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A new semifossorial snake of the genus *Arrhyton* (Squamata: Dipsadidae) from eastern Cuba, with taxonomic comments on other species

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Abstract

The genus *Arrhyton* is endemic to Cuba, with eight currently known species. A new species, *Arrhyton albicollum* **sp. nov.**, is described from the karst areas of Gibara, Holguín Province. The new species is closely related to *A. redimitum*, another eastern species, according to morphology and molecular phylogeny. It differs from all other species of the genus by having a conspicuous, white nuchal band, a contrasting black pattern on the head, a gray-colored body with faint stripes, and a high number of ventral and subcaudal scales. Additional comments on other species include new locality records and information on morphology and relationships.

Key words: Caribbean Islands, Serpentes, Colubroidea, phylogeny, species groups, *Arrhyton albicollum* **sp. nov.**

Resumen

El género *Arrhyton* es endémico de Cuba, con ocho especies actualmente conocidas. Una nueva especie, *Arrhyton albicollum* **sp. nov.**, es descrita de las áreas calizas de Gibara, Provincia Holguín. El nuevo *Arrhyton* está más relacionado con *A. redimitum*, otra especie oriental, de acuerdo con la morfología y la filogenia molecular. Se diferencia de cualquier otra especie del género por tener una banda nucal blanca, un patrón negro contrastante en la cabeza, el cuerpo gris con líneas casi imperceptibles, y un alto número de escamas ventrales y subcaudales. Los comentarios adicionales referidos a otras especies incluyen nuevos registros de localidades e información morfológica y filogenética.

Palabras clave: Islas del Caribe, Serpentes, Colubroidea, filogenia, grupos de especies, *Arrhyton albicollum* **sp. nov.**

Introduction

The genus *Arrhyton* Günther, 1858 is endemic to Cuba, with eight species described to date (Hedges *et al*. 2019). *Arrhyton* represents 19% of the Cuban snake fauna and it is the most speciose genus of colubroid snakes in the Caribbean islands. Within *Arrhyton*, Maglio (1974) and Crother (1999) also included species from Jamaica and Puerto Rico, but subsequent molecular phylogenetic and taxonomic studies restricted the genus to Cuba (Hedges *et al*. 2009; Grazziotin *et al*. 2012; Zaher *et al*. 2009, 2019). Most species are seldom seen in the field and are poorly represented in scientific collections. These nocturnal snakes have semi-fossorial habits, but may forage on the ground, among the leaf litter, on karst outcrops, and within vegetation (Henderson & Powell 2009; Amaro-Valdés & Morell-Savall 2017; authors' personal observations). The knowledge on their feeding and reproductive habits is limited; however, some observations were summarized by Schwartz & Henderson (1991), Henderson & Powell (2009), and Amaro-Valdés & Morell-Savall (2017).

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Arrhyton taeniatum is the type species of the genus and together with *A. vittatum* are the two oldest named members (Günther 1858; Gundlach 1880). For many years, only three (*A. dolichura* Werner, *A. vittatum* and *A. taeniatum*) of the currently valid species of *Arrhyton* were known (Barbour & Ramsden 1919; Grant *et al*. 1959; Schwartz 1965, with the description of *A. landoi* as a subspecies of *A. vittatum*), but the number increased notably in the 1980s and 1990s (Schwartz & Garrido, 1981; Hedges & Garrido (1992). Hedges & Garrido (1992) clarified the status of *A. redimitum* [formerly *Colorhogia redimita*, Cope (1863)] and *A. landoi* (*sensu* Schwartz & Garrido 1981), with Hedges *et al*. (2009) finally placing *A. landoi* Schwartz in the synonymy of *A. redimitum*. An informal classification of Cuban *Arrhyton* was based on color pattern and scalation, particularly ventral and subcaudal scale counts (Schwartz & Garrido 1981; Hedges and Garrido 1992), partly supported by molecular data (Hedges *et al*. 2009). The recognized species groups have been the *taeniatum* group (*A. taeniatum*), the *dolichura* group (*A. dolichura*, *A. procerum* Hedges & Garrido, *A. tanyplectum* Schwartz & Garrido), and the *vittatum* group (*A. ainictum* Schwartz & Garrido, *A. vittatum*, *A. redimitum*, and *A. supernum* Hedges & Garrido).

Rodríguez *et al*. (2013) compiled and mapped the distribution of all known *Arrhyton* species. However, some of the locality records were dubious due to misidentifications (Amaro-Valdés & Morell-Savall 2017). Most species are localized or have regional distribution patterns, but two species (*A. taeniatum* and *A. vittatum*) are widespread in the Cuban archipelago. Two or three species may occur sympatrically at different localities; for example, three species (*A. taeniatum*, *A. tanyplectum* and *A. vittatum*) are found along the karst hills of Viñales and Sierra de los Órganos in the Guaniguanico mountain range of Pinar del Río Province. Regarding their conservation status, five species (*A. ainictum*, *A. dolichura*, *A. procerum*, *A. supernum* Hedges & Garrido, and *A. tanyplectum*) were listed as threatened in the Red Book of Cuban Vertebrates (González *et al*. 2012). However, the IUCN (2021) currently recognizes only one species (*A. tanyplectum*) as threatened.

In January of 2010, a distinctive *Arrhyton* specimen (MNHNCu 6000) was collected by local people at Gibara, Holguín Province, eastern Cuba. The external morphology was different from other named congeners, and our genetic analysis confirmed that the snake was an unnamed species. Herein, we describe the new taxon and provide updates on some of the other species of the genus with taxonomic and zoogeographic implications.

