic color variation. Shown are **(a)** the holotype (EBRG 4668) and **(b)** a paratopotype (EBRG 4674). Details of external characteristics drawn from the paratype of *Pristimantis sarisarinama* **sp. nov.** EBRG 4673, including **(c)** a lateral view of the head, a palmar view of the left hand **(e)**, and a plantar view of the left foot **(f)**. Scale bars for hand and foot are 1 mm long, for the head it is 2.5 mm. D, advertisement call of *Pristimantis sarisarinama* **sp. nov.**

some individuals; labial bars dark to pale brown; supratympanic stripe black to dark brown; canthal stripe absent. Venter gray (pink in EBRG 4674); iris bronze with fine black reticulation.

In preservative, dorsum pale pink, orange to gray with pale brown bars on flanks, distinct pink to dark gray W-shaped mark, interorbital bar, labial bars, and transverse bars on limbs, venter pale gray (white with melanophores under microscope); iris silvery gray with black reticulations.

Measurements of holotype. SVL 25.5; TL 13.2; FeL 11.9; FL 11.0; HeL 10.0; HW 9.3; Ind 2.1; UEW 3.2; IOD 3.0; EN 3.0; ED 3.2; TD 1.0; FD 1.5; 4TD 1.2; ETS 4.0; 1FiL 2.9; 2FiL 3.0.

Natural history. *Pristimantis sarisarinama* is a forest-dwelling species, inhabiting the medium, evergreen upper montane forests of the summit at elevations of 1000–1400 m, as well as the forest of the simas. Males call from tree trunks 1–3 m above ground or from mossy rocks, about 1600–1900 h.

Vocalization. The call consists of one or two notes (rarely three), repeated at intervals of 2–6 sec. In a recording of two notes, the duration of the sequence is of 0.2 s, and the second note has a duration of 0.02 s; the dominant frequency is at 2500 Hz and another emphasized harmonic lies at 2050 Hz (Fig. 14D).

Distribution. This species is only known from the Sarisariñama massif, where we observed or heard individuals at four camps (I, II, III, IV) at elevations of 1000–1400 m. This species may also occur on Jaua and Guanacoco massifs.

Material examined. *Pristimantis cantitans*.—VENEZUELA: Estado Amazonas, Cima Cerro Yaví (50º3’ N, 65º54’ W), elev. 2150 m, EBRG 3003.

Pristimantis pulvinatus.—VENEZUELA: Estado Bolívar: Auyantepuy, Camp 4 (5º58’ N, 62º 33’ W), elev. 1600 m, EBRG 2730.

Pristimantis vilarsi.—VENEZUELA: Estado Amazonas: Base of Cerro Yapacana, Atabapo (3º49’ N, 66º50’ W), elev. 100 m, EBRG 637–38, 647. Base of Cerro Yapacana, Atabapo, elev. 600 m, EBRG 644; Caño Yagua, Chipital, Atabapo (4º33’ N, 65º31’ W), elev. 120 m, EBRG 651; Serranía Parú, Atabapo (4º33’ N, 65º31’ W), EBRG 653; Río Puruname, Atabapo, EBRG 1137–38.

Pristimantis yaviensis.—VENEZUELA: Amazonas: Cima Cerro Yaví (50º43’ N, 65º54’ W), 2150 m, EBRG 3007, 3015 (paratopotypes).

Tortoises

Family Testudinidae

Chelonoidis denticulata (Linnaeus 1766)

Yellow-footed tortoise, Morrocoy montañero, Wayamo

We did not observe this species, but Ye’kwanas told us of its presence in the lowland rainforest around Sarisariñama. It is a very important food source for some tribes in the Venezuelan Amazon, as was pointed out by Barrio-Amorós (1998*b*) and Barrio-Amorós and Narbaiza (2008).

Crocodilians

Family Alligatoridae

Paleosuchus sp.

Black Dwarf Caiman, Babo Negro or Morichalero, Yadibe

Black dwarf caymans are hunted and eaten by the native Ye’kwana. We found a skull along the riverbank at Karanakuni that had recently been cooked and was covered with ants.

Lizards

Family Gekkonidae

Gonatodes is the most speciose South American sphaerodactyline genus. We assign the new species to *Gonatodes* following Avila-Pires (1995) by having free claws on fingers and toes projecting from two or four basal scales, dorsal scales granular, round pupil, and sexually dimorphic coloration.

Gonatodes superciliaris sp. nov.

(Fig. 15A, B, C)
Sarisariñama Forest Gecko, Tuteque de Sarisariñama, Tamene-mü

Holotype. EBRG 4243, an adult male from Sima Mayor, Sarisariñama-tepui, Estado Bolívar, Venezuela (4°41'77'' N, 64°13'190'' W), elevation 1100 m, collected by César L. Barrio-Amorós and Charles Brewer-Carías on 15 March 2002.

Paratypes. EBRG 4244 (an adult male), EBRG 4245–46 (adult females), EBRG 4247 (subadult female), EBRG 4248 and EBRG 4369 (juveniles); all with same data as the holotype.

Referred specimens. EBRG 4166, an adult female from NE sector of Sarisariñama, but without exact locality data, collected by Omar Linares on 27 November 1987. A lot of three eggs (EBRG 4370) with same data as the holotype, collected by C. L. Barrio-Amorós.

Etymology. The specific name refers to the spine-like supraciliary scale, a diagnostic character of the species. It is a Latin adjective derived from *super-* (over or above) + *cilium* (eyelid) + *-aris* (an adjectival suffix meaning “pertaining to”).

Diagnosis. A *Gonatodes* with proximal subdigital lamellae narrower than digits; 22–28 lamellae under fourth toe; three lateral rows of scales on distal parts of fingers and toes; ventral surface of tail with repetitive series of single midventral scale in contact posterolaterally on each side with one scale followed by larger midventral scale in contact on each side with two scales (Type C of Rivero-Blanco 1979); elongate supraciliary spine present in both sexes; scales around midbody 80–96; ventrals in a longitudinal midventral row 35–43. In life, males with a blackish-blue dorsal ground color; lower side of head and chest orange or yellow; females dark green with blue vertebral stripe, and two dorsolateral rows of yellow round spots that coincide with enlarged, spinelike scales.

Gonatodes superciliaris is easily distinguished from other *Gonatodes* in the Guiana Shield and Amazonia by the following characters (those of *G. superciliaris* in parentheses). *Gonatodes annularis* has a Type A (Type C) subcaudal scale pattern, that is two single midventrals followed by a divided midventral, three or four lateral rows of scales on distal parts of fingers and toes (three), 41–49 (35–43) ventrals, males with or without vivid yellow spots (never with spots) a blue iris (brown), and no elongate supraciliary spines (present). *Gonatodes eladioi* is smaller, up to 34 mm SVL (up to 49 mm SVL), has 14–16 (22–28) subdigital lamellae under the fourth toe, has two lateral rows of scales on distal parts of fingers and toes (three), 43–48 (35–43) ventrals, males have a vertebral stripe (no stripe), and it is distributed south of the Río Amazonas (Guiana Shield). *Gonatodes hasemani* is the most similar species by having an elongate supraciliary spine and spinelike scales in the round spots on the flanks, but it differs by having Type F (Type C) subcaudal pattern, that is no distinct midventral series of scales, 41–55 (35–43) ventrals, and males have white spots (males without spots). Furthermore, *G. hasemani* occurs south of the Río Amazonas, and the closest record is 1200 km south of Sarisariñama (Avila-Pires 1995). *Gonatodes humeralis* is widespread in South America east of the Andes. It is a small species, up to 41.5 mm SVL (up to 49 mm SVL), with 15–21 (22–28) subdigital lamellae under the fourth toe, Type B (Type C) subcaudal pattern, two single midventrals followed by an enlarged one, 100–137 (80–96) scales around midbody, 48–78 (35–43) ventrals, and the dorsum in males with a red, yellow, and brown vermiculated pattern (males blackish-blue without vermiculations). *Gonatodes tapajonicus* has 18–23 (22–28) subdigital lamellae under fourth toe, Type A (like *G. annularis*) and B (like *G. humeralis*) subcaudal patterns (Type C), 116–126 (80–96) scales around midbody, 54–60 (35–43) ventrals, and the dorsum in males with vivid yellow and brown reticulation (males blackish blue).

