

A new snake of the genus *Tropidophis* (Tropidophiidae) from the Guanahacabibes Peninsula of Western Cuba

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Abstract. *Tropidophis xanthogaster*, new species, is described from Guanahacabibes Peninsula, Pinar del Río Province, Cuba. It has a grayish-brown or greenish-gray dorsum with eight rows of dark brown spots and a yellow venter which lacks spots on the anterior one-third. It is placed in the *pardalis* group mainly because of its small size, low number of ventral scales (155-164), eight spot rows, and 23 scale rows at midbody. It differs from its closest relative, *T. pardalis*, by a combination of color, pattern, and scale differences.

Introduction

The snake genus *Tropidophis* is Neotropical in distribution. It includes a total of 29 known species: three from South America and 26 from the Greater Antilles (Powell et al., 1996; Hedges, 2002). Cuba has the greatest species diversity, with 15 endemic species (Tolson and Henderson, 1993; Hedges, 2002).

The Cuban dwarf boas (or “tropes”) of the genus *Tropidophis* are mostly small (220-450 mm maximum snout-vent length, SVL), except *T. melanurus* which reaches nearly one meter in SVL. They are viviparous, usually terrestrial (several species climb in low vegetation), nocturnal, totally inoffensive and feed generally on small frogs (*Eleutherodactylus*, small *Osteopilus*, and *Hyla*) and lizards (small *Anolis*, *Hemidactylus*, *Gonatodes*, and *Sphaerodactylus*). They have diverse color patterns but are typically spotted. Physiological color change, during a cycle of 24 hours, has been studied in two Cuban species (Rehák, 1987; Hedges et al., 1989), but it is a common characteristic of most species in the genus (S.B. Hedges, pers.

obs). They also have a peculiar defense mechanism, auto-hemorrhaging (Darlington, 1927; Domínguez and Moreno, 2003).

A new species of *Tropidophis* is described here from Guanahacabibes Peninsula, Western Cuba. It is similar in body size, and in some aspects of scalation and general color pattern, to *T. pardalis*. However, it differs in several aspects from that species.

Materials and methods

Snout-vent length (SVL), tail length (TL), head length (HL), head width (HW), and neck width (NW) were taken with a Vernier caliper and recorded to the nearest 0.05 mm and eye diameter (EYE) was taken with a stereomicroscope (MBC-10) with an 8x measurement ocular and recorded to the nearest 0.05 mm. Comparisons among other species of *Tropidophis* were made by examination of preserved material located in Cuban collections (Appendix 1) and using published data about color pattern and scale counts (Schwartz and Garrido, 1975; Schwartz and Henderson, 1991; Tolson and Henderson, 1993; Hedges and Garrido, 1992, 1999, 2002; Hedges 2002; Hedges et al., 1999; Hedges et al., 2001; Domínguez and Moreno, 2005a, b). Acronyms here used are: CZACC (Colecciones Zoológicas del Instituto de Ecología y Sistemática, Cuba), and USNM (United States National Museum, Smithsonian Institution, Washington, D.C., USA).

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Tropidophis xanthogaster sp. nov. (fig. 1)

Holotype. Adult male CZACC 4.9465 from Las Perlas Cave, La Bajada, Guanahacabibes Peninsula, Pinar del Río Province (21°55' 53.38"N 84°28'48.90"W), collected by Ariel Rodríguez and Roberto Alonso on 4 May 2000.



Figure 1. Lateroventral view of *Tropidophis xanthogaster* (holotype, **A**) and *Tropidophis pardalis* (CZACC 4.12013, **B**).

Paratypes. Adult male CZACC 4.5398 from La Barca Beach, Guanahacabibes Peninsula, Pinar del Río Province (21°50'05.88"N 84°28'38.93"W), collected by Elier Fonseca on 12 February 2004. It was kept in captivity and died on 8 March 2004. Adult female USNM 562860 from La Ceiba (16.5 km S. La Jaula), Guanahacabibes Peninsula, 20 m elevation, collected by S. Blair Hedges on 22 April 1992.

Diagnosis. The new species has a robust body, small size (maximum SVL 239 mm), grayish-brown or greenish gray-dorsum with dark brown spots in eight rows (two dorsals and six dorso-laterals), middorsal spots (34-39) in contact at the midline, and a yellow venter which lacks spots on the anterior one-third, and lacks occipital spots. It also has a robust head (HW/HL = 0.67-0.71), rhomboid snout, 23 scale rows at midbody, smooth dorsal scales, and 155-164 ventral scales.

