



A new species of *Oreosaurus* (Squamata: Gymnophthalmidae) from the Turimiquire Massif, northeastern Venezuela

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Abstract

We describe a new species of gymnophthalmid lizard, *Oreosaurus bisbali* **sp. nov.**, from the Turimiquire Massif in northeastern Venezuela. It is one of three reptile species known to be endemic to the region and the fifth species of *Oreosaurus* from Venezuela. It can be distinguished from all congeners by a combination of rectangular dorsal scales at midbody, having two scales separating femoral pores medially, and lacking a nasoloreal suture. The new species is likely to be restricted in distribution to the highlands of the Turimiquire Massif, which have been significantly degraded by agriculture.

Key words: Reptilia, Microteiid, Anzoátegui State, Cercosaurinae, South America

Introduction

The tropical coastal montane system in northern Venezuela (Fig. 1) is one of the ecoregions prioritized for conservation (Jenkins *et al.* 2013), yet some of its areas remain data deficient. Within this montane system, the eastern Cordillera de la Costa Oriental (CCO) are the closest mountain formations to the Lesser Antilles, in particular the continental island of Trinidad, which is reflected through shared species and biogeographical patterns in the region (Jowers *et al.* 2011; 2015; Rivas & Freitas 2015; Sánchez-Pacheco *et al.* 2018; Rivas *et al.* 2021). The CCO is composed of two mountain ranges, in a west to east direction, the Turimiquire Massif (2400 m) and the Paria Range (1250 m), respectively. Despite the limited understanding of its overall biological diversity, ongoing studies suggest that this region is characterized by high species diversity and endemics (Manzanilla *et al.* 2005; Myers *et al.* 2009). The large geographical extension and altitude of the Turimiquire Massif in combination with the lack of intensive biological surveys in the region, suggests it may hold unforeseen species diversity. Herpetological surveys in the Turimiquire Massif so far have resulted in four species descriptions of squamate reptiles (two of which are seemingly endemic), *Anadia blakei* Schmidt 1932, *Mabuya croizati* Horton 1973, *Atractus matthewi* Markezich & Barrio-Amorós 2004, and *Thamnodynastes ramonriveroi* Manzanilla & Sánchez 2004.

A group of lizards that was notably absent from the Turimiquire Massif for many years was the “*Proctoporus*

luctuosus Group” of Uzzell (1958). The members of this group found in Venezuela have been recently allocated to the genus *Oreosaurus* Peters 1862, and, before the mention of an undescribed species of *Oreosaurus* from Turimiquire (Sánchez-Pacheco *et al.* 2018), these were known to occur in nearby mountain ranges including the Cordillera de la Costa Central (CCC), the Paria Range, and in the Northern Range of Trinidad. *Oreosaurus* exhibits high levels of endemism, with all species seemingly restricted in distribution to single mountain ranges. In northern Venezuela and Trinidad, three species were proposed to be closely related based on having hexagonal dorsal scales (a putative synapomorphy), namely *O. achlyens* (Uzzell 1958) from CCC, *O. rhodogaster* (Rivas, Schargel & Meik 2005) from the Paria Range, and *O. shrevei* (Parker 1935) from Trinidad (Rivas *et al.* 2005). The discovery of a population of *Oreosaurus* from Turimiquire fills in an important biogeographic gap in the distribution of the genus. To put this in perspective, there are only two other reptile genera (*Euspondylus* and *Imantodes*) that have been reported for both CCC and the Paria Range but that have not been reported for the Turimiquire Massif. Sánchez-Pacheco *et al.* (2018) included in their recent phylogenetic study of the genus *Riama* Gray 1858 (which at the time contained *Oreosaurus*), the undescribed species of *Oreosaurus* from Turimiquire (labeled as *Oreosaurus* “Venezuela”), and they found it to be closely related to *O. shrevei* from Trinidad. Therefore, and as it would have been expected based on biogeography, the species of *Oreosaurus* from Turimiquire is a member of the clade recognized by Rivas *et al.* (2005). Herein we present the formal description of the species of *Oreosaurus* from the Turimiquire Massif. We also discuss the most significant questions that remain unanswered about the systematics of this recently resurrected genus.