Gonatodes superciliaris is unique among its congeners by having the following combination of characters: elongate supraciliary scale, spinelike scales on round spots on the flanks only in females, 22–28 subdigital lamellae under fourth toe, 80–96 scales around midbody, and 35–43 ventral scales in a longitudinal midventral row; males blackish blue with yellow or orange throat, females with a middorsal stripe and yellow round spots on flanks.

Description. Sphaerodactyline gecko with maximum SVL in males 46.7 mm (holotype), in females 49 mm (EBRG 4245). Head length 25–27% SVL in adults, proportionally longer (30–35% SVL) in juveniles and subadults; snout round in profile (Fig. 15D), subacuminate from above (Fig. 15E), relatively wide, sloping gently toward top of the head; neck slightly narrower than head and cylindrical body; limbs well developed; tail rounded in cross section, tapering toward tip, 109–112% SVL in adults, 93–104% SVL in subadults and juveniles.

Tongue relatively wide, slightly narrowing anteriorly, tip rounded with short median cleft, covered anteriorly by imbricate, scale-like papillae; anterior third bluish gray, posteriorly white. Teeth small, conical, subequal in length.

Rostral large, nearly pentagonal, visible from above, with a cleft extending medially beginning at posterior margin. Three postrostrals, the lateral two, situated above the nasals, are distinctly larger than the median postrostral; median postrostral slightly larger than adjacent posterior scales on snout. Nostril bordered by rostral, first supralabial, five circumnasals, and lateral postrostral (supranasal); circumnasals much larger than adjacent loreals. Scales on snout and in loreal region from nearly round to nearly conical, juxtaposed. Loreal scales 12–13 in a line between circumnasals and anterior margin of orbit. Scales on top of head little smaller than scales posterior to circumnasals. Scales in supraorbital region similar to, and continuous with, those on top of head. Supraciliary flap with series of slightly enlarged scales forming smooth or indented margin of eyelid, with a long spine-like scale projecting anteriorly from middle of upper margin (Fig. 15D). Pupil round. Supralabials 5–6, decreasing in size posteriorly, 4–6 just below centre of eye (in EBRG 4247 [Fig. 15D], the fourth supralabial appears divided, suggesting a seventh scale). Scales in temporal region similar to those on posterior upper part of head. Ear opening smaller than eye, subtriangular in both males, round in subadult female, long narrow opening in adult females (perhaps an artifact of fixation).

Mental large, trapezoid, with lateral margins slightly concave, anterior and posterior margins convex. Postmentals 2 or 3 (usually 2), distinctly larger than adjacent posterior scales. Scales on chin just behind postmentals, minute, granular; few series of larger, polygonal, juxtaposed scales adjacent to infralabials (Fig. 15F); infralabials 5, decreasing in size posteriorly, 3–5 below center of eye.

Scales on nape and sides of neck granular, continuous with those on head and body; scales on throat smooth with round posterior margins; short transitional area with the granular scales on chin. Dorsals granular, similar in size to scales on snout and top of head; several groups of four or five larger, conical scales on flanks and neck, coinciding with round spots in adult females; transition between scales on flanks and venter abrupt; scales on venter distinctly larger than dorsals, smaller on chest than on belly, smooth, rhomboidal to hexagonal, in oblique rows, forming longitudinal rows on belly; 35–43 scales along the midventral line between anterior margin of forelimbs and anterior margin of hind limbs; scales around midbody 80–98, including 16 or 17 ventrals. Preanal scales at margin of vent minute; scales on dorsum of tail smooth, narrow,

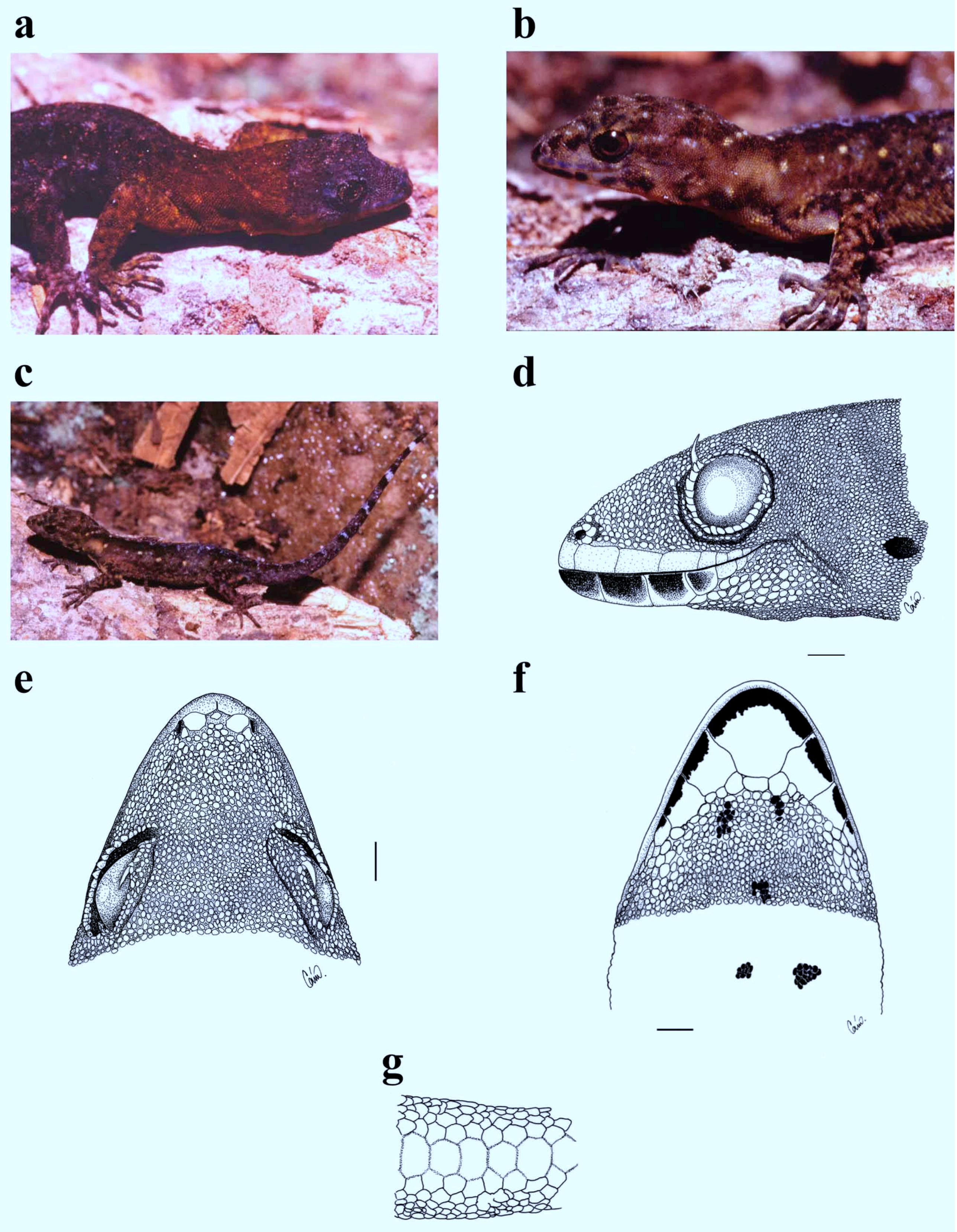

FIGURE 15. *Gonatodes superciliaris* **sp. nov. (a)** male holotype (EBRG 4243). **(b)** anterior half of the body of the female paratype (EBRG 4246). **(c**, female paratype EBRG 4246 in life, entire animal. Details of external characteristics drawn from EBRG 4247, including **(d)** lateral, **(e)** dorsal, and ventral **(f)** views of the head, and **(g)** a ventral view of the tail. Scale bars are 1 mm long.

tips directed posteriorly. Scales on underside of tail (Fig. 15G) smooth, flat, imbricate, increasing in size toward midventral line; midventral row of transversely enlarged scales, with sequence of one single median scale in contact posterolaterally with two smaller scales, followed by smaller single, median scale in contact posterolaterally with one smaller scale (Type C of Rivero Blanco 1979, or Sequence 1'1" of Avila-Pires 1995).

