

Noteworthy new records of squamate reptiles (Reptilia: Squamata) from various Venezuelan Caribbean islands, including a new addition to the herpetofauna of Venezuela

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ABSTRACT: The occurrence of *Gymnophthalmus lineatus* in Venezuela is established for the first time based on a specimen collected on Las Aves Archipelago. We also document the first records of *Phyllodactylus ventralis* from Los Frailes Archipelago, *Amphisbaena alba* from Isla de Margarita, and report the occurrence of *Thecadactylus cf. rapicauda* on Las Aves Archipelago. Additionally we expand the distribution of the snake *Leptophis ahaetulla* on Isla de Margarita and report the third specimen known from that island. We also present information on the lepidosis and coloration for all species when pertinent.

Fourteen named islands and archipelagoes, formed by a string of more than 600 isles and keys and ranging from small coral atolls to islands up to 33 km across, comprise the Venezuelan Antilles in the southernmost portion of the Caribbean Sea (Cervigón 1992; Ostos and Sisson 2005). Some of these land masses are located on the continental shelf and likely were connected to the mainland during the last glacial maximum (Los Monjes Archipelago, La Tortuga [and adjacent keys], Margarita, Cubagua, Coche, Isla La Sola, Los Frailes Archipelago and Los Testigos Archipelago). Other islands (Las Aves Archipelago, Los Roques Archipelago, La Orchila [and surrounding keys] La Blanquilla and Los Hermanos Archipelago) are oceanic, separated from one another and the mainland by deep-sea trenches and have never been connected to the continent (Neill *et al.* 2011). The taxonomy, composition and geographic distribution of the herpetofauna of the Venezuelan islands are poorly understood and have remained largely ignored until very recently. During the late 1800s and the first half of the 1900s several studies published the results of sporadic herpetological collection efforts on the Venezuelan islands, which resulted in the description of five new taxa: *Cnemidophorus nigricolor* Peters, 1863, *Ameiva bifrontata insulana* Ruthven, 1924, *Anolis blanquillanus* Hummelinck, 1940, *Phyllodactylus ruteni* Hummelinck, 1940 and *Drymarchon margaritae* Roze, 1959. Unfortunately, during the rest of the 1900s the herpetofauna from this region received little or no attention and most species were considered to be either conspecific with those on the mainland or to be endemic to several islands.

Recently, the first and last authors embarked on a survey of the herpetofauna from the Venezuelan Caribbean islands resulting in additional data, including discovery of several new species (Ugueto *et al.* 2009;

Ugueto and Harvey 2010; Ugueto and Rivas 2010; Rivas *et al.* 2013; unpublished data). In this paper we report a new important addition to the Venezuelan herpetofauna, add new distributional records of squamate reptiles, extending their known distribution in Venezuela, and present information on lepidosis and coloration from these specimens. The necessary collecting permits were provided to GAR by the Ministerio del Poder Popular para el Ambiente, Venezuela (*oficios* 667 and 5418) through the Facultad Experimental de Ciencias, Universidad del Zulia (LUZ), Maracaibo. All specimens were collected by hand. On Las Aves archipelago we spent 13 days (PV, LES) during a study of the structure and status of the mangroves in the archipelago. Collection of reptiles in this locality was casual. We also spent eight days on the island of Fraile Grande or Puerto Real, Los Frailes Archipelago (GAR, TRB, OL-A) during the course of a study on the ecology of *Cnemidophorus flavissimus*. Additionally, the comments of taxa from Isla de Margarita are based in individuals encountered or observed casually by LABV and GNU. All specimens collected have been deposited in the collection of the Museo de Biología, Universidad del Zulia, Maracaibo, Venezuela (MBLUZ).

Amphisbaenidae: *Amphisbaena alba* Linnaeus, 1758.— This worm lizard is the largest amphisbaenian known (maximum total length (TL): 750 mm). Although widely distributed throughout northern South America, east of the Andes, there are no records of this reptile from any island, except Trinidad (Murphy 1997). We report the first record of *A. alba* from a Venezuelan island based on a specimen (MBLUZ 1059) collected in 2007 in La Fuente, near Cerro Matasiete and Cerro Guayamuri, Municipio Antolin del Campo, Isla de Margarita, Nueva Esparta State (11°04'00"N, 63°51'00"W) and on three specimens

observed by one of us (LABV; Figures 1A-C and 2).

