

## New Snake (*Tropidophis*) from Western Cuba

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A new species of *Tropidophis* is described from the northern coast of La Habana Province, western Cuba. It is tan and has two rows of prominent, dark brown dorsal spots and a pale neck band. It most closely resembles another species from western Cuba, *T. maculatus*, in having a high number of ventral scales and in being prominently spotted. It differs from that species and others in aspects of scalation and coloration.

Se describe una nueva especie de *Tropidophis* de la costa norte de La Habana, en el occidente de Cuba. Esta es de color pajizo con dos filas de manchas bien definidas y una banda pálida en el cuello. Es semejante a otra especie del occidente de Cuba, *T. maculatus*, ya que tiene un alto número de escamas ventrales y patrón de manchas bien definidas. La nueva especie difiere de ésta y de las restantes en aspectos de la escamación y coloración.

SNAKES of the genus *Tropidophis* (Tropidophiidae) are Neotropical in distribution, and most of the species are endemic to the island of Cuba (Schwartz and Henderson, 1991). They are mainly ground-dwelling snakes that feed on lizards and frogs, and most have the unusual ability to change color (Hedges et al., 1989; SBH, pers. obs.). The current taxonomy is largely the result of the comprehensive revision by Schwartz and Marsh (1960), with some recent additions (Schwartz, 1975; Schwartz and Garrido, 1975; Hedges and Garrido, 1992).

Recently, a new species of *Tropidophis* was collected at a locality on the north coast of Cuba between the cities of La Habana and Matanzas. The single known specimen, an adult female, differs in scalation and pattern from all other species in the genus. Because most species of *Tropidophis* are rarely encountered, it may be many years before an additional specimen of this new species is collected. For this reason, and because of the relatively large number of diagnostic traits distinguishing it from its closest relatives, we are confident about describing this new species on the basis of a single specimen.

### MATERIALS AND METHODS

Snout-vent length (SVL) and tail length measurements were taken to the nearest millimeter; other lengths were measured with a digital read-out micrometer caliper and recorded to the nearest 0.1 mm. Illustrations of head scalation were made with a camera lucida. Other abbreviations are CARE (collection of Alberto R. Estrada), MNHNCU (Museo Nacional de Historia Natural, Havana, Cuba), and USNM (United States National Museum of Natural History).

Comparison of the new species with described species of *Tropidophis* was made by examination of preserved material of the three most relevant species (Comparative Materials Examined) and published color pattern and scale count data of other species in the genus (e.g., Grant, 1940; Schwartz and Marsh, 1960; Thomas, 1963). In addition, the authors collectively have had field experience with all species of West Indian *Tropidophis* except *T. greenwayi* (Bahamas) and *T. caymanensis* (Cayman Islands).

### *Tropidophis celiae* n. sp. Figures 1A–2

**Holotype.**—MNHNCU 4474, an adult female (gravid), from the northern (coastal) side of Loma Canasi, at the mouth of Río Canasi, Santa Cruz del Norte Municipality, La Habana Province, Cuba, 3 m elevation, 23°08'37"N, 81°46'40"W, collected by Alberto R. Estrada and Luis M. Díaz on 7 June 1996. Original number CARE 60928.

**Diagnosis.**—A species of *Tropidophis* distinguished from all others by a combination of scalation and color pattern (Table 1). It has a high number (203) of ventrals, a high number of midbody scale rows (27), two rows of prominent dark brown spots on a pale tan ground color, a pale neck band, and an unpatterned venter. The high ventral count distinguishes it from all species in the genus except *T. maculatus*, *T. caymanensis*, *T. melanurus*, and the *semicinctus* group (*T. feicki*, *T. semicinctus*, and *T. wrighti*). The combination of high ventral count and midbody scale row count in *T. celiae* further distinguishes it from all species in the genus except *T. melan-*