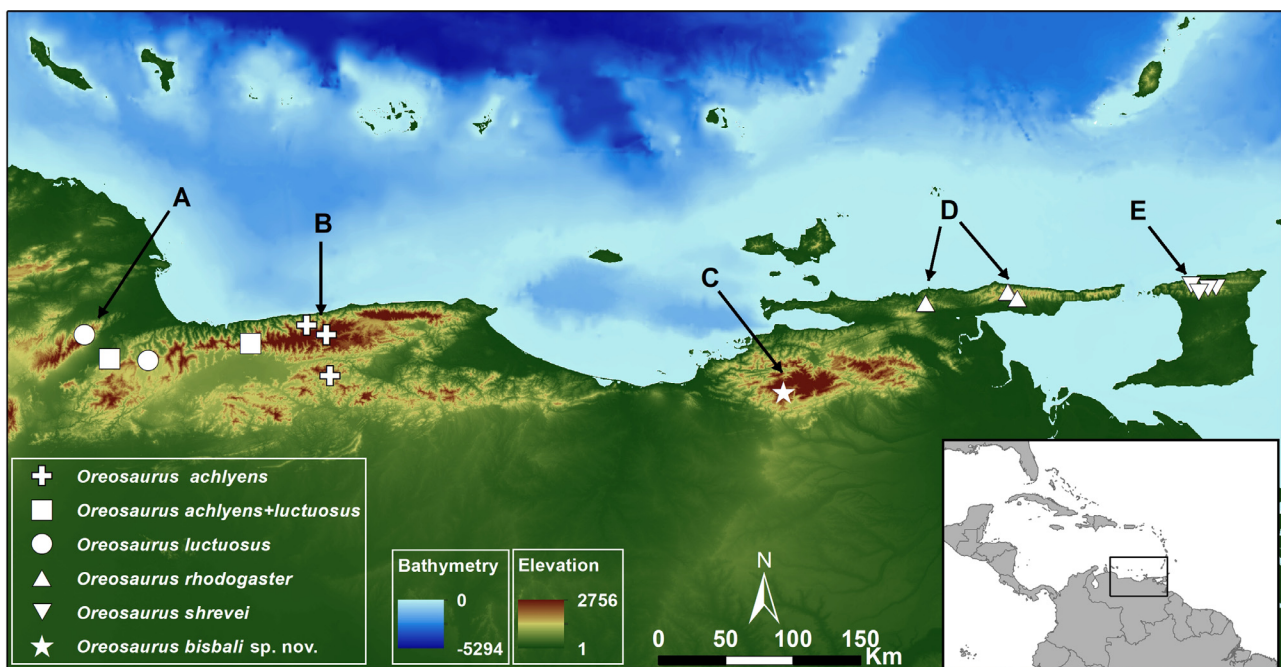


FIGURE 1. Map of northern Venezuela and Trinidad showing the geographic distribution of the five species of *Oreosaurus* known from this region. Localities are based on examined specimens, except for *O. shrevei*, which are taken from Murphy (1997: Cerro El Aripo and Mount Tucuche) and J. Murphy pers. comm (ArimaValley “Asa Wright Nature Center” and Caura Valley). The species shown here are distributed in the following mountain ranges of northern South America in Venezuela and Trinidad: **A.** Sierra de Aroa in the western limit of the Cordillera de la Costa Central. **B.** Cordillera de la Costa Central (including both “Serranias,” Litoral and Interior). **C.** Turimiquire Massif. **D.** Paria Range (including here Cerro La Cerbatana to the west and Serranía de Paria to the east). **E.** Northern Range of Trinidad.

Materials and methods

The format and terminology in the description of the holotype generally follows Kizirian (1996). However, because *Oreosaurus* in its current definition was only recently recognized, the species definition generally follows Sánchez-Pacheco *et al.* (2017). Within the genus, there is a variable degree of differentiation between dorsal scales and lateral scales at midbody; to make scale counts comparable, the dorsal scale counts reported include lateral scale rows. The hemipenes were prepared following the procedures described by Manzani & Abe (1988) and modified by Pesantes

(1994) and Zaher (1999). The retractor muscle was manually severed, and the everted organ filled with stained petroleum jelly. The organ was immersed in an alcoholic solution of Alizarin Red for 24 hours, to stain calcified structures (e.g., spines or spicules), in an adaptation proposed by Nunes *et al.* (2012) on the procedures described by Uzzell (1973) and Harvey & Embert (2008). The terminology of hemipenial structures follows Dowling & Savage (1960), Savage (1997), Myers & Donnelly (2001, 2008), and Nunes *et al.* (2012). Specimens examined are listed in the appendix following standard institutional abbreviations (Sabaj 2019).



FIGURE 2. Three endemic species of *Oreosaurus* from Cordillera de la Costa, northern Venezuela. *Oreosaurus bisbali* sp. nov., subadult (MHNLS 17676) in dorsal (A) and ventral (B) view. Cerro El Guamal, Turimiquire massif, Anzoátegui, 2150 m. *Oreosaurus luctuosus* (C), adult female, Pico El Tigre, Parque Nacional Yurubí, Sierra de Aroa, Yaracuy, 1930 m (EBRG 5855). *Oreosaurus rhodogaster* (D), adult male (MBLUZ 1411). Cerro La Cerbatana, Sucre, 900 m. Photographs by Gilson A. Rivas (A and B), Helga G. Terzenbach (C) and Luís A. Rodríguez J. (D).

Results

Oreosaurus bisbali sp. nov.

(Figs. 2–7)

Oreosaurus “Venezuela”: Sánchez-Pacheco *et al.* 2018 [phylogenetic position of species based on DNA obtained from MHNLS 17676 but listed as GAR 5962]

Holotype. EBRG 5962, an adult male collected at Cerro El Guamal, approximately 2150 m asl., Macizo del Turimiquire, Municipio Freites, Estado Anzoátegui, Venezuela (10°01'28" N, 64°07'44" W), on 2 June 2005 by Dinora Sánchez.

Paratopotype. MHNLS 17676 (presumably lost), a female collected at the same locality as the holotype, on 14 March 2006 by Gilson A. Rivas, Mariana Rojas, Fernando Rojas, and Juan C. Rodriguez.

Definition. (1) Maximum known SVL 54.4 mm; (2) frontonasal approximately equal in length to frontal; (3) prefrontal scales absent; (4) nasoloreal suture absent (= loreal absent); (5) supraoculars four or five, none in contact with ciliaries; (6) superciliary series complete, four; (7) supralabial-subocular fusion absent; (8) postoculars two or three; (9) postparietals two; (10) supratympanic temporals three; (11) genials in two pairs; (12) nuchal scales smooth; (13) most dorsals roughly rectangular, juxtaposed, keeled middorsally, smooth dorsolaterally; (14) paravertebral scales irregularly-shaped, not neatly juxtaposed; (15) transversal rows of the trunk staggered at the paravertebral region; (16) longitudinal dorsal scale rows 22 at the level of tenth transverse ventral row, 26 at fifteenth transverse ventral scale row; (17) transverse dorsal scale rows 39; (18) ventral scales smooth, in 18 transverse rows; (19) differentiated lateral scale rows absent; (20) anterior cloacal plate scales two; (21) posterior cloacal plate scales three; (22) femoral pores per hind limb in males 10 and one precloacal, in females absent; (23) scales between

medialmost pores two; (24) subdigital scales on forth toe 12; (25) dorsum brown medially with dark brown flanks and small white dots laterally; (26) roughly globose hemipenial body, slightly bilobed, ornamented with at least 18 spinulate chevron-shaped flounces on each side of the hemipenial body.