MBLUZ 1059 agrees in all scale counts and details of coloration with data previously reported for *Amphisbaena alba* (Vanzolini 2002). Measurements and lepidosis of this specimen are as follows: Snout-vent length (SVL) 473 mm; TL 518.9 mm; nasals two, in broad medial contact; prefrontals two in broad medial contact; supralabials four on each side (last one smallest); infralabials three on each side, the first in contact with mental; postmental pentagonal, in contact with first and second infralabials and large malar scale; body annuli 237; tail annuli 18; dorsal segments to a midbody annulus 42; ventral segments to a midbody annulus 39; preanal pores 10, five on each side; precloacals 10, broadly overlapping postcloacals.

One of the three additional specimens was observed on 10 March 2009, on the road to Los Robles, sector Palosano between Cerro Matasiete and Cerro Copey. This specimen was subsequently released 2 km N on the grounds of Cerro Copey National Park by LABV. On 19 October 2010 a second individual was observed at Calle El Saco, on the road to Cerro Copey. On 10 November 2011, a third specimen was found on the grounds of MINAMB (Ministerio del Poder Popular para el Ambiente), at sector La Granja, Salamanca, near Cerro Matasiete and Cerro Copey and later released 2.5 SW by LABV in Cerro Copey National Park.

Gymnophthalmidae: *Gymnophthalmus lineatus* (Linnaeus, 1758).— The Neotropical microteiid genus *Gymnophthalmus* Merrem, 1820, contains seven species of small lizards known to occur from southern Mexico to northern Brazil. Only two species have been recorded in Venezuela: *Gymnophthalmus cryptus* Hoogmoed, Cole and Ayarzagüena, 1992, from northern Amazonas and western

Bolívar in southern Venezuela, and *Gymnophthalmus speciosus* (Hallowell, 1820), a species with a suspiciously broad and still not clearly defined distribution extending from Mexico to Colombia and Venezuela and with a type locality restricted to Honduras. The status of the Venezuelan populations referred to this species needs to be clarified, because the name *G. speciosus* has been used there more for convenience than to correctly represent the proper taxonomic status of these populations; morphological and genetic studies are needed to clarify their status and distribution (Ugueto and Rivas 2010; see also Vanzolini and Carvalho 1991, and Carvalho 1997 for a discussion about the status of the Venezuelan population referred to this species). Other extralimital species of *Gymnophthalmus* are likely to be found in country, as they have been collected in areas close to the Venezuelan border (e.g., *G. underwoodi* Grant, 1958 and *G. vanzoi* Carvalho, 1999). Among the species of probable occurrence is *G. lineatus*, a taxon previously reported only from the Dutch Leeward Islands of Curaçao and Bonaire (van Buurt 2005). It also has been erroneously recorded from Suriname and Brazil (Hoogmoed 1973; Avila-Pires 1995). Mijares-Urrutia and Arends (2000) reported a specimen (MCNC 195) identified as *G. lineatus* from Tucacas, Falcón on mainland Venezuela. However, these authors indicated that the specimen needed confirmation of specific identity. No other specimens of *G. lineatus* are known from the state of Falcón, which instead is populated by its congener *G. speciosus*. Although we did not examine this specimen, we consider it very likely that it represents a misidentified specimen of *G. aff. speciosus* or an isolated introduction (as also suggested by Mijares-Urrutia and Arends 2000; Rivas *et al.* 2012).

Herein we report the first reliable record of *G. lineatus* for Venezuela, based on a single specimen (MBLUZ 1005)



FIGURE 1. *Amphisbaena alba* in life observed at sector La Granja, Salamanca, Isla de Margarita (A, B); photo: L.A. Bermúdez. Dorsal view of specimen MBLUZ 1059 from La Fuente, Isla de Margarita (C); photo: G.A. Rivas.