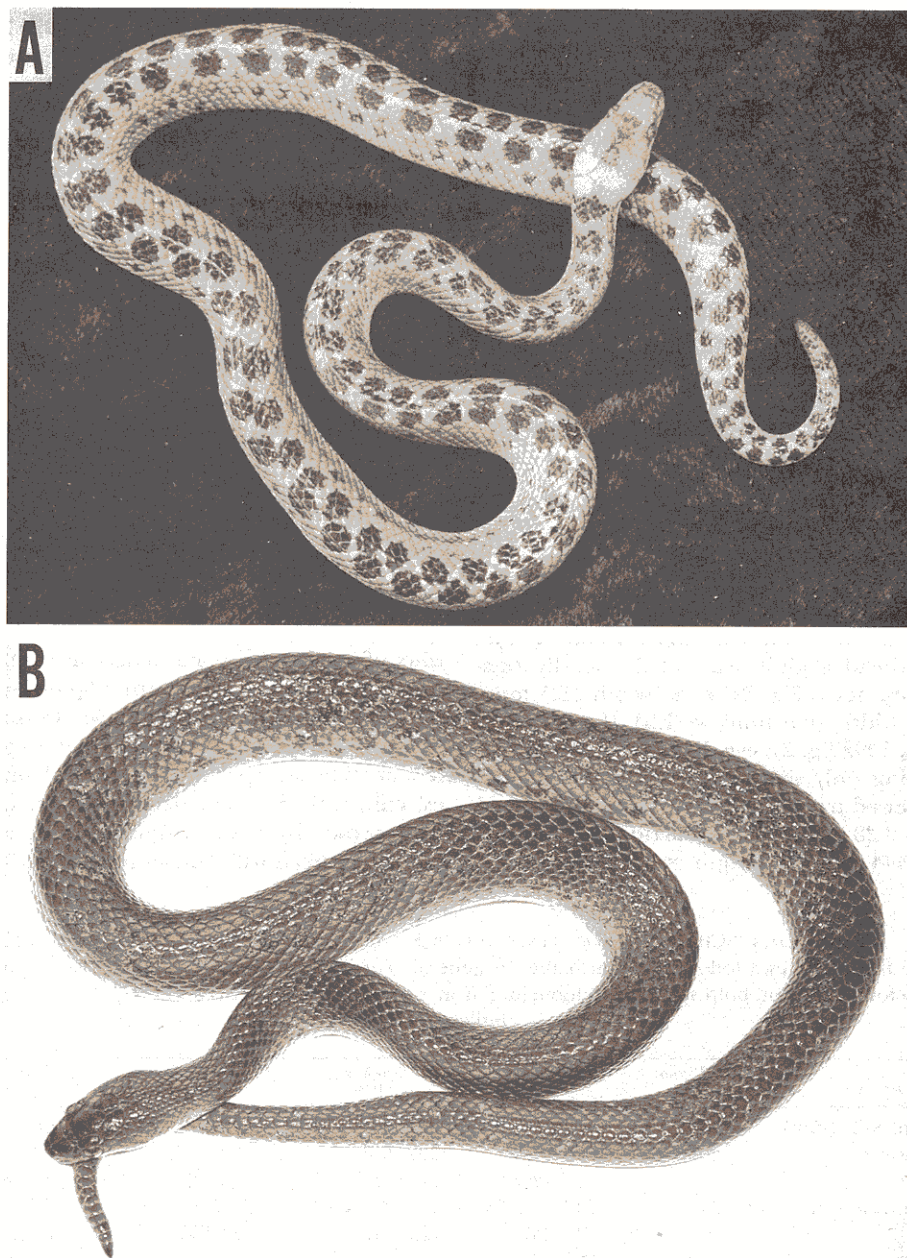


Fig. 1. (A) *Tropidophis celiae*, holotype (MNHNCU 4474); and (B) *T. maculatus* from Soroa, Pinar del Rio Province, Cuba (MNHNCU 3422).