Materials and methods

External morphology: A ruler was used to measure snout-vent length (SVL), tail length (Ta), and total length (TL). Other measurements were taken with an analog caliper (0.1 mm accuracy). Head length (HL) was obtained from the tip of snout to the angle of the jaw. Eye diameter was measured horizontally. Ventral scales were counted following Dowling (1951). Subcaudal scale counts do not include the terminal conical scale ("spine", *sensu* Schwartz 1965, and Schwartz & Garrido 1981). Dorsal scale rows are reported as a standardized formula (A–B–C), counting them one head's length after the occiput (A), on the midbody (B), and one head's length before the vent (C), according to Peters (1964). Sex was determined by a longitudinal incision at the base of tail. Postocular and labial scales are reported as left/right sides. Specimens examined for comparisons, genetics, and/or statistics are listed in Appendix 1. We combined our own measurements and counts of 19 specimens of *A. redimitum* with the original data sheets from Albert Schwartz for a total of 55 records of this species.

Molecular phylogeny: Sequences of the mitochondrial cytochrome *b* gene and *ND4* gene were obtained from the holotype of the new species (MNHNCu 6000), two specimens of *A. tanyplectum* (MNHNCu 6002–03), and from a specimen of *A. ainictum* (BSC.H 4154) or closely related species, and deposited in GenBank (OK061060–67). We used primers and methods as described in an earlier study on alsophine snakes (Hedges *et al*. 2009). Existing sequences of other species of *Arrhyton*, from the same published study were used for comparison, although most were extended in length and updated in GenBank. Our sequence alignment contained 1881 sites, 1076 of which were cytochrome *b* and 805 were *ND4*. With only two of the six genes used in Hedges *et al*. (2009), and four new samples, our goal was not to revise the phylogeny of *Arrhyton* but rather to obtain molecular information on the taxonomic affinities of these new samples. We used Mega X (Kumar *et al*. 2018) to construct a maximum likelihood phylogeny with the GTR (General Time Reversible) model and a discrete Gamma distribution to model evolutionary rate differences among sites (five categories). Confidence on the nodes was assessed with 2000 bootstrap replications. The tree was rooted with *A. taeniatum* based on an earlier, more comprehensive study (Hedges *et al*. 2009), that showed that species to be the sister taxon of all the other *Arrhyton*, with significant support in ML bootstrap and Bayesian posterior probability analyses.

Collection abbreviations: AMNH, American Museum of Natural History, New York, US; ASFS, Albert Schwartz's field series (numbers as stated in Schwartz's data sheets); BSC.H, herpetological collection of Centro Oriental de Ecosistemas y Biodiversidad, BIOECO, Santiago de Cuba, Cuba; CMST, private collection of Michel Sánchez Torres, La Habana, Cuba; CZACC, collection of Academia de Ciencias de Cuba, now in the Instituto de Ecología y Sistemática (IES), La Habana, Cuba; CZCESAM, collection of Centro de Servicios y Estudios Ambientales de Villa Clara, Cuba; DSP, private collection of Diego Salas Pantoja, La Habana, Cuba; IZ, former Instituto de Zoología, now IES; MCZ, Museum of Comparative Zoology, Harvard University, US; MNHNCu, Museo Nacional de Historia Natural de Cuba, La Habana, Cuba; SBH, field number of S. Blair Hedges, Temple University, Philadelphia, US; UIMNH, University of Illinois Museum of Natural History, Illinois, US; USNM, National Museum of Natural History, Washington D.C., US; ZBM, Museum für Naturkunde, Humboldt-Universität, Berlin, Germany.

Results

The specimen of *Arrhyton* from Gibara (MNHNCu 6000) is distinct from all other species of the genus in overall coloration (Fig. 1) and in details of the head pattern (Figs. 1–2). In the molecular phylogeny of the genus (Fig. 3), it is sister species to *A. redimitum*, a relationship that is highly significant (99%). It has a large sequence divergence (9.4%) from the latter species, greater than the genetic divergence among three other species: *A. dolichura*, *A. procerum*, and *A. tanyplectum* (7.5–7.7%). For these reasons, we conclude that MNHNCu 6000 represents a new species of the genus *Arrhyton* that we name and diagnose below.

Arrhyton albicollum **sp. nov.**

(Figs. 1–7)

Holotype. MHNHCu 6000. Juvenile male. Entrance of Cueva de los Panaderos (21.105861, -76.138222, WGS84), Gibara, Holguín. Collected by Alexis Silva García and José Raúl Suárez Bauzá on the 7th of January 2010.

Diagnosis. A species of the genus *Arrhyton*, related to *A. redimitum*, as shown in the molecular phylogeny of Fig. 3. It can be distinguished from other species of the genus by the combination of (1) a wide immaculate white neck band or collar; (2) faint body stripes on a gray to grayish-tan background; (3) a solidly black and sharply defined cephalic pattern ("cap", *sensu* Schwartz 1965), surrounded by whitish gray; (4) a short and solidly pigmented dark stripe crossing the eye, interrupted posteriorly by the white neck band, (5) a mucronate rostral scale (see Discussion), (6) high number of ventral scales (145), and high number of subcaudal scales (132).