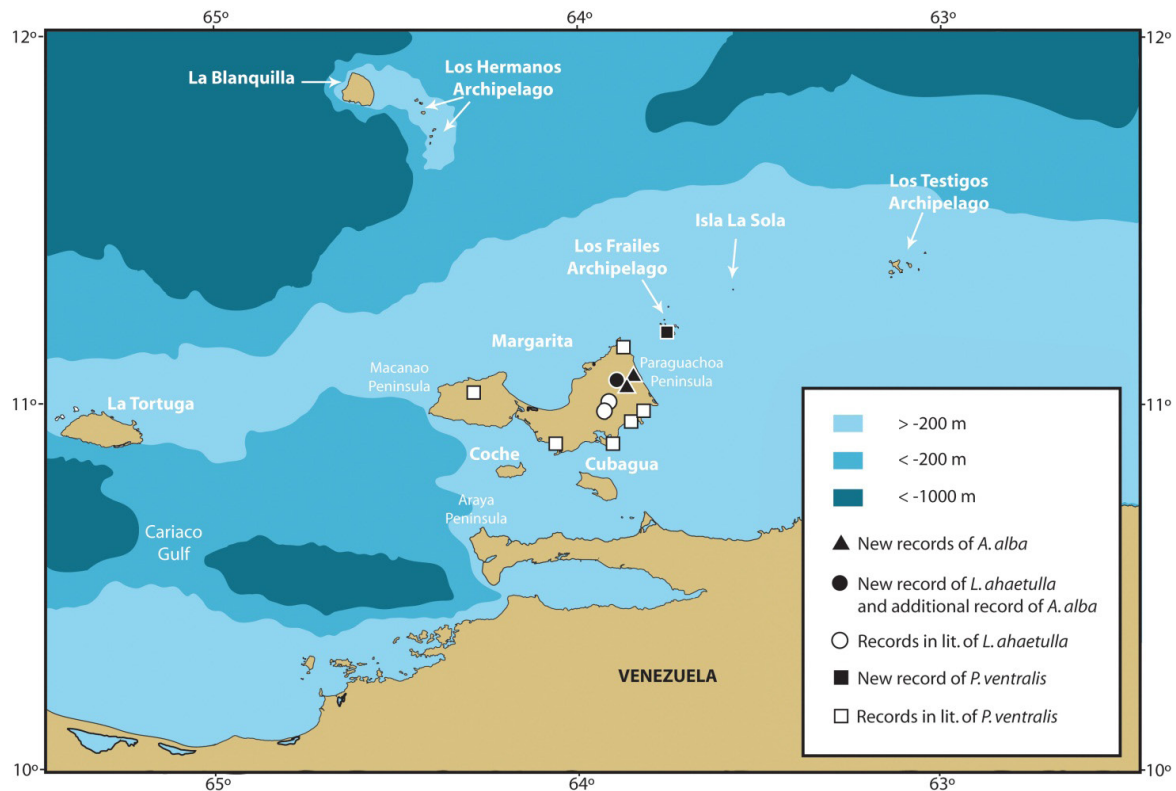


FIGURE 2. Map of the eastern Caribbean islands of Venezuela showing new records of *Amphisbaena alba*, *Leptophis ahaetulla* and *Phyllodactylus ventralis*.