Scales on limbs granular, smooth, flat, and nearly round on anterior and ventral surfaces of thighs, and on ventral surface of shanks; lamellae under third finger 19–22 (mean = 20.5), proximal 5 or 6 enlarged, under fourth finger 20–25 (mean = 22.5), basal 7–9 enlarged, under fourth toe 22–28 (mean = 25), with two or three of 9–12 in basal segment enlarged. Fingers and toes with three lateral rows of scales distally. Claws exposed, not retractile.

Sexual dimorphism evident. In life, males with blackish blue or bluish black head; nape, neck, and forelimbs dirty yellow dorsally; body and hind limbs colored like head (Fig. 15A). Few pale blue spots on flanks; chin white; throat and chest yellow to orange; belly dirty white; flanks dark gray; tail dirty white to orange ventrally; iris brown; claws white. Females with wide brownish-gray vertebral stripe with blue flecks on edges, bordered by black; flanks olive green with black reticulation and yellow nearly round spots (Fig. 15B); head brownish green with dark brown spots; forelimbs olive green with black reticulation; venter white, except dark brown spots in gular region; tail yellowish-gray with black spots dorsally, gray bordered by black ventrally; white and black bands or rings distally (Fig. 15C); iris brown; claws white. Juveniles brown dorsally with or without black dorsolateral stripes; otherwise colored like females but not as bright, with small yellow spots on flanks ventral whitish ivory, almost transparent.

In preservative, the dorsum of the head and anterior part of the body in males almost uniform brown, with a paler region corresponding to the yellow area in life; narrow pale brown vertebral stripe, seen in life; venter dirty white on throat and anterior part of body (few, nearly indistinct gular marks in EBRG 4244); scales on flanks, limbs, and posterior part of the body white outlined by black. In holotype, midventral row of scales on tail white outlined by black; rest of ventral surface of tail pale gray, becoming dark gray with white rings distally. In EBRG 4244, midventral row of scales on tail white outlined in black, bordered laterally by black flecks. In preservative, dorsum of females greenish brown with conspicuous vertebral stripe, bordered by irregular, slightly darker dorsolateral stripes; spots white; rings distally on tail well-defined, even dorsally, in EBRG 4246, not so evident in EBRG 4247, absent in EBRG 4166. Throat and chest white with black marks on throat, most evident in larger individuals (EBRG 4166, 4245–56); scales on belly white outlined by black, creating pale gray appearance. Creamy yellow egg visible beneath translucent ventral skin in EBRG 4245. Ventral surface of tail white with evident black rings on distal third in EBRG 4246, not so evident and only on tip in EBRG 4247, and absent in EBRG 4166.

Natural history. *Gonatodes superciliaris* inhabits forest, where it occurs primarily in leaf litter, but also under rocks, in crevices, and amidst roots, never more than 30 cm from leaf litter. This diurnal gecko is active from 0700–1800 h. A male under a root of a huge tree grasped a cricket with his jaws, repeatedly masticated it until it was dead, and then swallowed it. A communal nest in a crevice contained 16 spherical eggs 8–9 mm in diameter, as well as some broken eggshells. Opening some of the eggs revealed that the eggs were in different developmental stages; some contained advanced embryos, whereas others apparently were more recently deposited, because no embryo was visible). Some females were carrying one egg, visible through the translucent skin and located posteroventrally and slightly to the left. Although this species is not recognized by the Ye'kwana people, they called it tamene-mü, perhaps indicating the presence of *G. humeralis* or *G. annularis* in Canaracuni.

Distribution. To date, *G. superciliaris* is known only from Sarisariñama-tepui. The type series came from the bottom of Sima Mayor, but another specimen collected by Omar Linares on a previous expedition (see below) was caught in the NE sector of the massif, and we do not doubt that its distribution covers the entire massif.

Remarks. At the time that this work was in press, another species of *Gonatodes* was described from Guyana (Cole and Kok 2006). The species, *G. alexandermendesi*, has much in common with *G. superciliaris*. We could not check the type series yet, and until this can be made, we still offer the description of *G. superciliaris* as a new species, probably endemic to Sarisariñama.

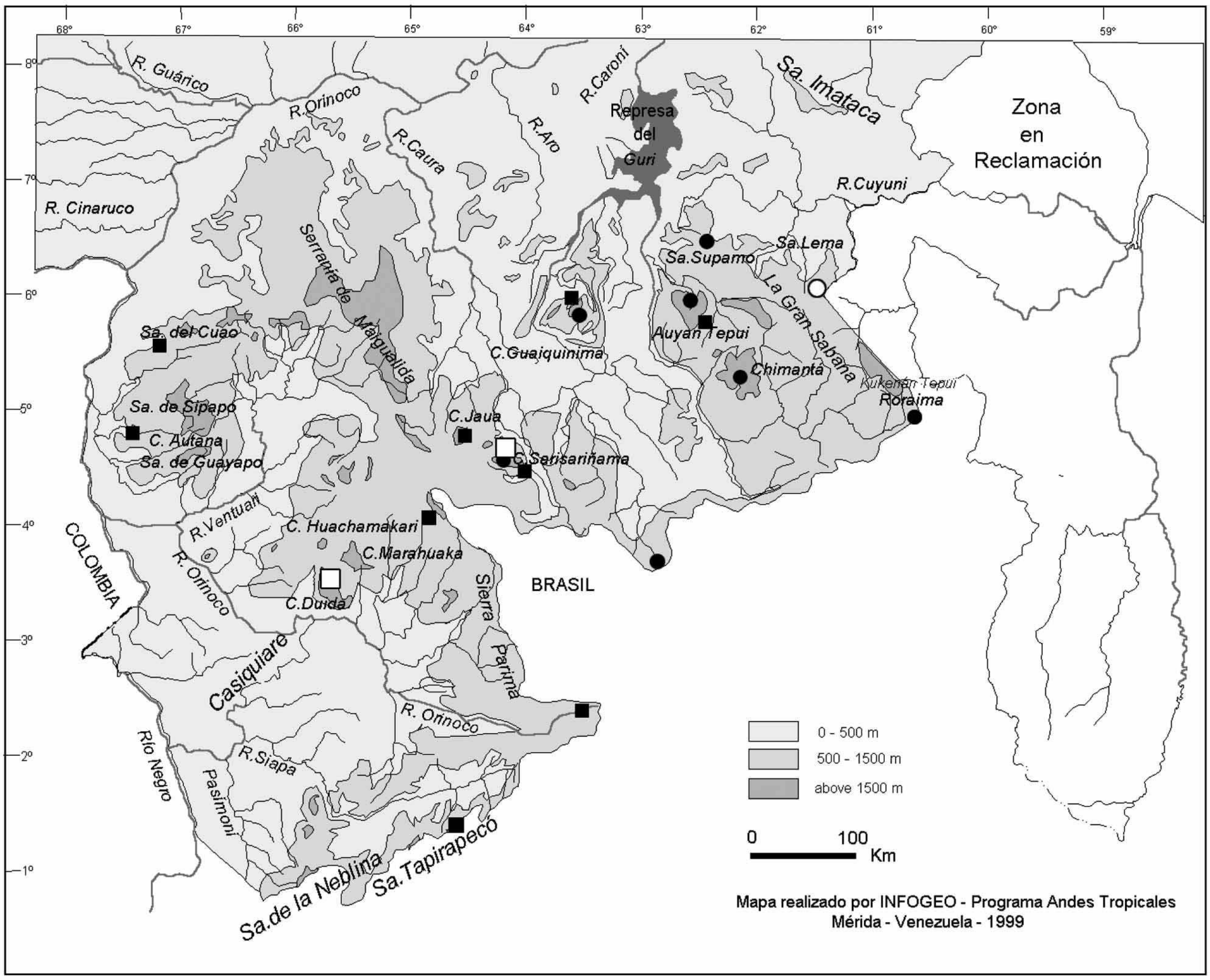

FIGURE 16. Distribution of *Neusticurus bicarinatus*, *N. racenisi* (black squares), *N. rudis* (black circles), and *N. tatei* (white squares) in Venezuela. The white circle identifies the single locality where *N. bicarinatus*, *N. racenisi,* and *N. rudis* are sympatric (La Escalera, Sierra de Lema, Bolívar State).

Family Gymnophtalmidae

See a recent phylogenetic classification of the family by Castoe *et al.* (2004).

Neusticurus cf. *racenisi* Roze 1958

Common Venezuelan water teiid, Lagartijo acuático de Racenis, Maskani

Camp V. 22 March 2002. EBRG 4249 (subadult male).