Description of the holotype (paratypes in parentheses, if different). An adult male; body and head robust, rhomboid snout, without occipital spots, HW/HL = 0.71 (0.67, 0.68), HW/NW = 1.64 (1.50, 1.67), EYE/HW = 0.25 (0.23, 0.24); SVL = 239 mm (male 230 mm, female 227 mm); tail length, 40 mm entire (male 33 mm mutilated, female 32 mm entire); ventrals, 161 (155, 164); supralabials, 9/9 (left: right) (8/8); infralabials, 9/9 (8/8); loreals absent; preoculars, 1/1; postoculars, 2/2; parietals not in contact, separated by a small scale (parietals in contact); smooth dorsal scales in 23-23-18 (21-22-17, 21-23-17) rows; body spots 34/36 (36/36, 39/39); tail spots 5/6 (6/7, 3/3). Live weight of female paratype 9.17 g.

Coloration. In life, dorsum was grayish brown or greenish gray contrasting with darker brown spots in eight rows at midbody, two dorsal and four dorsolateral spots. The two spot rows close to the middorsal line are bigger and in contact. Venter yellow and lacking spots on the first third; lateral intrusions of spots from midbody until vent, and below tail. Head uniformly dark brown, greenish gray pupil and black tongue

with a white tip. In alcohol color is similar, although yellow changed to cream.

Etymology. In Greek *xanthos* = yellow and *gaster* = venter (yellow venter), in allusion to yellow color and absence of spots on the first third of venter.

Natural History. This species apparently inhabits caves and shaded rocky areas of modified limestone rocks known as "diente de perro". The holotype and female paratype were collected inside a cave and the male paratype was found under a stone, close to the main road.

Distribution. *Tropidophis xanthogaster* is known from three localities in the westernmost part of Cuba: Las Perlas Cave, La Barca Beach, and La Ceiba (Guanahacabibes Peninsula, Pinar del Río Province). Also, two other specimens were collected in 1995 from near the Meteorological Station, La Bajada (21°55'20.28"N, 84°28'51.24"W) by Alberto R. Estrada and Luis V. Moreno (CZACC 4.4191); and from Bolondrón Cave (21°52'25.58"N 84°49'40.81"W) by Alberto R. Estrada, Julio Novo and Luis V. Moreno (CZACC 4.4192); both on the Guanahacabibes Peninsula (both specimens are now missing from the collection).

The collecting localities indicate that *T. xanthogaster* probably is widely distributed on the Guanahacabibes Peninsula (fig. 2).

Comparisons. The small size (maximum SVL 239 mm), robust habitus, and high number of spot rows (eight) associates *T. xanthogaster* with species in the *pardalis* group, which includes most Cuban species: *T. fuscus*, *T. galacelidus*, *T. hardyi*, *T. hendersoni*, *T. nigriventris*, *T. pardalis*, *T. pilsbryi*, *T. spiritus*, and *T. wrighti* (Hedges, 2002). However, it can be distinguished from *T. galacelidus*, *T. hendersoni*, *T. spiritus*, and *T. wrighti* by – among other differences – its lower number of ventrals (155-164 in *T. xanthogaster* versus >177 in those other species). From *T. fuscus*, it differs in having fewer spot rows (34-39 versus 43-52 in *T. fuscus*). From *T. nigriventris* (144-150 ventrals),

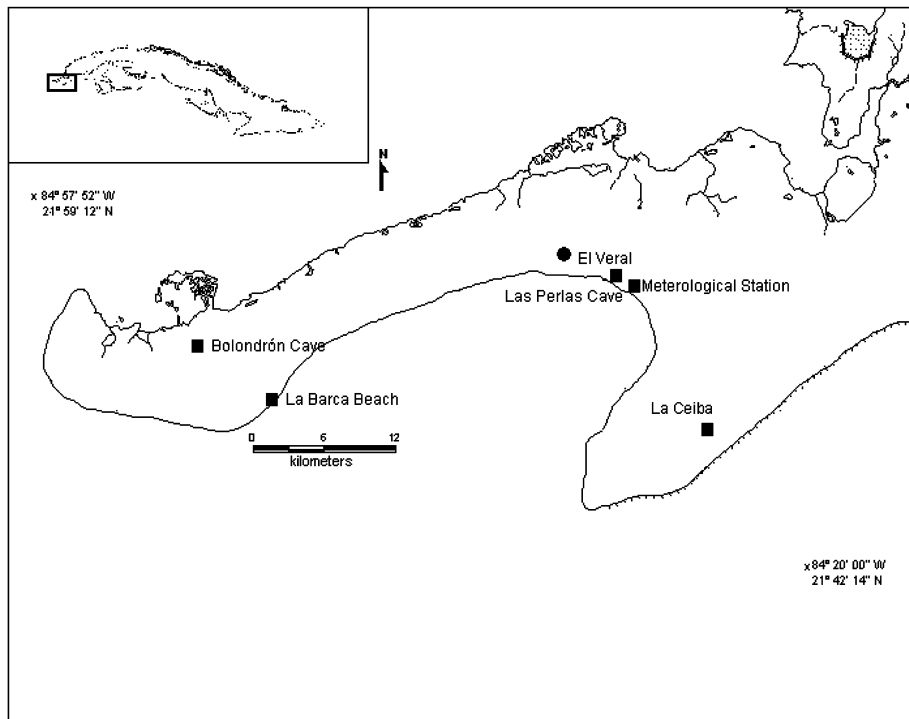


Figure 2. Localities for *Tropidophis xanthogaster* (■) and *Tropidophis pardalis* (●) on the Guanahacabibes Peninsula, Pinar del Rio Province, Cuba.