collected on 13 November 2010 on an unnamed key (12°01'13"N, 67°40'52"W) of Aves de Sotavento, Las Aves Archipelago. This locality lies approximately 60 km E from the nearest record of the species in Spelonk, Bonaire (Hummelinck 1940). The specimen was identified as a female due to the lack of femoral pores, which are present in males. Morphometric characters and scale counts of MBLUZ 1005 fall within the variation previously reported for *G. lineatus* (see Cole *et al.* 1990) and its coloration is also identical to that previously reported (see van Buurt 2005). The conspicuous whitish dorsolateral and lateral stripes (Figure 3A-B) and bright orange tail immediately differentiate it from its congeners on mainland Venezuela. Very little has been published about this taxon, and the following data on the Venezuelan specimen may prove useful: SVL 32 mm; tail length 47 mm; head length 5.34 mm; nasal entire and in contact with rostral; frontonasal entire; interprefrontal absent; prefrontals present and in relatively broad medial contact; frontal single, rhomboidal; supraocular single; frontoparietals absent; interparietal distinct, similar in shape but much larger than frontal with one shorter, transversely elongated parietal on each side, together forming a somewhat jagged suture across the back of the head; occipitals present, transversely elongated (similar to dorsals); supraciliaries two, first much longer and conspicuously expanded dorsally; loreal scale relatively small, hexagonal and in contact with supralabials, separating nasal and frenocular; preocular small; suboculars two (first much longer), none protruding laterally to lip; supralabials eight, fifth below center of eye; infralabials seven, suture between third and fourth below center of eye; ear opening distinct but small; two pairs of large chin-shields, both in contact with each other; no enlarged scale present posterior to second chin shield; median gulars enlarged; collar fold indistinct;

dorsals large, transversely expanded, imbricate, hexagonal and smooth; vertebral row smaller than adjacent rows and subrhomboidal or subhexagonal in shape; vertebral scales between interparietal and posterior level of hindlimbs 36; ventral scales in four longitudinal rows and 29 transverse rows; scales around midbody 15; forelimbs with four clawed digits, inner finger absent; hindlimbs with five clawed digits; subdigital lamellae under fourth finger of left hand 15; subdigital lamellae under fourth toe of left foot 17.

MBLUZ 1005 conspicuously resembles specimens from Bonaire (see photograph 58 in van Buurt 2005) in having the pale dorsolateral stripes faded on the posterior portion of dorsum. In contrast, in all specimens from Curaçao that we have observed ($n = 5$) these stripes remain distinct to the base of the tail (unpublished data; see also photograph 57 in van Buurt 2005). Whether this difference in color pattern is constant and whether it could possibly be indicative of two different taxa currently included in *G. lineatus* still needs to be assessed.

The only other mention of a *Gymnophthalmus* from the Venezuelan Antilles or oceanic islands was that of Hummelinck (1940), who reported one specimen of *G. laevicaudus* (a name currently under the synonymy of *G. speciosus*) collected on an unidentified island of Aves de Barlovento (Figure 4). We were unable to examine that specimen, but we believe that the presence of this continental taxon on an oceanic island is unlikely and that Hummelinck's record probably represents a misidentified specimen of *G. lineatus*.

Phyllodactylidae: *Phyllodactylus ventralis* O'Shaughnessy, 1875.— The Venezuelan Leaf-toed Gecko *P. ventralis* is distributed throughout most of northern Venezuela, including the Llanos and adjacent Colombia

(Dixon and Huey 1970). In Venezuela, the species is known from the states of Zulia and Portuguesa to eastern Sucre, and has been reported to occur on the tiny Isla de Patos (Lancini 1963) and several localities on Isla de Margarita (Ugueto and Rivas 2010).

Herein we report the first records of *P. ventralis* from the Los Frailes Archipelago (Figure 2) based on four specimens collected on 15 August 2009 (MBLUZ 927–928), one on 19 May 2010 (MBLUZ 967) and one on 25 January 2011 (MBLUZ 1082), all from Isla Fraile Grande (also known as Puerto Real), the largest of the islands and keys forming Los Frailes Archipelago (11°11'43" N, 63°44'09"W). These new records represent the northernmost locality for this species and extend its distribution 14 km NE from the nearest record in Playa El Agua, Isla de Margarita (Ugueto and Rivas 2010). MBLUZ 927 (SVL 35.5 mm) and MBLUZ 928 (SVL 49.5 mm) were found among piles of rubble

of a dilapidated building. MBLUZ 967 (SVL 42 mm) was observed hiding within the leaves of an agave plant (*Agave cocui* Trelease, 1913) in a forest dominated by Naked Indian trees (*Bursera karsteniana* Engler, 1883). In contrast, MBLUZ 1082 (SVL 53 mm) was found at night on the outside wall of a house while it was foraging for insects attracted by the nightlights.