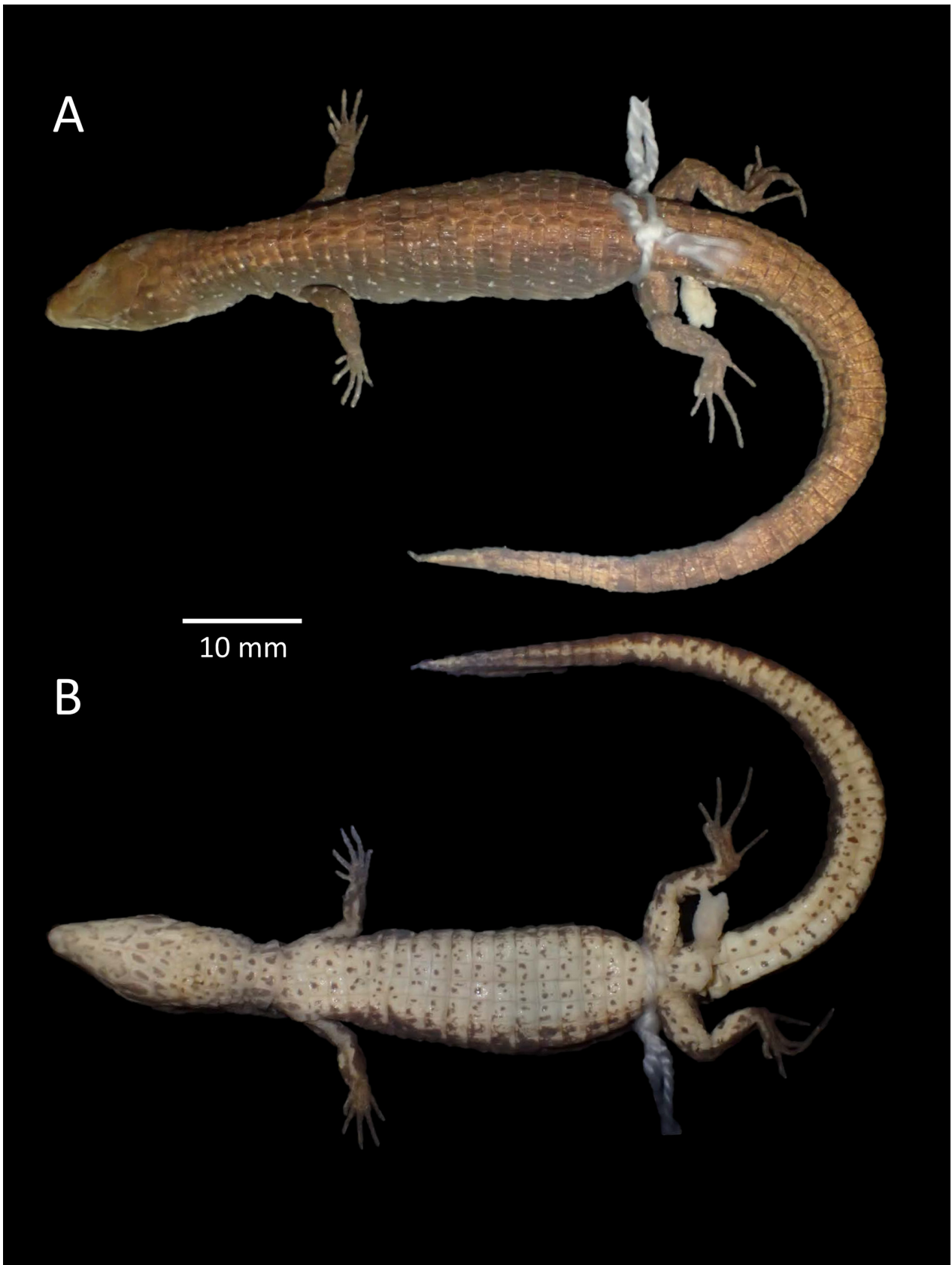


FIGURE 3. Holotype of *Oreosaurus bisbali* sp. nov. (EBRG 5962) in (A) dorsal and (B) ventral view.