*urus* (Cuba) and *T. caymanensis* (Cayman Islands). However, *T. melanurus* (Fig. 3), which is sympatric with *T. celiae*, is a much larger species (the gravid female *T. celiae* is smaller than the smallest gravid female *T. melanurus*) with a laterally compressed body (body not laterally compressed in *T. celiae*). *Tropidophis melanurus* also

has four dorsolateral stripes (absent in *T. celiae*), no occipital spots or band (present in *T. celiae*), and a pigmented (stippled) rather than unpatterned venter (Table 1). *Tropidophis caymanensis*, once considered to be a subspecies of *T. melanurus*, differs from *T. celiae* in most of those same characters (Table 1).

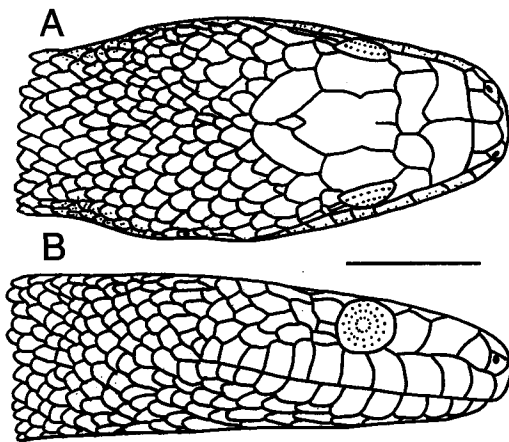


Fig. 2. Head scalation in *Tropidophis celiae*, holotype. Bar = 5 mm. (A) Dorsal view, (B) lateral view (right side).

**Description of holotype.**—An adult female with enlarged eggs (no embryos visible); body robust (stout), head slightly expanded laterally (distinct from neck; Fig. 2), head width (8.5 mm) ÷ neck width (6.5 mm) = 1.31 (Hedges and Garrido, 1992:fig. 2); eye diameter 2.4 mm, eyes protruding only slightly beyond edge of head when viewed from above, eye diameter ÷ head width = 0.28 (Hedges and Garrido, 1992:fig. 2); SVL = 344 mm, tail length = 41 mm; ventrals,

203; subcaudals, 30; supralabials, 10/11 (left/right), scales 4–5 in contact with eye; infralabials, 12/12 (no single scale distinctly larger than others); preoculars, 1/1; postoculars, 3/3; chin with long groove bordered by five scales on either side (arranged in pairs), the anterior two in contact with infralabials 1–2 and the remaining three chin-groove scales separated from the infralabials by 1–2 scales of same size as those along chin groove. Dorsal scales are smooth and scale rows (neck to region above vent) are 25 (corresponding to ventral rows 1–30), 27 (31–124; including midbody region), 25 (125–143), 23 (144–170), 21 (170–173), and 19 (174–203); scale row formula expressed as 25-27-19; the middorsal row is not enlarged, except a few scales on body and tail; parietal scales in contact; no apical scale pits.

In alcohol, dorsal ground color tan; dorsal spots dark brown, in two longitudinal rows near midline; each spot 2–3 scales in width; 60/60 spots on body, 12/12 on tail; 1–2 additional rows of small (one scale or less in width), less distinct and less well-organized spots lateral to the main rows; tail tip, dark brown; venter mostly cream, with almost no markings except for few small brown specks along ventrolateral edges; chin with fine, tan flecks and a few, small, dark brown spots on infralabial scales; dorsal surface of head with brown interocular bar fol-

TABLE 1. COMPARISON OF CHARACTERS OF SELECTED CUBAN SNAKES OF THE GENUS *Tropidophis*. Sample size is indicated in parentheses following taxon name. In general, *Tropidophis* does not exhibit sexual dimorphism, and therefore data from both sexes are combined. For meristic data, mean  $\pm$  SD and range (parentheses) are indicated.