Most *Arrhyton* species have basically three well-defined body stripes on a tan or brown background, but there is variation in this character and two additional paravertebral stripes may be present depending on the species, giving some taxa a quinquelineate pattern (Fig. 1B–H). *Arrhyton albicollum* **sp. nov.** is closely related to *A. redimitum*. Juveniles of *A. redimitum* may have a pair of small occipital spots interrupted by the middorsal stripe or show narrow post-occipital indentations of the paler colored areas on either side of the middorsal stripe that abruptly disconnect the paravertebral stripes from the cephalic pattern (Figs. 1B and 2B–D). The cephalic "cap" is dark brown, generally paler in the middle and outlined dark in adults. The dark stripe across the eye from the sides of snout is continuous with the lateral stripe on each side, running along the body to the tail. None of the available specimens of *A. redimitum* has a conical, abrupt, dark projection on the rostral scale. Like most *A. redimitum*, *A. albicollum* **sp. nov.** has a dark spot on each of the internasal scales and stippled first labials. The ventral scale count of *A. albicollum* **sp. nov.** (145) is within the range of *A. redimitum*. However, only the holotype (MCZ 42505) of *A. landoi* (= *A. redimitum*) has 150 ventrals, the remaining sampled individuals of this species have 110–144 (mean 128, n = 54) ventrals. The number of subcaudal scales of *A. albicollum* **sp. nov.** is higher than that of *A. redimitum* (63–125, mean 89, n = 44; specimens with missing tail tips were not included).

Arrhyton dolichura (Figs. 1C and 2F), *A. procerum* (Figs. 1D and 2G), and *A. tanyplectum* (Figs. 1F and 2J, K), have long tails which are 40–46% of the TL versus 25–40% of the TL of other species (39% in *A. albicollum* **sp. nov.**). These snakes have well defined stripes, and usually a vivid yellow or cream coloration on the lower flanks and the belly. In none of them is the cephalic dorsal pattern or "cap" solid black (as in *A. albicollum* **sp. nov.**) and the number of subcaudal scales of *A. albicollum* **sp. nov.** is in the range of *A. tanyplectum* (Table 1). *Arrhyton ainictum*

has a well-defined quinquelineate pattern, 137 ventrals (*vs*. 145 in *A. albicollum* **sp. nov.**), 108 subcaudals (*versus* 132), and shorter tail which is 33% of TL (*vs*. 39%).

Arrhyton vittatum (Figs. 1G and 2L) is easily distinguished from *A. albicollum* **sp. nov.** and the other species of *Arrhyton* in that it has a reddish brown coloration. The middorsal stripe may be absent, paler, or wider than those stripes on the flanks. Intercalated paravertebral stripes are sometimes slightly evident or generally absent in this species. The ventral coloration is pearl-white to iridescent grayish-pink. Juveniles may have some evidence of small occipital pale spots; the dark cephalic dorsal pattern is diffuse in adults ("soot-like"), not conspicuously surrounded by a distinctive pale coloration, and the snout is mostly pale brown. The number of ventral (107–123) and subcaudal (52–81) scales is notably lower than *A. albicollum* **sp. nov.** (Table 1) and the tail is shorter, 29–33% TL (*vs*. 39%).

Arrhyton supernum (Figs. 1E and 2H) has two occipital pale spots, instead of a broad white band, interrupted by the middorsal stripe; the overall coloration is dark brown, compared with the grayish color of *A. albicollum* **sp. nov.**, the number of ventral (124–128) and subcaudal (107–108) scales is much lower (Table 1), and the tail is 26% TL (*vs*. 39%).

Arrhyton taeniatum (Figs. 1H and 2I) is the largest species (up to 457 mm SVL, MNHNCu 4622) and it occurs syntopically with *A. albicollum* **sp. nov.** It is the only species which always lacks a loreal scale. It has wide body stripes that in some individuals are indistinct from the brown background, vivid yellow flanks and belly, the highest number of ventral scales (168–189, *vs*. 145 in *A. albicollum* **sp. nov.**), a projected and upturned rostral scale, a laterally expanded head and smaller eyes which are far from the head outline when seen dorsally *vs*. larger and slightly protruded eyes from the head outline in *A. albicollum* **sp. nov.**

TABLE 1. Summarized comparative measurements and scale counts of *Arrhyton*. An asterisk indicates a subcaudal count that corresponds to a tail with a missing tip (see Hedges & Garrido 1992).

Species	Maximum SVL (mm)	Maximum Ta (mm)	Ventral scales	Subcaudal scales
A. albicollum **sp. nov.**	143.5	90.5	145	132
A. redimitum	250	158	115–150	69–125
A. ainictum	363	176	137	108
A. dolichura	282	200	123–132	101–127
A. procerum	267	211	142–145	137–140*
A. supernum	255	171	124–128	107–108
A. taeniatum	457	150	168–189	73–99
A. tanyplectum	321	236	141–146	121–133
A. vittatum	207	87	107–123	52–81