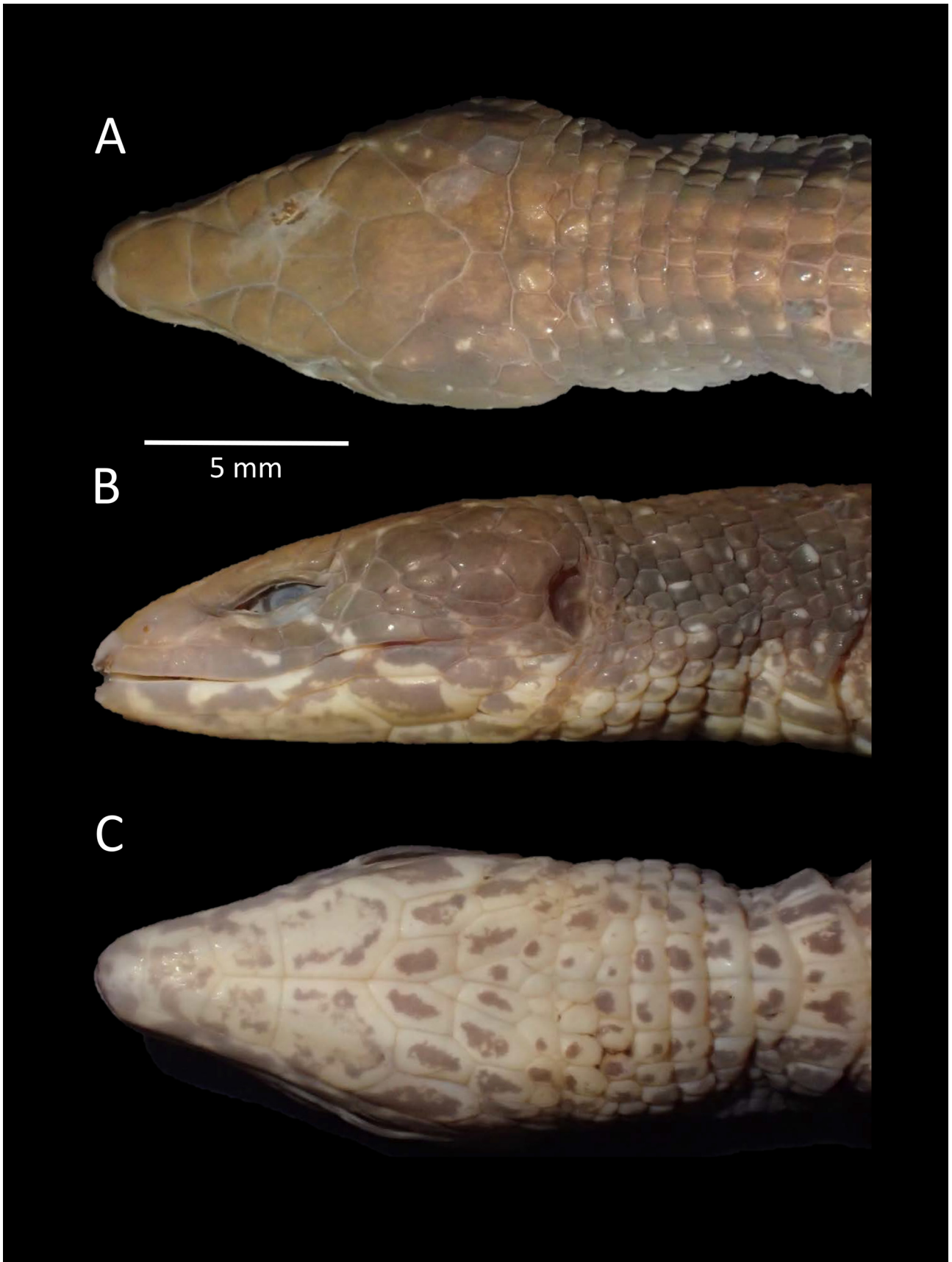


FIGURE 4. Head of the holotype of *Oreosaurus bisbali* sp. nov. (EBRG 5962) in (A) dorsal, (B) lateral, and (C) ventral view.

TABLE 1. Summary of some useful morphological characters to distinguish species of *Oreosaurus*. *Riama cephalolineata* and *R. inanis* were included given the uncertainty of their taxonomical allocation (probably belonging to *Oreosaurus*). Secondary data based on García Pérez & Yustizl (1995); Doan & Schargel² (2003); T. Doan pers. comm. to W.E. Schargel³; Sánchez-Pacheco *et al.* (2017)⁴; Uzzell (1958)⁵; Based on a female specimen (EBRG 5288, SVL 84.38)⁶; Kok & Rivas (2011)⁷; Rivas *et al.* (2005)⁸; Murphy *et al.* (2018)⁹.

Character	<i>Riama cephalolineatus</i> ¹	<i>Riama inanis</i> ^{2,3}	<i>Oreosaurus achlyens</i> ^{1,3,4,5}	<i>Oreosaurus bisbali</i> sp. nov.	<i>Oreosaurus luctuosus</i> ^{1,5,6}	<i>Oreosaurus mcdiarmidi</i> ⁷	<i>Oreosaurus rhodogaster</i> ^{4,8}	<i>Oreosaurus serranus</i> ⁴	<i>Oreosaurus shrevei</i> ⁵
Nasoloreal suture	absent	present	present	absent	present	present	present	present	absent
Dorsal scale shape	hexagonal	rectangular	hexagonal	rectangular	rectangular	rectangular	hexagonal	rectangular	hexagonal
Longitudinal dorsal scale rows at 10th ventral row	?	20–23	?	23	35	?	22–24	18–21	?
Scales separating femoral pores medially in males	?	2	2	2	2	4	0	2	0
Total number of femoral pores in males	23	23–24	25–29	20	27–29	18–20	28	14–18	29–31
Prefrontal scales	present	absent	absent	absent	absent	present	absent	absent	absent
Supratympanic temporals	?	3	2–3	3	4	4	3–4	2	3–4
Lateral scale rows	?	0–1	0	0	9–10	0	0	4–6	0–5
Postoculars	?	2	3	2	3	3	3	2	2–3
Scales around mid-body	?	?	31–37	28	46–48	35–36	?	?	?
Transverse dorsal scale rows	33	29–33	34–40	39	38–43	53–57	42–44	33–36	33–41
Venter color pattern	Immaculate cream (reddish in life)	Immaculate cream	Blotched with black (males); cream yellow (females)	Cream (reddish in life) sprinkled with brown	Uniformly pigmented with brown	Metallic blue	Immaculate cream (reddish in life)	Black with whitish spots	Cream (reddish in life)

Diagnosis. *Oreosaurus bisbali* and *O. shrevei* from Trinidad are closely related (Sánchez-Pacheco *et al.* 2018) and are the only two species in the genus in which the nasoloreal suture is absent (= loreal absent). The new species differs from *O. shrevei* in having rectangular dorsal scales (except the paravertebral rows) as opposed to hexagonal, fewer femoral pores in males (22 vs. 29–31), lacking well-defined lateral ocelli in adult males and having the venter densely covered with dark markings as opposed to an immaculate cream venter in preservative (cream or reddish in life). *Oreosaurus bisbali* further differs from the remaining species in the genus as follows: from *O. achlyens* by having rectangular as opposed to hexagonal dorsal scales, fewer femoral pores (22 vs. 25–29) and lacking well-defined lateral ocelli in adult males. From *O. luctuosus* (Peters 1862) it differs by having fewer femoral pores in males (22 vs. 27–29) and lacking well-defined ocelli in adult males. From *O. mcdiarmidi* (Kok & Rivas 2011) by lacking prefrontal scales. From *O. rhodogaster* by having rectangular as opposed to hexagonal dorsal scales, and having two scales separating the femoral pores medially in males as opposed to none. From *O. serranus* Sánchez-Pacheco, Nunes, Marques-Souza, Rodrigues & Murphy 2017 by having two pairs of genials as opposed to one, and having four or five supraoculars as opposed to three. Because the generic placement of *Riama cephalolineata* (García-Pérez & Yustiz 1995) and *R. inanis* (Doan & Schargel 2003) is uncertain and these two species might prove to be *Oreosaurus* (see Esqueda *et al.* 2017), we compared *O. bisbali* to these two species. *Oreosaurus bisbali* differs from both *R. cephalolineata* and *R. inanis* by lacking a nasoloreal suture and by having more transverse dorsal scale rows (39 vs. 29–33). For a summary of useful diagnostic characters in the genus, see Table 1.