Character	<i>T. celiae</i> (1)	<i>T. maculatus</i> (27)	<i>T. melanurus</i> (99)	<i>T. caymanensis</i> (51)	<i>T. semicinctus</i> (38)
Maximum SVL (mm)	344	347	957	512	408
Ventral scales	203	196 $\pm$ 4.4 (189–208)	202 $\pm$ 6.8 (183–217)	198 $\pm$ 6.1 (183–212)	208 $\pm$ 4.5 (201–223)
Midbody scale rows	27	24.9 $\pm$ 0.43 (23–25)	27.4 $\pm$ 1.04 (25–30)	25.7 $\pm$ 1.04 (23–27)	24.71 $\pm$ 0.86 (21–25)
Body shape	Robust	Robust	Laterally compressed	Laterally compressed	Gracile
Ground color	Pale tan	Red or reddish tan	Tan or brown	Gray to orange-tan	Yellow to orange
Dorsal pattern	Spots	Spots	Stripes and spots	Stripes and spots	Spots
Ventral pattern	None	Spots	Stippling	None or marked	None
Spot rows	Two	8.2 $\pm$ 0.85 (8–10)	0–10, ill-defined	0–10, ill-defined	Two
Body spots	60	44.9 $\pm$ 4.70 (35–55)	48.8 $\pm$ 3.45 (47–54; n = 20)	55.6 $\pm$ 4.07 (48–64)	23.6 $\pm$ 2.86 (18–29)
Tail spots	12	8.5 $\pm$ 1.72 (4–11)	5.3 $\pm$ 0.82 (5–7; n = 3)	6.8 $\pm$ 1.45 (4–9)	5.8 $\pm$ 1.34 (3–9)
Middorsal spot contact	Yes	No	Yes	Yes	No
Pale neck band	Present	Absent	Absent	Absent	Absent

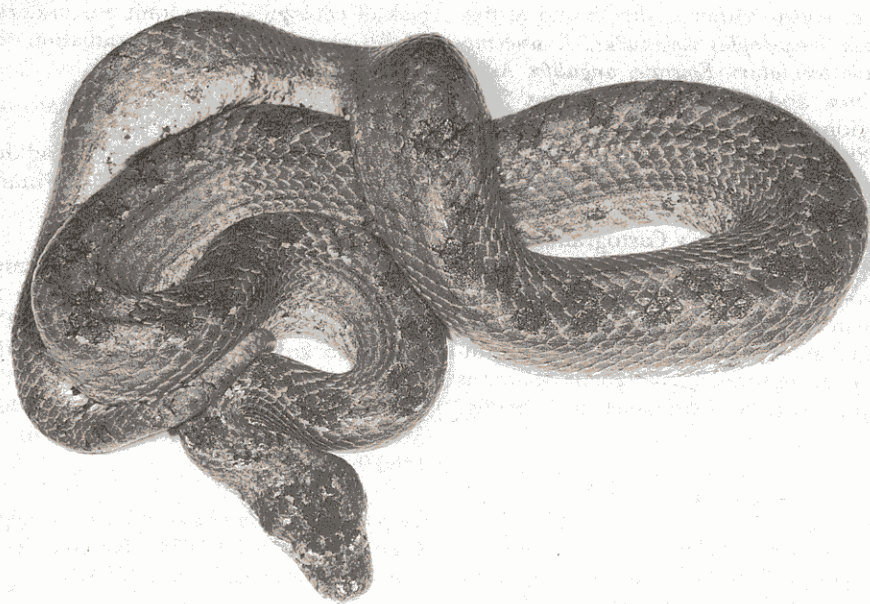


Fig. 3. *Tropidophis melanurus*, from John Paul Jones Hill, U.S. Naval base at Guantanamo Bay, Cuba (USNM 335881).

lowed by a less distinct brown hour-glass marking; side of head with indistinct pale brown postocular stripe; pale tan neck band, 5–6 scales in width, beginning two scales posterior to parietals, distinctly paler than tan ground color. Coloration in life was similar, except that the labial scales and tail were pale orange and the iris was golden.