Our specimen agrees with the descriptions given by Avila-Pires (1995) and Donnelly and Myers (1991). However, examination of specimens from several localities in Venezuela leads us to suspect that more than one species is involved. Only one specimen (MBUCV 3541 from Uruyen, in the foothills of Auyan-tepui, the type locality) agrees with MPEG 62208, the animal illustrated in Avila-Pires (1995), in having a middorsal row of enlarged, juxtaposed dorsal scales. Roze (1958*a*:256) described the dorsal scalation as (free translation) “small, uniform and keeled scales, in transversal rows; on the laterodorsal region [or dorsolateral] there is a longitudinal zone with slightly more enlarged scales with larger keels, followed again laterally by small scales that end abruptly where the first row of ventral scales starts.” This is the condition we observed in all animals except MBUCV 3541. The redescription of *N. racenisi* by Donnelly and Myers (1991), based on the holotype, paratype, and three specimens from Guaiquinima (plus the data of Van Devender [1967]) agrees with that of Avila-Pires (1995) in mentioning large middorsal scales. The two specimens from Guaiquinima we have examined (MBUCV 7051–52; formerly AMNH 136196–97 and previously studied by Donnelly and Myers) do not have enlarged scales in the middorsal row; in fact the middorsal scales are smaller than the adjacent scales. Moreover, EBRG 4249 from Sarisariñama differs from Guaiquinima specimens not only by having a significantly lower number of subdigital lamellae under Finger IV and Toe IV, but in having many fewer femoral pores (23/23 vs. 31/32 in MBUCV 7052). Based on available data and available specimens we cannot offer a better solution than to include all the studied specimens at the moment under the same name. However, the currently recognized taxon *racenisi* is most probably a composite of similar species.

Neusticurus racenisi is widespread in lowlands and uplands in southern Venezuela (Fig. 16). Only one subadult male (Fig. 17) was caught by day in the stream near Canaracuni, where other *Neusticurus* were observed (*N. tatei* is sympatric; see below) dropping into the water and usually escaping by diving under a submerged log or boulder.

FIGURE 17. Subadult male *Neusticurus racenisi* from Sarisariñama (EBRG 4249).

Material examined. *Neusticurus racenisi*.—VENEZUELA: Estado Amazonas, Río Cataniapo, Salto las Nieves, EBRG 1804; Río Autana, Caño Cabeza Manteco, EBRG 1817; Ugueto, close to the Orinoco source, MBUCV 8014; Simarawochi, MBUCV 3959. Estado Bolívar, Jaua, elev. 1600 m, EBRG 3348; Canaracuni, base of Sarisariñama, EBRG 4249; Uruyen, MBUCV 1904, 3541; north side of Cerro Guaiquinima, elev. 1030 m, MBUCV 7051–52 (formerly AMNH 136196–97).

***Neusticurus tatei* (Burt and Burt 1931)**

Tate's water teiid; Lagartijo acuático de Tate; Maskani

Camps IV, V, Locality VI. 23 March 2002. EBRG 4250–53.

Originally described as a species of *Arthrosaura*, Uzzell (1966) erroneously considered *N. racenisi* to be conspecific with *N. tatei*. Van Devender (1967) recognized *N. racenisi* and *N. tatei* as separate species. Avila-Pires (1995) and Donnelly and Myers (1991) provided good redescriptions of *N. racenisi*. We here provide a modern diagnosis for *N. tatei* based on the three specimens we collected.

Diagnosis. *Neusticurus* with elongate snout, regular scales in frontonasal-prefrontal region, tympanum deeply recessed in the external auditory meatus, lower eyelid with semitransparent disc of 4 or 5 palpebrals. Dorsum with enlarged, keeled scales on midline and paravertebral zone without enlarged tubercles; flanks with keeled scales of equal size. Scales across sides and dorsum in three different rings (one posterior to the forelimbs, another at midbody, the last before hind limbs) 29-35-28 on male (EBRG 4250), 34-34-39, 33-30-31, and 31-27-30 (respectively on three females EBRG 4251–53). Ventrals in 28, 27-27-29 transverse rows with 6–9 scales each (all specimens combined). Tail distinctly compressed without rows of tubercles, with enlarged, keeled scales forming double dorsal crest on distal part of tail. Male with 30 and 31 (total 61) femoral pores; 22 subdigital lamellae on Finger 4, 33 on Toe 4. Three females with 20–23 (mean = 21.7) subdigital lamellae on Finger 4, 32–34 (mean = 33) on Toe 4. Size of male (EBRG 4250) 94 mm SVL, 134 mm TL (tail half regenerated), 39.0 mm RHL, 51.0 mm RFL, 28.0 mm HL, 15.5 mm HW, 10.0 mm L4F, 16.8 mm L4T. Size of females 85.0-80.0-73.0 mm SVL, 125 (tail half regenerated)-160- (tail 1/6 regenerated)-145 (tail 1/5 regenerated) mm TL, 31.0-30.0-24.0 mm RHL, 45.0-44.0-44.0 mm RFL, 23.5-21.5-20.6 mm HL, 12.3-11.2-11.0 mm HW, 8.0-7.0-7.8 mm L4F, 13.5-13.5-13.5 mm L4T.

Other *Neusticurus* reported from the Venezuelan Guayana are *N. bicarinatus, N. medemi, N. racenisi,* and *N. rudis*. *Neusticurus tatei* can be easily differentiated from *N. racenisi* (sympatric in Sarisariñama) by the following characters (those of *N. tatei* in parentheses): short snout (elongated), irregular scales in frontonasal-prefrontal region (regular), smaller scales on flanks and dorsum in a transversal count, up to 63 (larger, up to 39). *Neusticurus bicarinatus* has six longitudinal rows of tubercles on the dorsum (none). *Neusticurus medemi* is similar to *N. racenisi* by having irregular scales on frontonasal-prefrontal region (regular) (Dixon and Lamar 1981). *Neusticurus rudis* has a moderately short snout (elongate), 4–6 regular or irregular rows of tubercles on the dorsum (none), flanks with prominent trihedral tubercles surrounded by distinctly smaller scales (absent).

Coloration. In life, male reddish brown dorsally; sides of head reddish orange; gular region yellow (Fig. 18, bottom); belly grayish white; lower surfaces of tail were dark gray; femoral pores yellow; soles and palms gray. Female pattern distinctive (EBRG 4252) (Fig. 18, top); head dark brown anteriorly, with dirty yellow marbling on sides; tympanic to gular regions yellow; dorsum dark reddish brown with dorsolateral orange spots; transverse broken rings of scales on flanks yellow, between normal dorsal colored flanks; belly dirty white or each scale dirty white with gray center.

In preservative, male uniformly dark brown dorsally; chin and throat white with gray mottling on infralabials; venter white, pale gray on chest and dark bluish gray on underside of tail; femoral pores dirty white. Of females, EBRG 4253, the darkest, with dark brown dorsum with diffuse pale brown spots dorsolaterally; ventral aspect of head pale gray; scales on chest and preanal plate white with dark gray center scales on belly and anterior part of the tail, darker gray distally. EBRG 4252 similar, but with more contrasting pattern, especially with pale yellow dorsolateral spots (each covering four scales), and broken transversal bands of scales on flanks white; gular region, chest, and belly dirty white; preanal plate and ventral surfaces of tail like EBRG 4253; sides of tail with a checkered pattern consisting of dark and pale brown squares, those on upper side of tail pale brown or pale orange and lower ones dirty white; posterior surfaces of hind limbs dark brown with dirty white round spots. EBRG 4251 even more contrastingly patterned, with dorsal (paravertebral) black spots and pale orange to white spots dorsolaterally; venter as in EBRG 4252.

Natural history. This species, which previously was known from few specimens from Cerro Duida, Amazonas, Venezuela, was common at Sarisariñama, both at Canaracuni creek, and at the base and slopes of the mountain (400–1100 m). It was sympatric with *Neusticurus racenisi* at Canaracuni creek. It is a highly aquatic species, active only by day, escaping by swimming or diving as soon as they are approached. At Camp IV, three adults were resting in a crevice at night in the spray zone of a cascade. All specimens have regenerated tails, suggesting a possible high predation rate or interspecific fights.

Material examined. *Neusticurus bicarinatus*.—VENEZUELA: Estado Bolivar, Sierra de Lema, MBUCV 8011.