FIGURE 5. Pericloacal region showing cloacal plate, preloacal and femoral pores of the holotype of *Oreosaurus bisbali* sp. nov. (EBRG 5962).

Description of holotype. Male (Figs. 3–7), SVL 54.4 mm, tail length 64.2 mm. Head scales smooth, glossy. Rostral wider than longer, higher than adjacent supralabials, in contact with frontonasal, both nasals, and first supralabial laterally. Frontonasal longer than wide, widest posteriorly, equal in length to frontal but distinctly wider; in contact with nasals laterally, anteriormost supraciliary, and marginally with anteriormost supraocular, and posteriorly with frontal. Nasoloreal suture absent. Nasals pentagonal, longer than tall; in contact with rostral, frontonasal, first and second supralabials, frenocular, first supraciliary, and a small, single preocular scale. Prefrontals absent. Frontal roughly pentagonal, 1.3 times longer than wide, much wider anteriorly than posteriorly; anterior and posterior sutures slightly convex, lateral sutures concave; in contact with frontonasal anteriorly, laterally with first and second supraoculars, posteriorly with both frontoparietals. Frontoparietals two, roughly pentagonal, in contact with second (narrowly), third and fourth (narrowly) supraocular laterally, and with parietals and interparietal

posteriorly. Supraoculars 5/4, none in contact with ciliaries. Supraciliaries four. Antermost supraciliary at least twice as large as the others; in contact with nasal, frontonasal, first and second supraoculars, second supraciliary and antermost ciliaries. Palpebral disc divided into five large and many small opaque, unpigmented scales. Ciliaries on upper immovable eyelid five. Ciliaries on lower movable eyelid nine. Frenocular irregularly quadrilateral, in contact with nasal anteriorly, subocular posteriorly, and second and third supralabial. Suboculars three, gradually increasing in size posteriorly. Postoculars 2/3. Interparietal roughly pentagonal, 1.5 times longer than wide, in contact laterally with parietals, postparietals posteriorly and frontoparietals anteriorly. Parietals roughly heptagonal; each in contact with frontoparietal, fourth (right side) or fourth and fifth supraoculars, and fifth supraoculars, one (left side) or two (right side) temporals, postparietal, and interparietal. Postparietals two, large, roughly octagonal. Several temporals variable in size and shape, but most pentagonal or hexagonal; supratympanic temporals three. Supralabials 7/7, third is largest; suture between third and four directly below middle of eye. Infralabials 4/4, suture between second and third roughly below middle of eye; fourth infralabial in contact dorsally with two elongated, very narrow scales partially covered by the posteriormost two supralabials when the mouth is closed. Mental wider than long, slightly wider than rostral, in contact with first infralabials and postmental posteriorly. Postmental single, pentagonal, smooth, posterior suture angular and directed posteriorly, in contact with first infralabials laterally, mental anteriorly, and two genials posteriorly. Genials in two pairs. Anterior pair genials collectively wider than postmental, quadrangular, in contact anteriorly with postmental, laterally with first infralabial narrowly and with second infralabials broadly. Second pair of genials at least twice as large as anterior pair, in contact with second and third infralabials laterally, preregulars posteriorly. Preregulars in two rows, polygonal, longer than wide scales. Gular scales in eight transversal rows between preregulars and collar fold; antermost three rows irregular with variable scale size; scales in other rows square-shaped or rectangular; posteriormost row with distinctly larger scales that enfold posteriorly. Lateral neck scales rounded or roughly quadrilateral.

Most of dorsal scales rectangular, longer than wide, juxtaposed, in 39 transverse rows; scales of the medialmost region slightly keeled becoming progressively smooth dorsolaterally; longitudinal dorsal scale rows 22 at the level of tenth transverse ventral row, 26 at fifteenth transverse ventral scale row. Scales of the paravertebral rows differentiated from the rest of the dorsals, with irregular size and shape and empty space between them. Transversal rows staged at the paravertebral region, generating intercalated pattern where a row at one side contacts two rows at the opposite side.