The new records reported here represent the third known island population of *P. ventralis*, after those from Isla de Margarita (Rivas Fuenmayor *et al.* 2005; Ugueto and Rivas 2010) and Isla de Patos (Lancini 1963). The four specimens from Los Frailes Archipelago agree with most scale characters reported for *P. ventralis* (Dixon and Huey 1970). Important scale counts from individuals of the Los Frailes Archipelago and comparison with those from *P. ventralis* from the continental mainland and Margarita are in Table 1.



FIGURE 3. *Gymnophthalmus lineatus* female (MBLUZ 1005) in life (A); photo: P. Velozo. Lateral view of same specimen in preservative; arrows indicate diagnostic dorsolateral and lateral light stripes (B); photo: G.N. Ugueto.

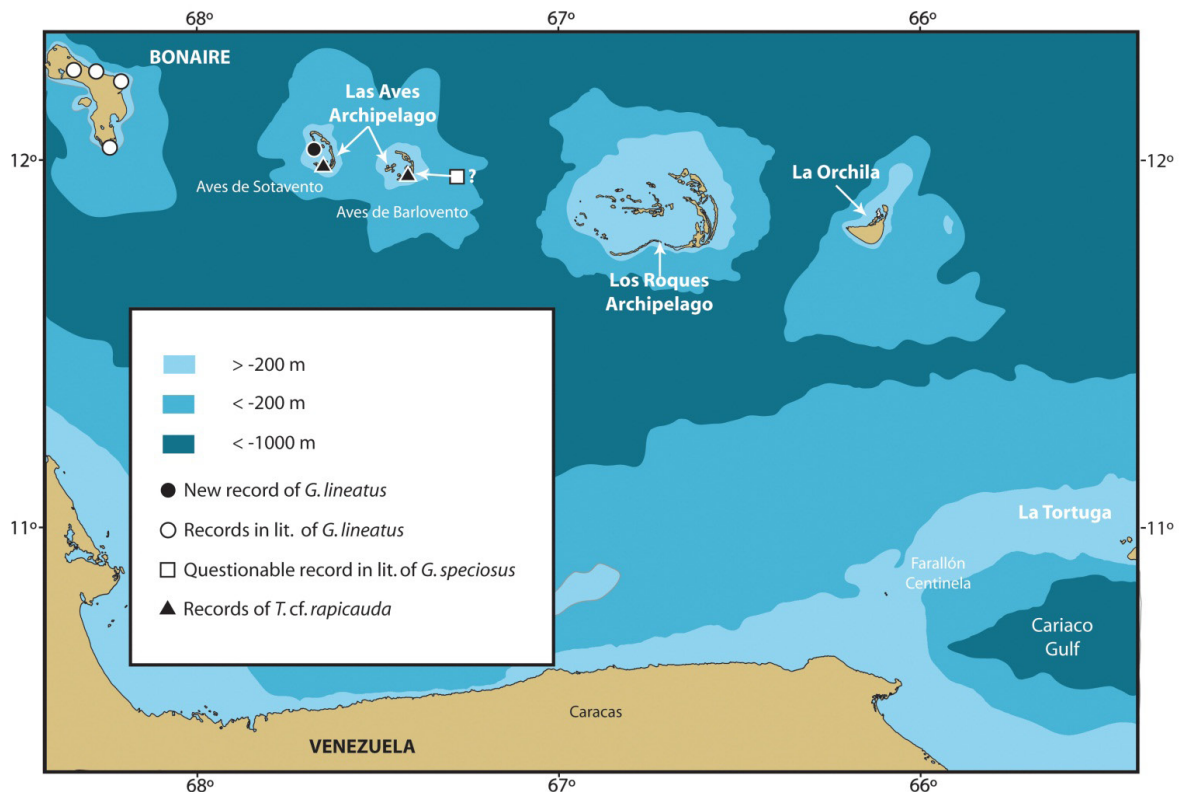


FIGURE 4. Map of the western Caribbean islands of Venezuela and adjacent Bonaire showing distribution of *Gymnophthalmus lineatus* and *Thecadactylus cf. rapicauda*. Records of *G. lineatus* in literature (Hummelinck 1940; van Buurt 2005); questionable record of *G. speciosus* from Aves de Barlovento, Las Aves Archipelago (Hummelinck, 1940).