Neusticurus tatei.—VENEZUELA: Estado Bolivar, Sarisariñama, EBRG: 4250–53.

FIGURE 18. Male (EBRG 4250; bottom) and female (EBRG 4252; top) of *Neusticurus tatei*.

Family Polychrotidae

Norops ortonii (Cope, 1869)

Orton's beta anole, Anolis de Orton, no Ye'kwana name

Camp II. 15 March 2002. EBRG 4254 (juvenile).

Inside Sima Mayor only one juvenile anoline lizard was observed and caught. It was on lichen-covered rocks in the driest zone. *Norops ortonii* was mentioned as part of the Venezuelan herpetofauna by La Marca (1997, following Hoogmoed 1973) without voucher specimens. This is the second confirmed record of this species from Venezuela after Molina *et al*. (2003). The animal, although a juvenile of only 27 mm SVL, agrees well with the description given by Avila-Pires (1995). The coloration in life was light gray, with a conspicuous interorbital dark bar, and some black paravertebral spots; the posterior part of the tail with alternate blackish and whitish bands. Ventrally the specimen was dirty white with scattered small gray and black spots. The dewlap was small and pinkish.

Family Scincidae

Mabuya sp.

Camp V. Not collected.

Several individuals of a forest dwelling, brown-tailed *Mabuya* were observed in sunny forest clearings beside Canaracuni creek. They were foraging among logs and fallen branches. *Mabuya* systematics is still very much in flux. Miralles *et al*. (2005) presented the basic taxonomy of Venezuelan *Mabuya*. Most probably, the only species living in lowland forests through the Venezuelan Guayana, with brown tail is *M. nigropunctata*. Another Guayanan species, *M. carvalhoi*, has a blue tail (Avila Pires 1995; Miralles *et al*. 2005).

Family Teiidae

Ameiva ameiva (Linnaeus 1758)

Amazon race runner, Mato común, Makasana

Camp V. Not collected.

This species was the most striking and dominant lizard in lowlands around Sarisariñama, inhabiting savannas, forest edges, the village and its surroundings.

Kentropyx calcarata Spix 1825

Striped forest whiptail, Lagartija selvática rayada

Camp V. Not collected

Some individuals were observed foraging at the forest edge beside Canaracuni creek.

Family Tropiduridae

Camp III. Not collected.

A *Tropidurus-Plica* like lizard was the only lizard observed at the summit of Sarisariñama. In a granitic dome, covered by *Brochinnia hechtioides* bromeliads, we saw an individual quickly escaping inside a crevice. Some tropidurid lizards are known to be endemic to different tepuis. *Tropidurus bogerti* is apparently endemic to Auyan-tepui (Roze 1958*a*). Donnelly and Myers (1991) described *Plica lumaria* from Guaiquinima, and recently Myers and Donnelly (2001) named *Tropidurus panstictus* from Yutajé-Corocoro massif, which is also known from Lago Leopoldo (Paraka-Wachoi; O. Fuentes, pers. comm.), 150 km to the SW, and likely inhabits all areas in between. It would be not unlikely to find a different species inhabiting the Jaua-Sarisariñama massif.

Snakes

Family Colubridae

Helicops angulatus **(Linnaeus 1758)**
Brown-banded water snake, Falsa mapanare de agua; Mokóroho

Camp V. Four individuals observed, one adult female, and three juveniles. Only one captured on 7 March 2002, a juvenile of 160 + 60 mm (EBRG 4255).

This is a common water snake, easily found at night in almost all creeks around Canaracuni. It is also a common species in all lowlands (savanna and rainforest) in Venezuela. Juveniles had a red venter, which is most often observed in southern Orinoco animals. It is known as mokóroho among the Ye'kwana and believed to be venomous.

Imantodes cenchoa **(Linnaeus 1758)**
Blunt-headed tree snake, Culebra Liana común, Kan-mwa-atotijiri

Locality VI. 20 March 2002. EBRG 4256 (juvenile).

This young specimen (325 + 125 mm) was resting between two leaves in rainforest 1.5 m above ground at afternoon. The Ye'kwana know this species as a nonvenomous snake.

Liophis typhlus **(Linnaeus 1758)**
Velvety swamp snake, Reinita verde, Mansé

Camp V. Not collected.

An adult female (about 65 cm long) was floating and apparently searching for frogs in a backwater of Canaracuni creek. It was caught, but died quickly and when we went to photograph and prepare the animal, it was completely rotten. Ye'kwana knows that it is harmless (see Barrio-Amorós 2003, however, for a case of envenomation by *Liophis*).

Pseustes poecilonotus polylepis **(Peters 1867)**
Neotropical bird snake, Cazadora selvática, Wasaihiudei

Locality VI. 20 April 2002. EBRG 4257 (subadult female).

The senior author observed two specimens in two successive days in nearby locations in the same creek at the Sarisariñama foothills. The first specimen was immobile along a branch above the creek. It was easily approached and captured and subsequently released. It measured approx. 150 cm in total length. The other specimen (EBRG 4257) was shorter (935 + 355 mm), and was resting at evening beside the creek shore. This specimen has 198 ventral scales, 121 subcaudals, and 21-23-19-15 dorsals, with uniform dorsal olive brown coloration. This species is well known and believed to be a protector of the tribe against venomous snakes such as viperids. It is highly respected by the Ye'kwana.

Family Viperidae

Bothrops atrox (Linnaeus, 1758)
(Fig. 19)
Fer de Lance; Mapanare amazónica, terciopelo; Kinoto

Camp I. 8 March 2002. EBRG 4258 (adult female).

A large female of 960 + 160 mm was captured in camp I in the morning after a rainy night. It has 7 supralabials, 9 infralabials, 208 ventrals, 66 paired subcaudals, 24-23-23-19 dorsals. It was perched on a branch and easily caught. It contained a rodent in its stomach. This snake was not aggressive. The Ye'kwanas were really frightened while we handled the snake. They called this snake kinoto, one of the representatives of evil in Ye'kwana lore.

FIGURE 19. Female of *Bothrops atrox* (EBRG 4258) from Camp I.

Additional specimens

An expedition in 1988 by the Universidad Simón Bolívar (USB) and Radio Caracas Televisión (RCTV) to Sarisariñama came back with a few specimens that appeared in a documentary for the series "Expedición", entitled "Sarisariñama, descenso al centro de un tepuy". These animals were collected by Omar Linares, mammologist and paleontologist from USB, and were in the collections of the USB for a long time. They were finally transferred to EBRG. We were able to examine some reptiles as follows. All specimens were collected in or around the campsite, which was close to a small tea-colored stream, in the NE sector of the massif (O. Linares, field notes).

Gonatodes superciliaris Barrio-Amorós and Brewer-Carías
Only a single specimen was collected on the NE sector of the massif. No further data.

Neusticurus rudis Boulenger 1900
Lagartijo acuatico rudo

EBRG 4165 (adult male, field number L-1319) and 4168 (subadult male, field number L-1323).

The presence of a third species of *Neusticurus* in Sarisariñama is not surprising, as some localities in the Guiana Shield harbor two or three sympatric taxa. At Sierra de Lema, in a locality like Paso el Danto, La Escalera region, Estado Bolívar, Venezuela, *N. bicarinatus*, *N. racenisi* and *N. rudis* occur sympatrically (Fig. 16). McDiarmid and Paolillo (1988) reported *N. medemi* and *Neusticurus* sp. from Neblina.

The most widespread and common species, however, are *N. racenisi* and *N. rudis*, which are commonly seen sympatrically in many other sites, like Auyan-tepui (Avila-Pires 1995; Uzzell 1966) and Guaiquinima (Donnelly and Myers 1991). *Neusticurus rudis* is most likely a complex of two or more species (Donnelly and Myers 1991).

Material examined. *Neusticurus rudis*.—VENEZUELA: Estado Bolivar, Paso el Danto, Sierra de Lema, CVULA 6510–11; Urutany tepui, MBUCV 669. Auyan-tepui, MBUCV 3066; Guaiquinima, MBUCV 7046 (formerly AMNH 136198), MBUCV (formerly AMNH 136204), MBUCV 7048 (formerly AMNH 136199), MBUCV 7049 (formerly AMNH 136208), and MBUCV 7050 (formerly AMNH 136207); Cerro Santa Rosa, Serranía del Supamo, FA 266–67 (slides in the collection of Fundación AndígenA, Mérida).