it differs in having more ventrals. It is similar to *T. hardyi*, *T. pardalis*, and *T. pilsbryi* but can be distinguished from all three by the yellowish ventral coloration and absence of spotting on the anterior venter (versus white or brownish venters with spots).

The closest comparison must be made with *T. pardalis*. Both species are similar in size, scale rows at midbody, body spot counts, dorsal pattern, and midline contact of the middorsal spots (Table 1). Also, the distribution of *T. pardalis* is adjacent to the distribution of *T. xanthogaster* in Western Cuba. Besides the ventral coloration and anterior venter pattern difference already noted, another consistent coloration difference in those two species is the grayish-brown or greenish-grey dorsum (versus tan or brown or dark brown in *T. pardalis*). They also differ in head width, with *T. xanthogaster* having a wider head (HW/WL 0.67-0.71 versus 0.44-0.64 in *T. pardalis*) (Table 1). Two additional characters help to distinguish the two species,

Table 1. Comparison of characters of *Tropidophis xanthogaster* and *Tropidophis pardalis*. (Numbers in parentheses represent mean).

Character	<i>T. xanthogaster</i> n = 3	<i>T. pardalis</i> n = 49
Maximum SVL (mm)	238	284
Ventral scales	155-164 (160.0)	139-160 (147.5)
Midbody scale rows	22, 23 (23)	23, 25 (23)
Dorsal ground color	Grayish-brown or greenish-gray	Tan to brown or dark brown
Ventral ground color	Yellow	White
Dorsal pattern	Spots	Spots
Anterior ventral pattern	None	Spots
Spot rows	8	6, 8 (6)
Body spots at midbody	34-39	30-49
Middorsal spots in contact	Yes	Yes
Head width/Head length	0.67-0.71	0.44-0.64
Head width/Neck width	1.50-1.67	1.03-1.83
Eye diameter/Head width	0.23-0.25	0.15-0.37

although they show some overlap. *Tropidophis xanthogaster* has eight spot rows at midbody versus typically six in *T. pardalis*. Also, ven-

Table 2. Geographic variation in ventral scale counts of *Tropidophis pardalis*. (Numbers in parentheses represent mean).

Zone	Ventral scales
Pinar del Río Province	142-149 (142.3), <i>n</i> = 4
La Habana – Ciudad de la Habana – Matanzas Provinces	139-156 (147.7), <i>n</i> = 33
Villa Clara – Sancti Spiritus Provinces	146-160(153.0), <i>n</i> = 2
Paredón Grande Key, Sabana – Camagüey Archipelago	142, <i>n</i> = 1
Isla de la Juventud	141-154 (147.7), <i>n</i> = 9

tral scale counts in *T. xanthogaster* are unusually compared with *T. pardalis*, especially those from the same province: 155-164 in *T. xanthogaster* versus 142-149 in *T. pardalis* from the Pinar del Río (Table 2). Two of the three specimens of *T. xanthogaster* have higher numbers of ventrals than any recorded *T. pardalis* (<161) from throughout the range of that species.

Discussion

With this new species of *Tropidophis*, the number of local endemic taxa of amphibians and reptiles on the Guanahacabibes Peninsula (Schwartz and Henderson, 1991) is raised to ten, which further supports the evolutionary and ecological importance of this region. In addition, the distribution of *T. xanthogaster* is close to that of *T. pardalis*, at the base of the peninsula near El Veral (fig. 2). The two specimens of *T. pardalis* from that locality appear to be typical of the species and do not show evidence of intergradation. For example, they have 23 and 25 scales rows at midbody, 143 and 149 ventral scale counts, six spot rows at midbody, 41/48 and 35/37 body spots, ratio HW/HL 0.63 and 0.50, and venter completely spotted, respectively.

This new species now increases the number of species of *Tropidophis* in Cuba to 16. This great diversity of species, certain to increase in the future, invites evolutionary and ecological

studies to better understand this adaptive radiation.