Description of holotype. See Fig. 4 for head scales. SVL 143.5 mm; Ta 90.5 mm (39% TL), 234 mm TL. Head distinct from body; head length 8.6 mm (6% SVL), head width 5.5 mm (64% head length) at widest point, head height 3.5 mm at tallest point; interocular distance 3.7 mm (67% head width); snout-eye distance 2.2 mm (25% head length, HL); nostril-eye distance 1.5 mm; rostral subtriangular, 1.9 mm wide and 1.2 mm high, well visible in dorsal view; prefrontal divided, 1.6 mm long (17% HL), 2.3 times longer than internasals; prefrontals not in contact with orbit, but instead contacting supraocular and upper half of the preocular; frontal subtriangular 2.5 mm long (29% HL) and 2.2 mm wide; supraocular 1.8 mm long (21% HL) and 0.9 mm wide, twice wider distally than proximally; parietals 3.4 mm long (39% HL), 2.4 mm wide; nasal divided; nostril horizontally oval, its posterior border lying on the nasal suture, but most of the opening is on the prenasal scale; prenasal scale 0.7 mm (8% HL); postnasal scale 0.6 mm (7% HL); loreal single, quadrangular, 0.6 mm long (7% HL) and 0.4 mm high; loreal contacting second supralabial; preocular single, two times higher than wide, entering orbit posteriorly; eye diameter 1.9 mm (22% HL), pupil round; postoculars 2/2, upper postocular twice higher than lower postocular; temporals 1+2+3 on both sides of head; supralabials 7/7, of which 3rd and 4th are in contact with the eye; 6th supralabial slightly tallest than 5th, both in contact with first temporal; infralabials 8/8, first pair in contact with mental, 1st to 3rd contacting first chinshields, 4th and 5th contacting second chinshields; dorsals smooth, rhomb shaped, with no pits externally visible; dorsal scales row formula 17–17–17; cloacal plate divided; number of ventral and subcaudal scales were already mentioned in the diagnosis; a terminal conical projection about five times longer than the two last subcaudals.

FIGURE 1. Diversity of snakes of the genus *Arrhyton*. (**A**) *A. albicollum* **sp. nov.**, holotype (MNHNCu 6000) in life, from Gibara, Holguín; (**B**) *A. redimitum*, from Macambo, Guantánamo; (**C**) *A. dolichura* (DSP 8), from Rincón de Guanabo, La Habana; (**D**) *A. procerum* (MNHNCu 6001), Gironcito, Península de Zapata, Matanzas; (**E**) *A. supernum* from La Melba, Guantánamo; (**F**) *A. tanyplectum* (MNHNCu 6002), from Mogote del Valle, Viñales, Pinar del Río; (**G**) *A. vittatum*, from Soroa, Artemisa; (**H**) *A. taeniatum* (MNHNNCu 6008), Río Máximo, Camagüey. Photos: José Luis Ponce de León (D) and Luis M. Díaz (all the others).

FIGURE 2. Head patterns of preserved snakes of the genus *Arrhyton*. (**A**) *A. albicollum* **sp. nov.** (holotype MNHNCu 6000), Gibara, Holguín; (**B**) *A. redimitum* (BSC.H 2670), El Cobre, Santiago de Cuba; (**C**) *A. redimitum* (BSC.H 3151), La Pimienta, Baconao, Santiago de Cuba; (**D**) *A. redimitum* (BSC.H 3963), Playa Blanca, Baracoa, Guantánamo; (**E**) *Arrhyton* aff. *ainictum* (BSC.H 4154), El Cucán, near Jiguaní, Granma; (**F**) *A. dolichura* (CMST 27), Bosque de La Habana, La Habana; (**G**) *A. procerum* (MNHNCu 6001), Gironcito, Península de Zapata, Matanzas; (**H**) *A. supernum* (MNHNCu 2704) from Yunque de Baracoa, Guantánamo (holotype); (**I**) *A. taeniatum* (MNHNCu 4622), Loma de Canasí, Mayabeque; (**J**) *A. tanyplectum* (MNHNCu 6002), Mogote del Valle, Viñales, Pinar del Río; (**K**) *A. tanyplectum* (MNHNCu 6003), Idem.; (**L**) *A. vittatum* (MNHNCu 6004), Soroa, Artemisa. Photos: Ansel Fong (B–E) and Luis M. Díaz (all the others).

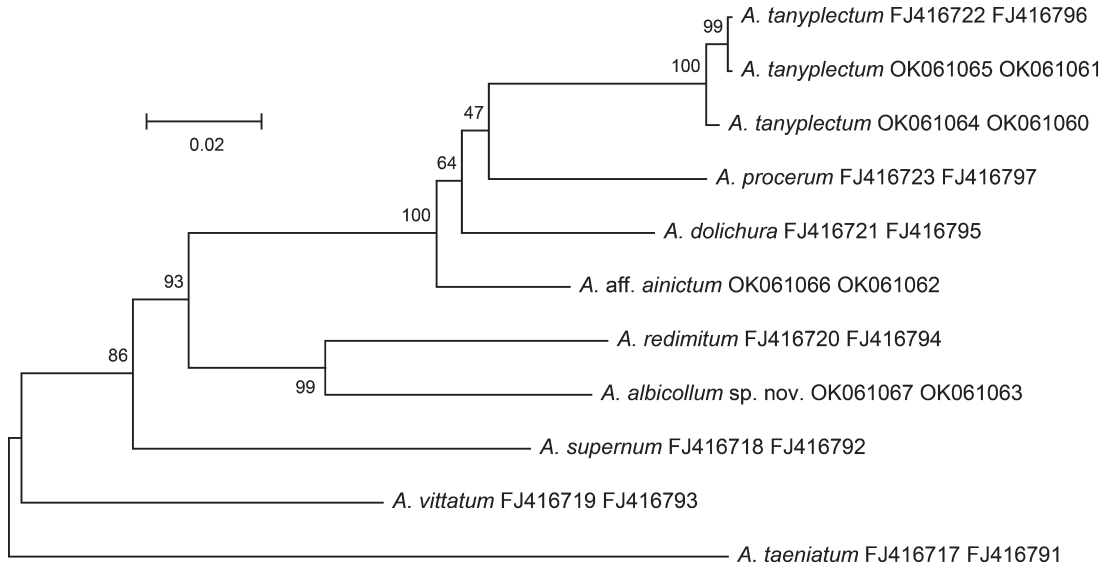

FIGURE 3. Maximum-likelihood phylogeny of snakes of the genus *Arrhyton* from sequences of two mitochondrial genes (cytochrome *b* and *ND4*). Each species name is followed by GenBank accession numbers of the cytochrome *b* and *ND4* genes, respectively. Voucher specimens are listed in Appendix 1. Numbers at nodes are bootstrap support values. The scale bar indicates 2% sequence divergence on a branch.