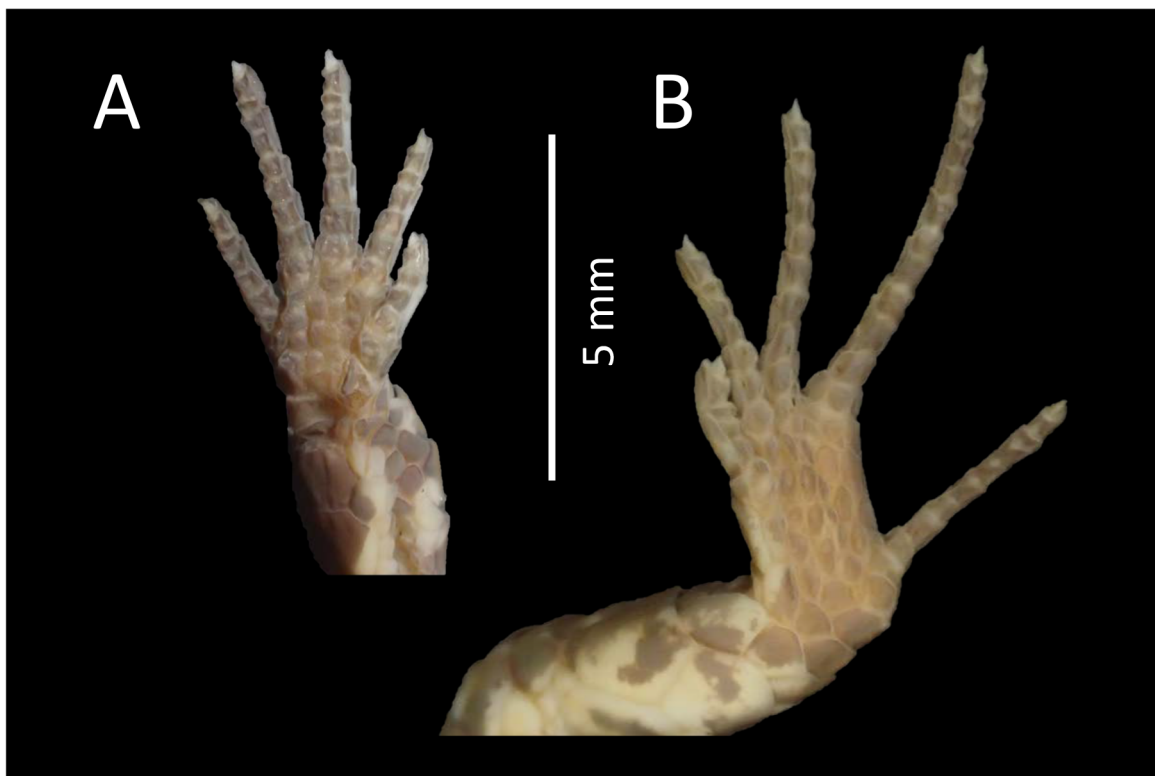


FIGURE 6. Details of the ventral region of left hand and foot of the holotype of *Oreosaurus bisbali* sp. nov. (EBRG 5962).

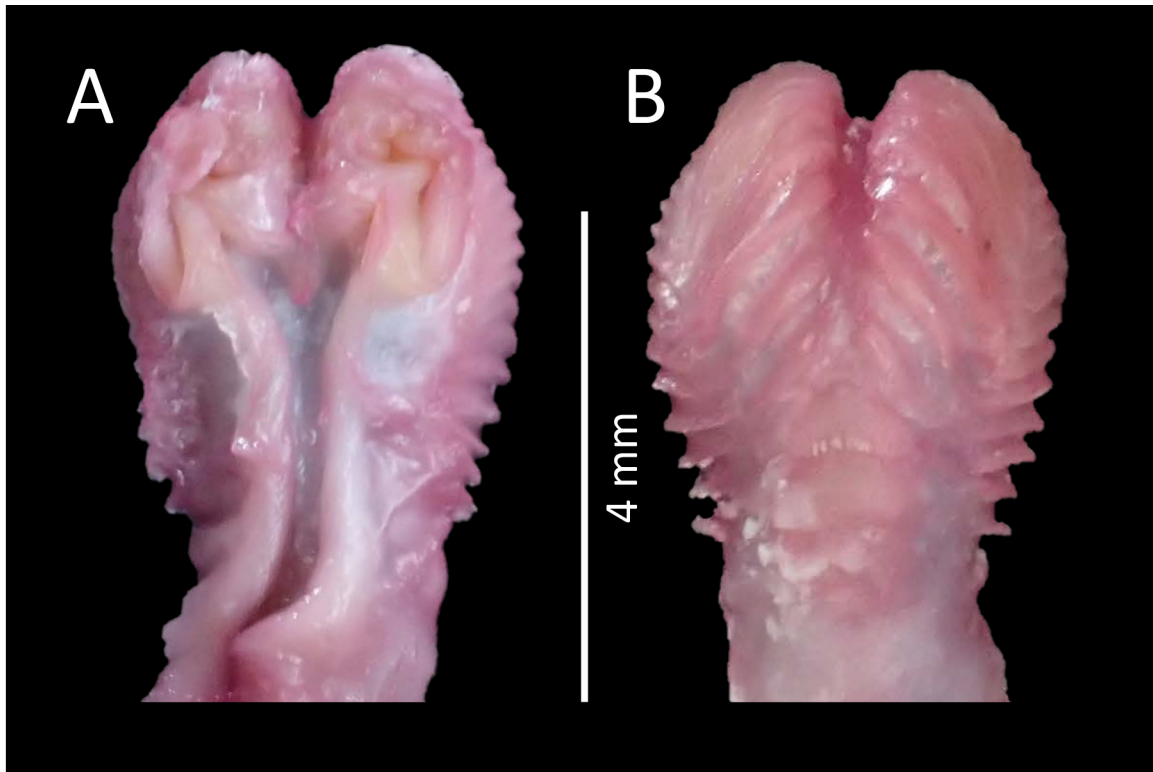


FIGURE 7. Left hemipenis of the holotype of *Oreosaurus bisbali* sp. nov. (EBRG 5962) in (A) sulcate and (B) asulcate view. The hemipenis is nearly completely everted.

Differentiated lateral scales absent. Lateral body scales near insertion of forelimbs and hindlimbs small to granular. Ventral scales smooth, juxtaposed, square-shaped, except distalmost row rectangular, longer than wide. Complete transverse ventral scale rows 18, the fifth transverse ventral scale row divided into two transverse rows on left side only from midventral line. Longitudinal ventral scale rows at midbody six. Cloacal plate roughly rounded, divided into five scales: two anterior pentagonal scales, and three larger posterior scales of which the distalmost are about double the size of medialmost. Tail quadrilateral in cross section. Scales on tail rectangular, juxtaposed, slightly keeled dorsally on anterior fifth, otherwise smooth. Subcaudals paired, distinctly larger than other caudal scales. One preanal pore at each side. Femoral pores 10/10, separated medially by two scales.

Limbs pentadactyl; digits clawed. Dorsal, anterodorsal and posterodorsal upper arm scales (brachials) large but variable in size and shape, roughly polygonal (distalmost corner of scales typically rounded), smooth, juxtaposed to subimbricate; ventral, anteroventral and posteroventral upper arm scales small, granular, juxtaposed to subimbricate. Forearm scales (antebrachial) mostly large, smooth, subimbricate, becoming smaller and ovoid anteroventrally. Dorsal manus scales polygonal, varying in size, largest at base of digits, subimbricate. Palmar scales small, ovoid, subimbricate; thenar scales two. Dorsal scales on digits of manus smooth, rectangular, subimbricate, overlapping subdigital lamellae laterally, 2/2 on I, 4/4 on II, 5/5 on III, 6/6 on IV, 4/4 on V. Subdigital scales on digits of manus: 4/4 on I, 6/6 on II, 8/8 on III, 9/9 on IV, 6/6 on V. Anterior thigh scales large, polygonal, juxtaposed, with short transition dorsally and becoming small, ovoid, and imbricate, posteriorly. Ventrally thigh scales on anterior half medium size (about a third of the size of ventral body scales) ovoid, subimbricate, on anterior half; posterior half ventral thigh scales much smaller, ovoid, imbricate; pore bearing scales rounded to roughly square-shape, distinctly protruding relative to scales posteriorly, sharply separating the two different kinds of ventral thigh scales.