Chironius sp.
Olive whipsnake, Cuaima machete

One juvenile female (EBRG 4169, field number L-1324) of 360 + 186 mm, with 185 ventrals, 168 paired subcaudals, 10 dorsals at midbody (12 on the anterior part of the body), and very prominent eyes. This specimen has some unusual characters that do not agree well with the description of *C. fuscus* (following Dixon *et al*. 1993). The first divergent character is the high number of ventrals (ventrals in the species range from 131–159 in males, and 140–160 in females), and also the high number of subcaudals, ranging in *C. fuscus* from 112–140 in males and 105–140 in females. Also there are no distinguishable keels on the paravertebrals (this can be in the variation of *C. fuscus*). There are no apical pits on the dorsal nuchal scales. The color for a juvenile is not typical for young *C. fuscus*, as it shows distinct light crossbands on a brown background, which changes ontogenetically. The coloration is more like an adult, uniform brownish above, and white ventrally; supralabials also white. Another unusual feature is a divided anal plate. Identification following the key of Dixon *et al*. (1993) identifies this specimen as *C. grandisquamis*, which is the only species with ten rows of dorsals at midbody and divided anal plate. However, *C. grandisquamis* distribution is Central American and Chocoan (from Honduras to northwestern Ecuador), and there is no geographic connection between those areas and the Guiana Shield. No other species in the shield region have these characteristics. *Chironius scurrulus* has ten dorsals at midbody and no keeling, but the anal plate is entire. Furthermore, juveniles are usually green in life and blue-black in preservative. This specimen may represent a new species or an aberrant *C. fuscus*. More animals from Sarisariñama must be examined in order to determine its final taxonomic status. The specimen had a recently metamorphosed hylid in its digestive tract, possibly *Hypsiboas tepuianus*.

McDiarmid and Donnelly (2005) report on a *Chironius* shed from Sarisariñama (probably collected by Orejas Miranda during the 1974 Expedition).

Liophis torrenicola Donnelly et Myers 1991
Reinita acuática tepuyana

Donnelly and Myers (1991) described *Liophis torrenicola* from the summit of Guaiquinima, an isolated tepui

120 km NNE of Sarisariñama, based on two specimens. EBRG 4167 (field number L-1322) is a juvenile female of 187 + 37 mm. It has 17-17-15 dorsals, 170 ventrals, and 52 subcaudals. The coloration is as described for the paratopotype AMNH 136210 in Donnelly and Myers (1991), with a blackish head, a white collar and a dark brownish dorsum, with paravertebral whitish small spots. Laterally, there are triangular alternating brown and white bands. The venter is white with black checkering, less profuse than in AMNH 136210, and absent on the tail. All characters fall well in the diagnosis and description of the species by Donnelly and Myers (1991). The animal had in its digestive tract an undistinguishable mass, containing apparently some fish scales.

As shown in the RCTV documentary, the animal was swimming in a stream when captured. *Liophis torrenicola* was believed to be isolated at Guaiquinima (Donnelly and Myers 1991). However, the species is present at least on two tepuis 130 km distant from each other and separated by the Río Caura basin. It is also present in Parima B (O. Fuentes, pers. comm.). We predict that *L. torrenicola* will be found on some other nearby tepuis, such as Jaua, Guanacoco, or Ichún.

Material examined. *Liophis torrenicola*.—VENEZUELA: Estado Bolívar, Guaiquinima tepui, AMNH 136210 (currently in MBUCV).

Discussion

Zoogeography

The neighboring mountain, Jaua-tepui, was explored by the Museo de Historia Natural La Salle in 1994, and several new species were described from this material (*Anomaloglossus ayarzaguenai* [La Marca 1996], *Stefania percristata* and *S. oculosa* Señaris *et al*. 1996, and *Hypsiboas rythmicus* [Señaris and Ayarzagüena 2002]. In addition, a variety of other species were reported, including *Hyalinobatrachium crurifasciatum* (Señaris and Ayarzagüena 2005), *Hypsiboas sibleszi*, *H. benitezi* (= now *H. tepuianus*), *Dendropsophus minutus* and an undetermined species of *Otophryne* (Señaris and Ayarzagüena 2002). Barrio (1999) reported *Otophryne steyermarki* from Jaua. All these species likely also occur on Sarisariñama-tepui.

Several species of snakes are known to be inhabitants of summits and slopes of tepuis, such as *Thamnodynastes* (*T. chimanta* Roze 1958*b*, *T. corocoroensis* Gorzula and Ayarzagüena 1995, *T. duidensis* Myers and Donnelly 1996, *T. marahuaquensis* Gorzula and Ayarzagüena 1995, *T. yavi* Myers and Donnelly 1996), which appears to be particularly species-rich on tepuis, as is *Atractus*, with many species described from different tepuis (*A. duidensis* Roze 1961, *A. insipidus* Roze 1961, *A. riveroi* Roze 1961, *A. steyermarki* Roze 1958). It is expected that new species of these two genera will be discovered on other tepuis.

Arthrosaura tyleri (USNM 317880) was collected on Jaua-tepui by Braulio Orejas-Miranda in 1974, during a short stop along the upper Marajano River, at an elevation of 1800 m. The presence of this species, as well as the presence of *Neusticurus tatei* on the summit of Sarisariñama, as well as on Duida, suggest a connection between the Duida-Marahuaka and Jaua-Sarisariñama massifs, although each pair of massifs are on each side of the mentioned Parima-Maigualida barrier. Most probably, both species are more widespread than currently known.

Sarisariñama can be considered as an isolated tepui, or as a part of a massif of three tepuis (Jaua, Sarisariñama, Guanacoco) that are connected at about 400 m of elevation. Because Guanacoco remains herpetologically unexplored and Jaua is known only for a few species such a connection cannot be ascertained until more extensive collections are made on all three tepuis. Pending such investigation, we conservatively consider Sarisariñama as a unique zoogeographic unit. Although the explored areas of Sarisariñama are all between 400 and 1800 m (at the western edge, visited by Phelps and Steyermark), the tepui rises to about 2100 m, and the high summit remains to be explored. Of the entire recognized herpetofauna (Table 3, plus the three species from the USB-RCTV expedition), five (*Hyalinobatrachium mesai*, *Anomaloglossus moffetti*, *Stefania* *riae, Pristimantis sarisarinama, Gonatodes superciliaris*) are apparently endemics (15.6%). *Hyalinobatrachium mesai* is only known from the southern slopes of Sarisariñama-tepui, at 420 m, so it may also occur on neighboring massifs, such as Jaua and Guanacoco, or even occur more widespread through lowlands in the Guayana shield. *Anomaloglossus moffetti* is also known from the southern slopes, at higher altitude (1108 m), but may also be spread around the mountain and be able to reach the neighboring massifs. *Anomaloglossus*

TABLE 3. Species reported from the "Instituto Geográfico Simón Bolívar-NHK" expedition to Sarisariñama. The specimens from the RCTV-USB expedition are not included, as the localities are not clear. The camps are described in the Collecting localities section.

	Camp I 1375 m	Camp II 1100 m	Camp II 1328 m	Camp IV 1108 m	Camp V 406 m	Loc. VI 450-600 m
Rhaebo guttatus					+	+
Rhinella margaritifer					+	+
Chaunus marinus					+	
Hyalinobatrachium mesai						+
Anomaloglossus moffetti				+		
Dendrobates leucomelas					+	+
Hypsiboas boans					+	
H. aff. crepitans					+	
H. tepuiana				+		+
Osteocephalus taurinus		+				+
Stefania riae		+		+		
Adenomera andreae						+
Leptodactylus diedrus					+	
L. riveroi					+	
Pristimantis aff. *cavernibardus*	+		+	+		
P. sarisarinama	+	+	+	+		
Lithobates palmipes					+	+
Chelonoidis denticulata					+	
Paleosuchus sp.					+	
Gonatodes superciliaris		+				
Norops ortonii		+				
Mabuya sp.					+	
Ameiva ameiva					+	
Kentropy calcarata					+	
Neusticurus racenisi					+	
N. tatei				+	+	+
Tropiduridae sp.			+			
Helicops angulatus					+	
Imantodes cenchoa						+
Liophis typhlus					+	
Pseustes poecilonotus						+
Bothrops atrox	+					

ayarzaguenai, which occurs on Jaua, might then act as a competitor if it uses the same habitat. *Stefania riae* may be endemic to Sarisariñama, as in Jaua two other species are known (*S. oculosa* and *S. percristata*). *Gonatodes superciliaris* was found at the bottom of Sima Mayor and at the NE sector of the massif. We do not doubt that it is widespread on Sarisariñama, but we do not have data for other tepuis.