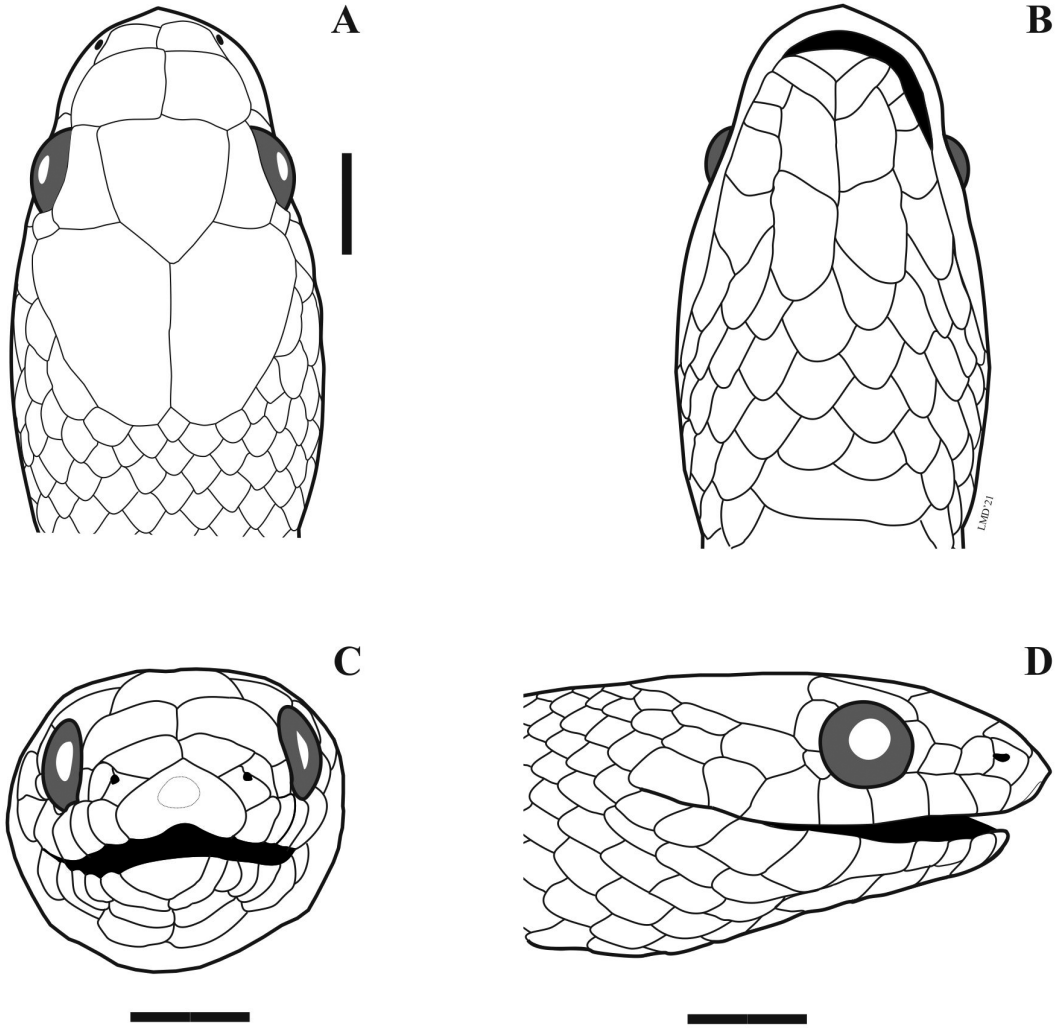

FIGURE 4. Line-drawing of *A. albicollum* **sp. nov.** holotype (MNHNCu 6000) head in dorsal (A), ventral (B), frontal (C), and lateral (D) views. Scale bars = 2 mm.

Color in life (Fig. 1A): Dorsum gray to grayish-tan, with faint stripes. Each scale with somewhat darker pigmentation on the edge giving the overall dorsal region a net-like appearance. The neck band is immaculate white, and behind it there is a slightly darker, smoky-gray pigmentation that transitions to the dorsal color. Internasal scales with a dark spot on each. Another dark spot is present on each prenasal scale. First three supralabials and four infralabials stippled with dark brown. Rostral conical projection dark. Eye bicolored: upper half grayish-white; inferior half very dark brown, almost black. Venter paler than dorsum. A faint lateral stripe on scale row four, just defined by slightly darker pigmentation of scale borders, giving a serrated outline and bordered at the top by a narrow zone paler than the rest of the dorsum.

Color in alcohol (ten years after collection): similar to coloration in life, except that yellowish pigments completely disappeared. The faint stripes are even less obvious.

Distribution. *Arrhyton albicollum* **sp. nov.** is only known from the type locality near the town of Gibara, ~36 km NNE from the city of Holguín in eastern Cuba (Fig. 5), but it probably occurs in suitable habitats between Bahía de Puerto Padre and Banes (Las Tunas and Holguín Provinces, respectively).