Dorsal pes scales smooth, large, polygonal, juxtaposed to subimbricate. Plantar scales small, ovoid, subimbricate. Dorsal scales on digits of pes single, rectangular, smooth, imbricate, overlapping subdigital lamellae laterally, 3/3 (left/right) on I, 4/4 on II, 7/7 on III, 9/8 on IV, 5/5 on V. Subdigital scales on digits of pes single: 5/5 (left/right) on I, 7/7 on II, 9/10 on III, 12/12 on IV, 8/8 on V.

Coloration of holotype (in preservative). Top of the head and middorsal body color cinnamon-brown; under magnification the ground color is pale brown with dark brown mottling. Sides of the head, neck and body very dark brown. A series of small but distinct white dots on the side of the body is roughly arranged into three longitudinal

lines extending from the neck to the posterior limbs. The white spots are located singly on the posterior edge of dorsal scales and are typically present on contiguous scales of the same longitudinal row or separated by one or two scales devoid of spots. Sides of the head with an irregular arrangement of small white spots in the postocular and temporal region. A poorly defined subocular white stripe extends posteroventrally from the third subocular to the distalmost preangular scale on the first row. Second supralabial with irregular white spots on the posterior margin.

Dorsal and lateral surfaces of the tail cinnamon-brown suffused with dark brown mottling. Lower half of lateral surface of tail more heavily suffused with dark brown and with a narrow, broken, poorly defined creamish white longitudinal line extending from near the limb insertion to near the tip of the tail. Forelimbs are dark brown with scattered white spots except the ventral surfaces of the upper arm and forearm, which are creamish white medially. Forelimbs cinnamon-brown with dark brown suffusion and scattered white spots except ventral surfaces of thighs and shanks, which are creamish white medially with scattered dark brown spots. Ventral surfaces of the head, body and tail creamish white heavily overlaid with dark brown markings. These markings are larger on the head and neck compared to the belly. On the tip of the tail the brown markings completely covered the ventral surface. Manus and pes cinnamon-brown ventrally.

Hemipenial morphology. The holotype's hemipenial pair (EBRG 5962) was used to describe the species male genitalia. Partially everted and partially expanded right organ with the calcified structures stained and lobes damaged and partially everted and fully expanded left organ, with not stained calcified structures and lobes intact. Organs 5 mm long (ca. 3 subcaudal scales); hemipenial body roughly conical, thinner at base, bilobed. *Sulcus spermaticus* broad and deep, central in position, bordered by thick lips, originating medially at base of organ and extending in a straight line to the lobular crotch, where it gets divided by a fleshy fold in two branches that run ventrally on each lobe and end among folds.

Laterals and asulcate aspects of hemipenes ornamented with at least 18 chevron-shaped flounces (vertexes directed proximally) bearing calcified comb-like spicules, extending along the body, except at central asulcate face and in lateral margins of the asulcate face, where longitudinal nude stripes interrupt the spicules series; four first proximal flounces not interrupted in central asulcate face; 7th and 8th first proximal flounces with spicules series not interrupted in the margins of asulcate face; 1st and 2nd proximal flounces restricted to asulcate face and in a roughly straight line shape; 3rd and 4th flounces chevron-shaped in asulcate face (vertexes directed distally).

Variation. The paratype was presumably lost before complete data could be obtained from it. It was noted to be a small female (possibly subadult) with a total length of 80 mm, no femoral pores, nasoloreal suture absent, 36 scales around midbody, and 14 subdigital lamellae on the fourth toe. For the paratype the color in life was described as: chocolate brown above, with a slight reddish cast on posterior body and dorsal aspect of tail, and very inconspicuous slightly darker mottling; a very narrow, inconspicuous light yellowish brown dorsolateral stripe extends discontinuously (as a series of dashes, especially on posterior dorsum) at each side of body from mid neck to anterior third of tail where it fades; body laterally of the same color as dorsum with a series of very numerous, inconspicuous, and small black-bordered whitish or pale yellowish ocelli extending from sides of neck, above arm to groin; head chocolate brown on top with a small, inconspicuous light brown blotch where a prefrontal scale would be located on each side of head; laterally head slightly darker, temporal region blackish; two prominent, oblique whitish bars with broad, black margins present on sides of head, anterior one extending from frenocular and anterior corner of eye to chin below center of eye; posterior one extending from posterior subocular to chin below mid temporal region; tail laterally with several black stripes (about 3) separated by narrower whitish lines; a few blackish flecks are present along dorsolateral region of tail; arms dark brown (slightly darker than dorsum) with suture among some scales on upper arm whitish; legs chocolate brown dorsally, darker anteriorly with suture between large anterior scale whitish. Chin rosy white, becoming orange red towards throat, and with black markings (most evident along infralabials); throat and chest bright orange-red with some blackish blotches; abdomen uniformly orange-red; ventral aspect of tail orange-red with few black blotches.

Etymology. The specific epithet, *bisbali*, noun in the genitive case, is dedicated to our deceased friend, Francisco J. Bisbal E. (1953-2020). This eponymy honors his close friendship with the first author, and recognizes his more than 30 years (1980-2014) as Director of the Museum of the Rancho Grande Biological Station (EBRG), Venezuela. It also highlights his efforts on behalf of the highest environmental authorities in Venezuela to promote the knowledge and conservation of the Venezuelan fauna. The holotype of *Oreosaurus bisbali* and many other species are kept in the EBRG Museum. It is an institution whose collections, even though are well curated, currently deserve better attention.



FIGURE 8. Vegetation on the summit of Cerro El Guamal, Turimiquire Massif, Anzoátegui State, Venezuela. Patch of bushes and rocky outcrops (a) on Cerro El Guamal, where the two specimens of the new species were collected. Low stratum humid forest (b), which likely represents the original habitat in the area.