Thecadactylus cf. rapicauda.— Widely distributed, *Thecadactylus rapicauda* Houttuyn, 1782, occurs from the Yucatan Peninsula south to northeastern Brazil and The Guianas; it also is present on Aruba, Curaçao and Bonaire, the Venezuelan islands of Isla de Margarita and Los Testigos Archipelago, Trinidad, Tobago, and throughout the Lesser Antilles from Grenada to St. Croix and the U. S. Virgin Islands (Schwartz and Henderson 1991, Bergmann and Russell 2007).

During fieldwork in November 2010 on Las Aves Archipelago (Figure 4), PV collected three *Thecadactylus* specimens. Two specimens were found on Isla Larga (MBLUZ 1006–1007), Aves de Sotavento (11°58'31"N, 67°39'13"W, and 11°58'41"N, 67°40'05"W), and the third was collected on an unnamed key (MBLUZ 1008) of Aves de Barlovento (11°56'40"N, 67°25'58"W). All were found amidst layers of dead branches in a salt-tolerant red mangrove forest (*Rhizophora mangle* Linnaeus, 1753). According to the original color notes, the lizards were very dark at the time of capture. The three specimens are adult males, as indicated by the fully everted hemipenis and agree with *T. rapicauda* in several details of squamation and coloration but are much smaller; SVL 67 mm in the largest specimen (MBLUZ 1008).

The Las Aves individuals differ from *T. rapicauda* as defined by Köhler and Vesely (2011) and Avila-Pires (1995, although this latter sample appears to be a mixture of *Thecadactylus rapicauda* and *T. solimoensis* Bergmann and Russell, 2007), in several morphometric and squamation characters. We provisionally assign these specimens to *T. rapicauda*. Until very recently, *Thecadactylus* was considered a monotypic genus, but recently two additional species were described, *T. solimoensis* from the western Amazonia in southern Colombia, Ecuador, Peru, Bolivia and northwestern Brazil (Bergmann and Russell 2007) and *Thecadactylus oskrobapreinorum*, from the island of Sint Maarten (Köhler and Vesely 2011).

Colubridae: *Leptophis ahaetulla* (Linnaeus, 1758).— This snake occurs from southern Mexico to northern Argentina and is commonly considered a polytypic taxon with up to eleven subspecies recognized; from these, only *L. a. coeruleodorsus* Oliver, 1942 has been recorded to be present on Isla de Margarita (Ugueto and Rivas, 2010). Oliver (1942) described this arboreal snake (as *L. coeruleodorsus*) based on 13 specimens

from Trinidad, five from Tobago and four specimens from areas along the north-central and northeastern portions of Venezuela. This taxon is easily recognizable from the other subspecies of *L. ahaetulla* by having two dorsolateral yellow stripes separated by a green or bronze dorsum (usually posteriorly) and by the lack of a pale vertebral stripe. Currently, the distribution of this species encompasses the Llanos and forests across northern and Central Venezuela (including Isla de Margarita), Trinidad and Tobago (Murphy 1997).