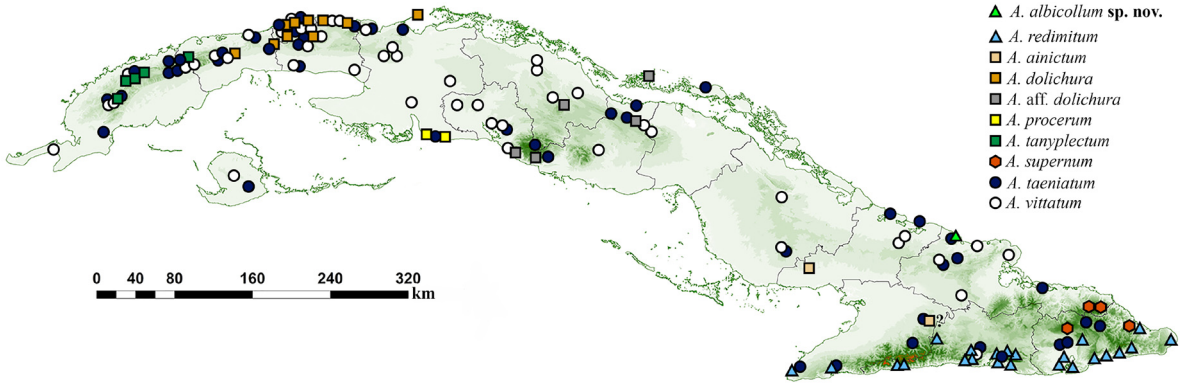

FIGURE 5. Distribution of *Arrhyton* in Cuba. Localities, other than the type-locality of *A. albicollum* **sp. nov.**, are based on Rodríguez *et al*. (2013), Cajigas & Velazco (2020), the authors' visual records, and specimens listed in Appendix 1. See the Discussion for *Arrhyton* aff. *ainictum* (with question mark) and *A*. aff. *dolichura*.

FIGURE 6. Type locality of *Arrhyton albicollum* **sp. nov.** Cueva de los Panaderos at Gibara, Holguín Province. The degraded habitat comprised of grasses and spiny bushes (dominated by the invasive *Dichrostachys cinerea*). Photo: Antonio Cádiz.

Habitat. The type specimen was found under a pile of rocks at the entrance of Cueva de los Panaderos during the day (Fig. 6). Caves and sinkholes are common structures in the area. The locality has patches of secondary semideciduous forest on limestone rock; however, the native vegetation is being displaced by the invasive spiny-bush *Dichrostachys cinerea* and the whole area is threatened by human use of caves and the trash dumping. Associated herpetofauna and complementary description of habitat is in Díaz *et al*. (2014).

Etymology. The specific epithet is derived from the Latin words *albus* (white) and *collum* (neck), in reference to the conspicuous white neck band.

Proposed English name. Gibara White-collared Racerlet

Discussion

After ten years of searching for additional specimens of *A. albicollum* **sp. nov.**, an adult individual was collected on November 2020 by locals who discovered the snake at night while it was perched on a bush. Unfortunately, the animal was kept alive privately instead of being provided for the completion of this long-term study. Despite this, the individual was photographed by one of the authors (DS) and illustrated in Fig. 7. The snake was an adult, 350 mm total length, and very similar to the holotype, except that the conical projection on the rostral scale was more conspicuously developed. The coloration was greyish-tan with light cream belly. This individual demonstrated that *A. albicollum* **sp. nov.** reaches a medium size similar to that of other species (the largest *A. redimitum* was 384 mm TL: ASFS V6234; Appendix 1; Table 1) and the most striking diagnostic characters are present in adult animals, ruling out that the unique coloration pattern could be either an aberrant or juvenile condition. Scale counts and accurate measurements other than length and weight were impossible to obtain in the second collected animal due to the owner's restrictions. Considering their secretive lifestyle, finding additional specimens might take many more years. Therefore, we decided to describe the species now because of the morphological and molecular evidence in the hope that it will stimulate more search effort and conservation strategies for this apparently rare species.

In addition to the description of the new taxon, all of the comparative material examined brought to light new information on other species (Table 1) and an updated phylogeny (Fig. 3) and distribution (Fig. 5). Therefore, some additional comments are warranted. For the first time, a member of the *Arrhyton dolichura* group is reported from Granma Province, eastern Cuba: the specimen from El Cucán, east of Jiguaní (BSC.H 4154; GenBank OK061066, OK061062) which was included in the phylogenetic analysis (Fig. 3). The snake was first labeled as *A. landoi* (= *A. redimitum*) in collection (see Fig. 2E), but it has characters in common with *A. ainictum*. Indeed, Schwartz & Garrido (1981: 218), and later Hedges & Garrido (1992: 176), commented that *A. ainictum* seemed to be more closely related to species of the *A. dolichura* group than to the eastern *A. redimitum* (= *A. landoi*, at that time), and we obtained both morphological and genetic evidence (Fig. 3) suggesting this could be correct. Like *A. ainictum*, the specimen from El Cucán has a quinquelineate pattern (although it is not an exclusive character of this species as already mentioned), 135 ventral scales (137 in holotype *A. ainictum*), 116 subcaudals (*vs*. 108) and tail length is 41% of TL. Based on these characters, two hypotheses could be equally valid. The first one would be that *Arrhyton ainictum* has a wider distribution than previously thought, extending 123 km E (76.4 miles, air distance) of the only known locality in the province of Las Tunas. The second hypothesis is that this animal may represent another unnamed species. At the moment, the paucity of data and the poor quality of the holotype specimen of *A. ainictum* make it difficult to successfully clarify the taxonomic status of the referred specimen which is currently considered to be *A.* aff. *ainictum*. The basal position of this taxon with respect to the other species related to *A. dolichura* suggests an eastern origin of the group and its subsequent expansion to the center and western regions.