A second group of species consists of Guiana Shield regional endemics that are not restricted to one mountain. This group includes eight species (25% of the total), namely *Dendrobates leucomelas, Hypsiboas crepitans* complex, *H. tepuianus, Pristimantis* cf. *cavernibardus, Neusticurus racenisi, N. rudis, N. tatei,* and *Liophis torrenicola*. *Dendrobates leucomelas* is widespread in lowlands and uplands in southern Venezuela and parts of Guyana and Northern Brazil (Barrio-Amorós et Fuentes 1998), as is *Neusticurus racenisi* (Avila-Pires 1995). *Hypsiboas tepuianus* is found on several eastern tepuis (see above). *Neusticurus tatei* is currently known only from its type locality, Cerro Duida, and now from Sarisariñama, two locations 235 km apart. It is likely that this species occurs in areas between the two mountains. Frogs in the Guayanan Shield *Hypsiboas crepitans* complex are distinctive, ranging from eastern Venezuela (C. Barrio-Amorós, own observations) to French Guiana (Lescure and Marty 2000). They are related to the widespread *Hypsiboas crepitans*, but can be distinguished by color and call. A comprehensive review of the *H. crepitans* complex should include this distinctive species as new (M. Hoogmoed, pers. comm.). *Pristimantis* cf. *cavernibardus* may not be the same species that occurs at Tapirapecó.

A third group is represented by widespread Amazonian elements. Thirteen species (*Rhaebo guttatus, Osteocephalus taurinus, Leptodactylus andreae, Leptodactylus diedrus, L. riveroi, Lithobates palmipes, Chelonoidis denticulata, Paleosuchus* sp., *Norops ortonii, Ameiva ameiva, Kentropyx calcarata, Liophis typhlus* and *Bothrops atrox*) fall into this group (40.6%).

A last group would include widespread species known mainly from the Amazonian region, but also occurring as far as Central America. There are six species (18.7%) in this category (*Chaunus marinus, Rhinella margaritifer* complex, *Hypsiboas boans, Helicops angulatus, Imantodes cenchoa, Pseustes poecilonotus*).

Mabuya sp. and *Tropiduridae* species are not included in any group, as we cannot assign them to any particular species; we do list them in our total species count.

Comparison with other venezuelan Tepui Herpetofauna

Only a few tepuis have been explored herpetologically. A complete recopilation of herpetofauna known for each tepui and an exhaustive compilation of the history of exploration is in McDiarmid and Donnelly (2005). Here I will refer only to those tepuis with over five known species, including Roraima (Boulenger 1895*a,b*, 1900; Duellman and Hoogmoed 1984; McDiarmid and Donnelly 2005), Cerro Duida (Burt and Burt 1931; Rivero 1961, 1966; Robinson 1989; Ayarzagüena 1992; Ayarzagüena *et al*. 1992; McDiarmid and Donnelly 2005), Marahuaka (Rivero 1961; Robinson 1989; Señaris *et al*. 1994; Ayarzagüena 1983; Ayarzagüena and Señaris, 1993; Ayarzagüena *et al*. 1992; Fuentes and Barrio-Amorós, 2004; McDiarmid and Donnelly 2005), Auyan-tepui (Roze 1958*a*; Ayarzagüena 1992; Señaris and Ayarzagüena 1993; Myers 1997; McDiarmid and Donnelly 2005), Chimantá (Roze 1958*b*; Gorzula 1992; Williams *et al*. 1996; McDiarmid and Donnelly 2005), Guaiquinima (Mägdefrau *et al*. 1991; Donnelly and Myers 1991; McDiarmid and Donnelly 2005), Neblina (Zweifel 1986; Roze 1987; McDiarmid and Paolillo 1988; Donnelly *et al*. 1992; Myers *et al*. 1993; McDiarmid and Donnelly 2005), Cerro Yaví (Myers and Donnelly 1996), Tamacuari (Myers and Donnelly 1997), Cerro Yutajé (Myers and Donnelly 2001), and Sarisariñama (Lancini 1968; Duellman and Hoogmoed 1984). Table 4 shows the known herpetofauna for each of these tepuis. Data on other tepuis is in McDiarmid and Donnelly (2005).

TABLE 4. Composition of different tepui (including Tamacuari and Neblina which are, in fact granitic mountains) herpetofaunas, including lowlands, uplands and highlands. Those of uplands and highlands are in *italic*. Du: Duida. Ma: Marahuaka. AT: Auyan tepui. Ch: Chimantá. Gq: Guaquinima. Ne: Neblina. Ya: Yaví. Ta: Tamacuari. Yu: Yutajé-Corocoro. Ro: Roraima. Sa: Sarisariñama.
**Dendrobates rufulus* Gorzula was passed to *Epipedobates* by Myers (1997) and to *Allobates* by Grant et al.(2006). The first author is redescribing the species and it is not *Allobates*.

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Amphibians												
Bufonidae												
Bufonidae sp.						+						
Chaunus marinus					+	+						+
Rhaebo guttatus	+	+			+	+						+
Rhinella ceratophrys		+										
R. margaritifer complex					+	+						+
Metaphryniscus sosae		+										
Oreophrynella críptica			+									
O. macconelli										+		
O. quelchii										+		
Centrolenidae												
Centrolene gorzulai			+									
Cochranella duidaeana	+											
Hyalinobatrachium crurifasciatum								+			+	
H. eccentricum									+			
H. mesai												+
H. taylori			+									
H. cf. orientale			+									
Centrolenidae sp 1						+						
Centrolenidae sp 2						+						
Aromobatidae												
Allobates brunneus	+	+										
A. cf. marchesianus		+										
*Allobates rufulus**				+								
A. undulatus									+			
Anomaloglossus ayarzaguenai											+	
A. moffetti												+
A. praderioi										+		
A. roraima										+		
A. shrevei	+	+										
A. tamacuarensis								+				
A. tepuyensis			+									
Hyloxalus fuliginosus						+						
Dendrobatidae												
Dendrobates leucomelas	+	+										+

......continued

TABLE 4. (continued)

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Hemiphractidae												
Stefania ginesi				+								
S. goini	+											
S. marahuaquensis	+	+										
S. percristata											+	
S. oculosa											+	
S. riae												+
S. schuberti			+									
S. tamacuarina								+				
S. sp.						+						
Hylidae												
Dendropsophus marmoratus						+						
D. minutus					+	+					+	
D. sarayacuensis						+						
Hypsiboas benitezi	+	+						+				
H. boans					+	+						+
H. “crepitans”					+							+
H. geographicus						+						
H. hobbsi						+						
H. lanciformis						+						
H. rythmicus											+	
H. sibleszi			+	+						+	+	
H. tepuianus			+		+						+	+
Myersiohyla aromatica												
M. inparquesi		+										
Osteocephalus lepreuirii		+				+						
O. taurinus					+	+						+
Scinax sp. *(“ruber”)*						+						
Tepuihyla aecii												
T. edelcae			+	+								
T. luteolabris												
Trachycephalus resinifictrix						+						
Phyllomedusa bicolor						+						
P. tomopterna						+						
P. vaillanti						+						
Hylidae sp. 1						+						
Hylidae sp. 2						+						
Hylidae sp. 3						+						
Hylid species			+									
Leptodactylidae												
Adelophryne sp.						+						

......continued

TABLE 4. (continued)