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- 4.12114); Lugones Lagoon (4.11784); La Jaula (4.12104); Santa Cruz (4.12053, 4.12092); all of them from Guanahacabibes Peninsula. Pinar del Río Province: Viñales (4.5759, 4.5902, 4.11764, 4.11792, 4.11797, 4.11800-01). Ciudad de La Habana Province: Atabey, Playa (4.4310, 4.4407, 4.4573, 4.11772). Isla de la Juventud: (4.3132, 4.3153, 4.11810-11).
- T. morenoi*, Cuba – Sancti Spíritus Province: Alejandro von Humboldt Cave, Caguanes (4.5492, Holotype; 4.5493, Paratype).
- T. pardalis*, Cuba – Pinar del Río Province: El Veral, Guanahacabibes Peninsula (4.5475-76); Soroa (4.12034); Pedreras de Mendoza, Guane (4.12037). Ciudad de La Habana Province: Atabey, Playa (4.5466, 4.5706-08, 4.5741, 4.8554); El Laguito, Playa (4.5488, 4.12007); Cubanacán, Playa (4.5714-15); Bosque de La Habana (4.5705, 4.12013, 4.12015); La Tropical, Marianao (4.5709); Vedado (4.5905); “La Chata”, Capdevila, Boyeros (4.5443, 4.5463, 4.5710, 4.5712); Santiago de las Vegas (4.12026, 4.12032); Jardín Botánico de La Habana (4.12033, 4.12066); Guanabo (4.12046). La Habana Province: Sierra de Anafe (4.12017); La Chorrera (4.12019); San Antonio de los Baños (4.5487, 4.12014); Río Ariguanabo (4.5490, 4.12043); Madruga (4.5489); Güines (4.12042). Matanzas Province: Valle de Yumurí (4.12024). Sancti Spíritus Province: Sierra Trinidad, Macizo Guamuhaya (4.7387). Villa Clara Province: Loma de la Esperanza, Sierra Morena (4.12012). Ciego de Ávila Province: Paredón Grande Key, Sabana-Camagüey Archipelago (4.12058). Isla de la Juventud: Sierra de la Cañada (4.3077-79, 4.3080, 4.3084, 4.5491); Sierra de Casas (4.12074-75); Punta del Este (4.3081).
- T. pilsbryi*, Cuba – Santiago de Cuba Province: Santa Faz, San Vicente (4.12088-89). Guantánamo Province: Safarona, between Asunción and Castillo (4.12099, 4.12100).
- T. semicinctus*, Cuba – Pinar del Río Province: Soroa (4.3008); Rancho Mundito, Taco Taco (4.12068). Matanzas Province: El Palenque (4.3000); Valle de Yumurí (4.3012). Villa Clara Province: Mogotes de Jumagua, Sagua la Grande (4.3011). Sancti Spíritus Province: Casilda (4.3006).
- T. spiritus*, Cuba – Sancti Spíritus Province: Caja de Agua, Sierra de Banao, Macizo Guamuhaya (4.5660).
- T. wrighti*, Cuba – Camagüey Province: Mogote Bernabé de la Torre, Sierra de Najasa (4.3003). Las Tunas Province: Puerto Manatí (4.3019, 4.5485, 4.12069). Granma Province: Blanquizaral, Manzanillo (4.3004). Santiago de Cuba Province: Cuabitas (4.3013, 4.12054-55). Guantánamo Province: Piedra “La Vela”, Yateras (4.5750-51).

Appendix 1

Specimens examined located in Colecciones Zoológicas del Instituto de Ecología y Sistemática, Cuba (acronym CZACC).

T. feicki, Cuba – Pinar del Río Province: Manantiales River, Soroa (4.5479, 4.6690); Soroa (4.12063, 4.12067); Granja “Moncada”, Viñales (4.12066); Indio Cave, Viñales (4.5444, 4.5752); San Vicente, Viñales (4.5445); Ojo de Agua, Rangel (4.12065).

T. galacelidus, Cuba – Sancti Spíritus Province: Cafetal de Gaviña surroundings, Sierra de Trinidad, Macizo Guamuhaya (4.3455, Holotype); Topes de Collantes, Sierra de Trinidad, Macizo Guamuhaya (4.5748-49).

T. haetianus, Haiti – Departamento Sur: Campamento Perry (4.12101-03).

T. maculatus, Cuba – Pinar del Río Province: Candelaria (4.11994); Ensenada de San Carlos (4.11999); Cinco Pesos, San Cristóbal (4.5739). Ciudad de La Habana Province: Atabey, Playa (4.5738, 4.11989); El Laguito, Playa (4.11988); La Tropical, Marianao (4.5469-70); La Ceiba, Marianao (4.11990); Marianao (4.11993, 4.11995); La Víbora, 10 de Octubre (4.5481); “La Chata”, Capdevila, Boyeros (4.5740); Reparto “Miraflores Viejo” Boyeros (4.5448). La Habana Province: Jibacoa (4.11991).

T. melanurus, Cuba – Pinar del Río Province: Los Cayuelos (4.11766); Agua Cave (4.12120); El Veral (4.12059,