Distribution and habitat. The two known specimens of *Oreosaurus bisbali* were captured in a single locality, Cerro El Guamal, in the southern side of the Turimiquire Massif (Fig. 1). Despite great sampling efforts, no additional specimens were found in two subsequent trips to the type locality between July 2006 and January 2007. The vegetation in this locality is composed of patches of a low stratum humid forest and rocky outcrops (Fig. 8). The species may also be found in the Cerro Las Maravillas and Fila La Esmeralda, located further north of Cerro El Guamal. These two areas possess a similar altitude to Cerro El Guamal and natural vegetation mainly near the top. The natural vegetation in the Turimiquire Massif has been severely affected by agricultural practices including coffee and different subsistence crops. Large areas of the Turimiquire Massif seem to be burned periodically and, in these areas, grasslands predominate. Even if large areas of the Turimiquire Massif are legally protected by Ministerio del Poder Popular para el Ecosocialismo (MINEC) of Venezuela, the destruction of natural vegetation and its replacement with crops and grasslands is old and has kept expanding in recent times (Huber & Oliveira-Miranda 2010). Because habitat destruction in the area and because *O. bisbali* is likely endemic to the highlands of the Turimiquire Massif and seems locally rare, it is important to increase surveys of this species and evaluate its conservation status.

Discussion

The phylogenetic position of *Oreosaurus bisbali* within the *O. achlyens*, *O. rhodogaster* and *O. shrevei* clade (Rivas *et al.* 2005) seems well-established (Sánchez-Pacheco *et al.* 2018). However, unavailable molecular data for *O. rhodogaster* means that the specific relationships in this clade remain incomplete. Based on biogeography, *O. rhodogaster* and *O. shrevei* are more likely to be sister species, given the stronger affinity between the biota of Paria Range and the Northern Range of Trinidad than with any of these two areas and the Turimiquire Massif (Rivas *et al.* 2021). A close relationship between *O. rhodogaster* and *O. shrevei* is supported by two putative morphological synapomorphies: having dorsoventrally compressed heads and lacking scales medially separating the femoral pore bearing scales (Rivas *et al.* 2005). *Oreosaurus bisbali* lacks these two character states but shares with *O. shrevei* the unique character state in the genus of lacking a nasoloreal suture. There are other aspects of the systematics of the genus *Oreosaurus* that will need to be addressed, including the phylogenetic position of *O. luctuosus* and the taxonomic status of *Riama cephalolineata* and *Riama inanis*. Both *R. cephalolineata* and *R. inanis* are likely to fall

nested within *Oreosaurus* (see Esqueda *et al.* 2017). It is also possible that these two names are conspecific and a proper detailed description of the holotype of *R. cephalolineata* is warranted.

One of the most surprising phylogenetic results obtained by Sánchez-Pacheco *et al.* (2018) was the placement of *Oreosaurus mcdiarmidi* (originally described as an *Anadia*) within *Oreosaurus*. The genus *Anadia* remains one of the least sampled gymnophthalmid genera with respect to molecular phylogenies. In Venezuela, there are several country-endemic species of *Anadia* in the Cordillera de Mérida, CCC, and CCO, that have not been sampled for molecular analyses. If the placement of *O. mcdiarmidi* is indeed within *Oreosaurus*, it is possible that other species of Venezuelan *Anadia* are also nested within *Oreosaurus*, which would require redefining both genera. Alternatively, greater taxon sampling might prove the position of *O. mcdiarmidi* to be different. Even if the systematics of the family Gymnophthalmidae has received unprecedented attention in recent years (e.g., Goicoechea *et al.* 2016; Torres-Carvajal *et al.* 2016; Moravec *et al.* 2018; Vásquez-Restrepo *et al.* 2020), it is clear that we are still far from attaining a stable genus-level taxonomy, especially in the Cercosaurinae clade. At this stage, it seems difficult to make further significant advances in the systematics of this clade without increasing taxon sampling of groups (e.g., *Anadia* and *Euspondylus*) in northern South America.

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APPENDIX. Additional specimens examined

Riama inanis.—VENEZUELA: Portuguesa: Carreterra Chabasquen-Cordova, Sierra de Portuguesa, 1450 m (MCNG 825–828, type series of *Proctoporus inanis*). Barinas: Los Alcaravanes, Calderas, 1100 m (MBLUZ 952).

Oreosaurus achlyens.—VENEZUELA: Aragua: Rancho Grande, Parque Nacional Henri Pittier, 1100–1200 m (EBRG 5783, MBLUZ 901, MHNLS 16170, 3075, AMNH 137267–69, 137271–76, 137278–82); Tiara, 1000 m (MHNLS 1278). Distrito Capital: Quebrada La Negra, embalse Agua Fría, Parque Nacional Macarao (MHNLS 17073–75). Vargas: Las Llanadas, Hacienda El Limón, 1000 m (MHNLS 4924–25). Yaracuy: Hacienda La Guaquira, macizo de Nirgua, 1330 m (EBRG 5290).

Oreosaurus luctuosus.—VENEZUELA: Aragua: Rancho Grande, Parque Nacional Henri Pittier, Aragua, 1100 m (EBRG 1706, MHNLS 1464, AMNH 137270, 137277). Carabobo: Cerro La Copa, Montalbán, límite con Temerla, 1500–1600 m (EBRG 5748). Yaracuy: Hacienda La Guaquira, macizo de Nirgua, 1330 m (EBRG 5288); Pico El Tigre, Parque Nacional Yurubí, sierra de Aroa, Yaracuy, 1800 m (EBRG 5851); same data as EBRG 5851, but collected at 1930 m (EBRG 5855).

Oreosaurus rhodogaster.—VENEZUELA: Sucre: a foot path between Las Melenas and Cerro Humo, Península de Paria, 650 m (MHNLS 15730–31, MHNLS 17676, UTA R- 52895–96, type series); Cerro Humo, 900 m (MBLUZ 1296). Cerro La Cerbatana, 950 m (MBLUZ 1410–1411).