The reported distribution of *L. ahaetulla* on Isla de Margarita includes only two localities based on two specimens collected more than five decades ago: one from Cerro Copey and another from Cerro Ochenta (Roze 1964; Roze 1966; Ugueto and Rivas 2010). In 2010 a female specimen (MBLUZ 1060) of this species was found dead on the grounds of Ministerio del Poder Popular para el Ambiente (MINAMB), at sector La Granja, Salamanca, Municipio Arismendi, Isla de Margarita, Nueva Esparta State (11°03'N, 63°52'W, Figures 2 and 5). This is the third record of this taxon on Isla de Margarita and the northernmost locality in Venezuela, extending its distribution approximately seven km N of the nearest record in Cerro Copey and confirming the continuous presence of this species on the island. Main characteristics of this specimen are: SVL 940 mm; TL 1480 mm; diameter of eye much shorter than distance between nostril and eye; sutures between internasals roughly subequal in length to that between prefrontals; loreal scale absent; preocular single and large, separated from frontal; postoculars two, upper larger than lower; supralabials eight, fourth and fifth in contact with eye; infralabials 10, seven in contact with chin shields; temporals 1+2; ventrals 165; anal plate divided; subcaudals 137, paired. MBLUZ 1060 agrees in most scale counts with those reported for *L. a. coeruleodorsus* except in the number of subcaudals, which is slightly lower (148–172 in Roze 1966; 148–175 in Lancini and Kornacker 1989).

This is an uncommon species on Isla de Margarita where it appears to be restricted to relatively humid forests (Ugueto and Rivas 2010), not entering drier areas of thorn scrubland. However, this new record indicates that *L. ahaetulla* also can be found around human habitations on the island. On mainland Venezuela, where this snake is much more common, it has been regularly found around human habitations.

TABLE 1. Comparisons of scale counts and measurements (mm) between specimens of *Phyllodactylus ventralis* from Los Frailes Archipelago and those previously reported from the mainland and Isla de Margarita (based on Dixon and Huey 1970; Ugueto and Rivas 2010).

CHARACTERS	LOS FRAILES ARCHIPELAGO (n=4)	ISLA DE MARGARITA AND MAINLAND VENEZUELA
Max. SVL	53 mm.	75 mm.
Tubercles on temporal region	Large and conspicuous	Large and conspicuous
Postmentals	2, 3 in one specimen (MBLUZ 927)	2, very rarely 3
1 st postmental in contact with infralabials	Only with 1 st (0) Also with 2 nd (100%)	Only with 1 st (25%) Also with 2 nd (75%)
Longitudinal rows of dorsal tubercles	14–18	14–19
Tubercles between head and vent	34–40	34–49
Tubercles on dorsum between axilla and groin	21–24	18–24
Tubercles across base of tail	6–8	6–8
Transversal rows of ventrals	47–51	46–54
Ventrals across midbody	20–24	18–24
Lamellae under fourth toe	12–14	12–14

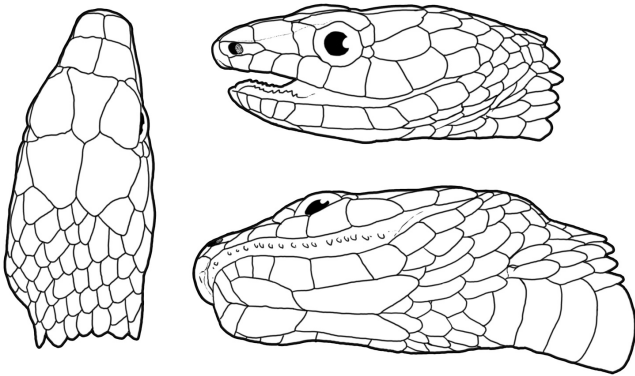


FIGURE 5. Drawing of dorsal, lateral and ventral views of head of *Leptophis ahaetulla* (MBLUZ 1060) from Salamanca, Isla de Margarita. Drawing by G.N.Ugueto.

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NOTE ADDED IN PROOF: While this paper was in the editorial process, Murphy et al. (2013) suggested the recognition of *Leptophis coeruleodorsus* as a full species distinct from *L. ahaetulla* based on an analysis of mitochondrial DNA, details in color pattern, and differences in hemipenial morphology of Trinidad and Tobago specimens.

Murphy, J.C., S.P. Charles, R.M. Lehtinen and K.L. Koeller. 2013. A molecular and morphological characterization of Oliver's parrot snake, *Leptophis coeruleodorsus* (Squamata: Serpentes: Colubridae) with the description of a new species from Tobago. *Zootaxa* 3718(6): 561-574.