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Leptodactylus andreae						+						+
Dischidodactylus colonnelloi		+										
D. duidensis	+											
Pristimantis avius								+				
P. cantitans							+		+			
P. cavernibardus								+				+
P. marahuaka		+										
P. marmoratus	+	+								+		
P. memorans								+				
P. pruinatus							+					
P. pulvinatus			+									
P. sarisarinama												+
P. vilarsi					+				+			
P. yaviensis							+		+			
P. zeuctotylus						+						
P. sp. *(Auyantepui)*			+									
P. "bromeliad"						+						
P. "bromlike"						+						
P. "stream"						+						
P. "violet"						+						
P. "short toe"						+						
P. "spiney"						+						
P. "V"						+						
Leptodactylus diedrus						+						+
L. knudseni						+						
Leptodactylus lineatus						+						
L. longirostris			+	+	+	+						
L. mystaceus						+						
L. riveroi						+						+
L. rugosus			+		+							
L. sabanensis			+							+		
L. sp.						+						
Pseudopaludicola llanera									+			
Microhylidae												
Adelastes hylonomos						+						
Chiasmocleis hudsoni						+						
Synapturanus salseri						+						
Otophryne pyburni						+						
O. robusta										+		
O. steyermarki				+						+	+	
O. sp.											+	

......continued

TABLE 4. (continued)

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Pipidae												
Pipa pipa						+						
Ranidae												
Lithobate palmipes						+						+
Caecilidae												
Ceacilia tentaculata						+						
Oscaecilia sp.						+						
Reptiles												
Crocodylia												
Alligatoridae												
Paleosuchus trigonatus			+			+						
Paleosuchus sp.												+
Chelonia												
Testudinidae												
Chelonoidis denticulata	+	+										+
Chelidae												
Phrynops tuberosus					+							
Squamata												
Geckonidae												
Gonatodes humeralis	+					+						
G. superciliaris												+
Pseudogonatodes sp.						+						
Thecadactylus rapicauda						+						
Polychrotidae												
Dactyloa punctata						+						
Norops auratus			+									
Norops chrysolepis			+		+	+		+				
Norops eewi				+								
Norops fuscoauratus			+			+						
Norops ortonii												+
Phenacosaurus bellipeniculus							+					
P. carlostoddi				+								
P. neblininus						+						
Tropiduridae												
Plica lumaria					+							
Plica plica	+				+	+						
Plica umbra					+	+						
Tropidurus bogerti			+									
T. hispidus			+		+							
P. panstictus									+			

......continued

TABLE 4. (continued)

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Uracentrum azureum						+						
Uranoscodon superciliosum						+						
Tropiduridae sp.												+
Scincidae												
Mabuya sp.	+				+	+		+		+		+
Teiidae												
Ameiva ameiva	+		+		+	+				+		+
Cnemidophorus lemniscatus			+							+		
Tupinambis tegui in										+		
Kentropy altamazonica						+		+				
K. calcarata	+					+						+
Gymnophtalmidae												
Adercosaurus viadneus									+			
Anadia sp. A				+								
A. sp. B			+									
Arthrosaura reticulata						+						
A. synaptolepis						+		+				
A. tyleri	+											+
A. versteegii			+									
A. sp.				+								
Bachia flavescens						+						
B. pyburni						+						
Cercosaura goeleti							+		+			
C. phelpsorum												+
Leposoma percarinatum					+	+						
Neusticurus rudis			+	+	+					+		+
Neusticurus cf. rudis					+							
N. tatei	+											+
N. racenisi			+		+			+				+
N. medemi						+						
N. sp.						+						
Riolama leucosticta										+		
R. uzelli	+											
R. sp. 1						+						
R. sp. 2						+						
Tetrioscincus ori+iminensis						+						
Amphisbaenidae												
Amphisbaena fuliginosa						+						
Leptotyphlopidae												
Leptotyphlops albifrons			+		+							

......continued

TABLE 4. (continued)

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Boidae												
Boa constrictor						+						
Corallus caninus						+						
C. hortulanus					+	+						
Epicrates c. cenchria			+			+						
Eunectes murinus					+	+						
Aniilidae												
Colubridae												
Anilius scytale "phelpsorum"			+									
Atractus duidensis	+											
A. riveroi	+											
A. steyermarki				+								
A. torquatus						+						
Chironius carinatus			+			+						
C. fuscus					+							+
C. exoletus						+						
Dendrophidion dendrophis						+						
Dipsas catesbyi						+						
D. cf. indica						+						
D. sp.						+						
Drymoluber dichrous						+						
Eryththrolampus aesculapii	+	+	+									
Helicops angulatus												+
Helicops sp.						+						
Imantodes cenchoa			+			+						+
I. lentiferus					+							
Leptodeira annulata			+	+		+						
Mastigodryas boddaerti			+		+							
M. pleei			+									
Leptophis ahaetulla			+			+						
L. sp.						+						
Liophis ingeri				+								
L. lineatus			+									
L. torrenicola					+							+
L. trebbaui			+	+								
L. typhlus												+
L. reginae semilineata					+							
Oxybelis aeneus			+			+						
Oxyrhopus formosus						+						
O. melanogenys						+						
O. petola						+						

......continued

TABLE 4. (continued)

	Du	Ma	AT	Ch	Gq	Ne	Ya	Ta	Yu	Ro	Ja	Sa
Phylodryas cordata					+							
P. viridissimus						+						
Pseustes poecilonotus polylepis												+
Siphlophis compressus	+											
Tantilla melanocephala						+						
Thamnodynastes chimanta				+								
T. corocoroensis									+			
T. duida	+											
T. marahuaquensis		+										
T. pallidus					+			+				
T. yavi							+					
Elapidae												
Micrurus hemprichii ortoni						+						
M. lemniscatus						+						
M. remotus						+						
M. nattereri	+					+						
M. spixi obscurus						+						
Viperidae												
Bothriopsis bilineata						+						
B. taeniata				+		+				+		+
Bothrops atrox	+		+			+						
B. brazili						+						
Crotalus durissus ruruima										+		
Lachesis muta					+							
Known total	24	17	41	17	34	109	6	11	10	17	10	37

Conclusion

Sarisariñama remains one of the most poorly explored places of the Venezuelan Guayana. With the here presented data from our 2002 expedition, we feel that we still barely scratch the surface of diversity for this tepui. Additional exploration of this and other tepuis is necessary, but will likely continue to be infrequent due to the remoteness of the locations and the complex and expensive logistics involved. Certainly, a careful examination of any available specimens (such as the USNM material collected in 1974) would be a timely next step to discover more about the herpetofauna on top of this “Lost World”.

Acknowledgements

We are indebted to our field companions Javier Mesa, Charles Brewer Capriles, the NHK crew (Masahiro Hayakawa, Mashihiro Muta, Yuichi Sekki), Alberto Horie, and our Ye’kwana guides Inati and Luis, with whom we shared exciting moments of exploration, discovery, conversation, and even excellent meals. In relation to meals, we are deeply thankful to our cook, Levis Olivo, for his amazing performances in the middle of nowhere, and to Federico Mayoral for his companionship and his sushi surprise. The logistic support of Eduardo Wallis, Roberto Brewer, Adriana Santiago, Alberto Tovar, Fanny Brewer, Karen Brewer, and John Brewer are also recognized. Mark Moffett was an unforgettable field companion and a source of encouragement at all hours. We are very grateful for the hospitality and support from the Canaracuni Ye'kwana people. Collection permits issued to César L. Barrio-Amorós were obtained through IGSB and MARN. We thank Francisco Bisbal and Ramón Rivero for integrating our specimens into the EBRG collection. Teresa de Ávila-Pires, Ronald Heyer, Carlos Rivero-Blanco, Juan Manuel Guayasamín, Santiago Castroviejo, and Gabriel Uguetto commented and improved different parts of the manuscript. William Duellman and Ross MacCulloch commented early versions of the entire paper. Hinrich Kaiser edited a preliminary version and helped in many ways. Craig Hassapakis also was kind to review and update many details. Salvador Carranza provided CLBA with digital images of the holotype of *Hyalinobatrachium taylori* from the BMNH for comparison and helped preparing figures. Oswaldo Fuentes helped us in creating some tables. Ronald Crombie answered questions about USNM specimens. Rafael and Héctor Aguilar helped with sound analysis. Omar Linares provided further comments on the RCTV-USB expedition to Sarisariñama. Drawings were made by Osvaldo Villareal. Carlos Rivero Blanco rejected the original proposal of naming the new *Gonatodes* after him; we really appreciate his altruistic gesture. Gilson Rivas helped in many ways during the working process of the samples. Five referees improved previous versions of the work (Aaron Bauer, Maureen Donnelly, Brice Noonan, Charles Myers and John Lynch). Despite all of suggestions and comments on the manuscript received from many colleagues, not all advices were followed; CLBA is the only one responsible for the final taxonomic content.

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