Figure 2 illustrates the cephalic pattern of all of the currently described species of *Arrhyton* for comparative purposes with the new taxon, and the potential inclusion of *A. ainictum* from a new locality. In the case of *A. tanyplectum*, two cephalic patterns are represented (Fig. 2J, K). In the original description by Schwartz & Garrido (1981) the coloration of this species was referred to as iridescent brown with "absence" of a defined cephalic "cap". However, more recently collected specimens from the surroundings of the type locality in Viñales, Pinar del Río, have shown that there are dark individuals with coloration similar to those mentioned in the original description and others that have a dark head "cap" outlined by paler coloration, and yellow or cream lower flanks and belly (Fig. 1F). The genetic data (Fig. 3) which include the pale outlined dark head cap morph (MNHNCu 6002) and the undelineated dark head cap morph (MNHNCu 6003 and USNM 306538) demonstrate that the morphs represent variation in just one

FIGURE 7. *Arrhyton albicollum* **sp. nov.** unvouchered adult individual from the type locality. The mucronate rostral scale is evident in the lower photograph. Photos: Diego Salas Pantoja.

species. This phenotypic diversity was unexpected because it is not known to occur in other related species of the *dolichura* complex. The combination of a longer size and high number of ventral scales (Table 1) remain diagnostic for this species with respect to *A. dolichura*. The longest *A. dolichura* (MNHNCu 6006; 282 mm SVL, 200 mm Ta) is smaller than most *A. tanyplectum*. For *A. dolichura*, we are extending its distribution west to Artemisa Province (Fig. 5). However, the taxonomic status of some populations of this species complex may be confusing in Central Cuba (Fig. 5) due to a mosaic of morphological variation and the similarity between *A. dolichura*, *A. procerum*, and *A. tanyplectum*.

We examined a second specimen of *A. procerum* (MNHNCu 6001; 267 mm SVL, 211 mm Ta), not far from the species type locality, which adds variation in scale counts (Table 1). Both specimens agree in having high counts of ventrals and subcaudals, diagnostic of *A. procerum*. However, we report here additional specimens of snakes in the *dolichura* group from central Cuba that extend the variation in *A. dolichura*, in some cases approaching the range of variation in *A. procerum* and *A. tanyplectum*. We refer to these as *A.* aff. *dolichura* in the map (Fig. 5). A specimen from El Cubano, Trinidad, Sancti Spiritus (MNHNCu 4963; 272 mm SVL, 175 mm Ta), has 135 ventrals (slightly higher than *A. dolichura*) and 104 subcaudals (in range of *A. dolichura*). Also, MNHNCu 6009 (258 mm SVL, 142 mm Ta), from Jobo Rosado, Sancti Spiritus, has 135 ventrals, but despite the tail tip missing (90 subcaudals), it is likely that the number of subcaudals would be considerably lower than *A. procerum* and in the range of *A. dolichura*. An individual (BSC.H 3949; 213 mm SVL, 157 mm Ta) from Loma del Pedernal, near Guajimico, Cienfuegos, has a similar condition (134 ventrals; 119 subcaudals). The specimen BSC.H 3632 (177 mm SVL, 126 mm Ta) from El Playazo, Villa Clara is within the range of *A. dolichura* (130 ventrals; 115 subcaudals). Finally, an individual (CZCESAM), from Cayo Santa María (280 mm SVL, 196 mm Ta), has 141 ventrals (higher than *A. dolichura* but in the range of *A. tanyplectum*) and 123 subcaudals (in the range of *A. dolichura* and *A. tanyplectum*). All of the above-mentioned localities are new distribution records for this group. Additionally, the loreal contacting the second and third supralabial in *A. procerum* (Hedges & Garrido 1992) versus the first and second ones in *A. dolichura*, is not of diagnostic value since both species may have either condition and the first state of the character is typical. The original description of *A. procerum* (Hedges & Garrido 1992) mentions additional diagnostic characters separating that species from *A. dolichura*, such as a wider, more distinct head, broader parietal scales, a wider stripe on the side of the head, and darker coloration. These and other morphological characters, in addition to genetic evidence, need to be examined in the *dolichura* species group to better assess the boundaries of species.

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Appendix 1

List of specimens examined (n = 99). Asterisk denotes specimens used for statistics from Albert Schwartz's data sheets. Vouchers of the genetic phylogeny are underlined (GenBank accession numbers are in parenthesis according to Fig. 3).

Arrhyton ainictum.— **Las Tunas Province**: IZ 4256 = CZACC 4.4619 (holotype), Cueva del 18, Francisco (revised by the first author in 1993).

Arrhyton aff. *ainictum*.— **Granma Province**: BSC.H 4154 (OK061066, OK061062), El Cucán, E of Jiguaní.

Arrhyton dolichura (n = 11).—**Artemisa Province**: MNHNCu 6006, Cueva del Basurero; **La Habana Province**: CMST 27 – 28, surroundings of the Pedro Marrero Baseball Stadium, Bosque de La Habana; DSP 1–3, Cojímar; DSP 8, Rincón de Guanabo; MNHNCu 5011, Parque Zoológico Nacional de Cuba; USNM 306534 (FJ416721, FJ416795), Jardín Botánico Nacional. **Mayabeque Province**: CMST 22, El Narigón; MNHNCu 4623, Boca de Jaruco, Jaruco.

Arrhyton aff. *dolichura* (n = 5).— **Villa Clara Province**: CZCESAM (no number), Cayo Santa María; BSC.H 3632, El Playazo, Santa Clara. **Cienfuegos Province**: BSC.H 3949, Loma del Pedernal, 2.5 km E de Guajimico. **Sancti Spiritus Province**: MNHNCu 4963, Parque El Cubano, Trinidad; MNHNCu 6009, Jobo Rosado.

Arrhyton procerum (n = 2).—**Matanzas Province**: MNHNCu 3285 (SBH 191526) (FJ416723, FJ416797), 11.4 km ESE Playa Girón, Zapata (holotype); MNHNCu 6001, Gironcito, Girón, Zapata.

Arrhyton redimitum (n = 55).—**Granma Province**: AMNH 36703–04*, Ensenada de Mora, Pilón. **Santiago de Cuba Province**: AMNH 2949*, Santiago de Cuba; AMNH 83584*, 6.5 km S Palma Soriano; BSC.H 2384, El Sapo, road to Gran Piedra; BSC. H 2459, La Tabla, Tercer Frente; BSC.H 2650, Aguadores; BSC.H 2666, Sigua, W of Baconao; BSC.H 2670, surroundings of El Cobre, Sierra Maestra; BSC.H 3147 Las Yaguas, Río Baconao valley; BSC.H 3151, La Pimienta, Río Baconao; BSC. H 3161, Providencia, Río Baconao; BSC.H 3653, Los Morones, La Mula, Guamá; BSC.H 3656, 3882, Siboney; BSC. H 3880, road to Gran Piedra; BSC.H 4068, Universidad de Oriente campus; BSC.H 3163, Peña Blanca, 4.5 km al S de Cruce de los Baños, Tercer Frente; BSC.H 4218, Río Bayamita; BSC.H 4242, Gran Piedra; IZ 5134*, Cueva del Mamoncillo; IZ 5577*, Santiago de Cuba; IZ 5600*, 5601*, 5626*, 5635, ?*, Vista Alegre; IZ 5625*, Loma del Gato; IZ 5628*, 5638*, Río Frío, El Cobre; IZ 5629*, Santa María del Loreto; IZ 5636*, Playa Damajayabo, Santiago de Cuba; MCZ 42547*, Cobre Range, Sierra Maestra; MNHNCu 6007, 2 km NE, Río Uvero, Guamá; UIMNH 49303*, Colonia España, Santiago de Cuba. **Guantánamo Province**: BSC.H 1895, Punta Maisí; BSC.H 3963, Playa Blanca, Río Miel, Baracoa; MCZ 42505, mountains north of Imías (holotype of *A. landoi* = *A. redimitum*); ASFS V6233–34*, U.S. Naval Base; ASFS V15036*, Idem.; IZ 5592*, Soledad Estate, Guantánamo; IZ 5593*, Las Pailas; IZ 5598 – 99*, Chávez, Nazareno; IZ 5602*, 5606*, Guantánamo; IZ* 5627, Río Guantánamo; IZ 5662*, Tiguabos; MCZ 68724*, 68943, 141580, U.S. Naval Base; UIMNH 49301–02*, U.S. Naval Base; USNM 335891 (SBH 161985) (FJ416720, FJ416794), Blue Beach, U.S. Naval Base.

Arrhyton supernum (n = 2).—**Guantánamo Province**: MNHNCu 2704 (FJ416718, FJ416792), SW slope of El Yunque de Baracoa (holotype); MNHNCu 5176, Cupeyal del Norte, Parque Nacional A. de Humboldt.

Arrhyton vittatum (n = 11).—**Artemisa Province**: MNHNCu 6004, Soroa, Candelaria; SBH 191528 (FJ416719, FJ416792), Idem. **La Habana Province**: CMST 230, Finca La Chata, Boyeros. **Camagüey Province**: CMST 111, 112, 298, 299, Lugareño, Minas; BSC.H 3827, Sierra de Cubitas. **Holguín Province**: MNHNCu 6005, Bariay, Holguín. **Santiago de Cuba Province**: MNHNCu 6008, 3 km N Loma del Gato, Sierra del Cobre. **Matanzas Province**: ZBM 4096, "Cuba", presumably from Cárdenas (syntype of *Cryptodacus vittatus*).

Arrhyton taeniatum (n = 7).—**Artemisa Province**: CMST 374, Guajaibón, Mariel. **Mayabeque Province**: MNHNCu 4622, north slope of Loma de Canasí. **Camagüey Province**: BSC.H 3864, Sierra de Cubitas; MNHNCu 6008, Reserva Ecológica Río Máximo. **Santiago de Cuba Province**: BSC.H 3333, La Caoba; BSC.H 4244, road to Puerto Boniato. **Guantánamo Province**: SBH 191163 (FJ416717, FJ416791), 2 km N La Munición.

Arrhyton tanyplectum (n = 4).— **Pinar del Río Province**: AMNH 77782, San Vicente, Viñales (holotype); MNHNCu 6002–6003 (OK061064, OK061060; OK061065, OK061061), Mogote del Valle, Sierra de los Órganos, Viñales; USNM 306538 (FJ416722, FJ416796), 4 km NW of San Vicente, Viñales.