*Etymology*.—We take great pleasure in naming this species for Señora Celia Puerta de Estrada, wife of Alberto R. Estrada.

*Comparisons*.—The species requiring the closest comparison with *T. celiae* is *T. maculatus* (Fig. 1B). It also occurs in western Cuba (Schwartz and Henderson, 1991) and is sympatric with *T. celiae*. The two species are similar in body size, have high numbers of ventral scales, and share dorsal patterns of dark spots on a pale ground color (Table 1; Schwartz and Marsh, 1960:fig. 4). However, *T. maculatus* has a lower number of dorsal scale rows at midbody and a lower number of dorsal body spots and dorsal tail spots. Also, *T. maculatus* lacks the pale neckband, lacks contact of middorsal spots, has 4–8 rows of dorsal body spots, and has two rows of large black spots on the venter (Table 1). As noted by Stull (1928), the specimen reported by Boulenger (1893) to have 27 midbody scale rows and 183 ventrals is not *T. maculatus*; both

scale counts correspond to *T. haetianus* (then considered to be a subspecies of *T. maculatus*).

All other species of small, spotted, ground dwelling *Tropidophis* (*maculatus* and *fuscus* groups; Hedges and Garrido, 1992) have fewer ventral scales than *T. celiae* and differ in color pattern and other characters (Schwartz and Marsh, 1960). However, *Tropidophis semicinctus* (*semicinctus* group), another species sympatric with *T. celiae*, has a similarly high number of ventral scales and two rows of dark dorsal spots (Table 1). *Tropidophis semicinctus* can be distinguished from *T. celiae* by its more gracile body shape, fewer dorsal scale rows at midbody, yellow-orange ground color, fewer (and larger) dorsal spots, absence of a pale neck band, and by its more distinct (expanded) head with larger eyes (Barbour and Ramsden, 1919: plate 15, figs. 4–6; Tolson and Henderson, 1993). One of the three mainland species, *T. battersbyi* of Ecuador, has a high number of ventrals (200) but only 23 dorsal scale rows at midbody (Peters and Orejas-Miranda, 1970).

*Natural history*.—The specimen was found crawling on limestone rocks at 0300 hours, only six meters from the ocean. Shortly after being collected, it regurgitated a new species of frog, *Eleutherodactylus blairhedgesi* (Estrada et al., 1997). Other species of frogs collected at the locality were: *E. atkinsi*, *E. planirostris*, *E. pinar-*



*ensis*, and *E. varleyi*. Other snakes found at this locality were *Tropidophis melanurus*, *T. semicinctus*, *Arrhyton taeniatum*, *Epicrates angulifer*, *Antilophis andreaei*, and *Alsophis cantherigerus*. This coastal region of La Habana province receives about 1000–1200 mm of annual precipitation, and the vegetation is characterized by sea-grape (*Coccoloba uvifera*) and dry scrub forest (Instituto Cubano de Geodesia y Cartografía, 1978).

*Distribution.*—*Tropidophis celiae* is known only from the type-locality, which is located about 57 km E La Habana (city) and 33 km west Matanzas (city) in the Alturas de la Habana-Matanzas physiographic region (Estrada et al., 1997:fig. 3).

#### DISCUSSION

The phylogenetic relationships of species within the genus *Tropidophis* are not well established. However, *T. celiae* shares several traits with some or all species in the *maculatus* species group (Schwartz and Marsh, 1960; Hedges and Garrido, 1992): robust body shape, high number of dorsal spots, small dorsal spots, presence of occipital spots or a neck band, and terrestrial habits. Within that group, the high number of ventral scales and pattern of prominent spots might suggest that *T. celiae* is closest to *T. maculatus*. Although *T. celiae* is considered here to have two rows of body spots, the much smaller spots (one scale or less in width) on the sides of the body of *T. celiae* may be homologous with the larger lateral body spots in other species of the *maculatus* group. If true, *T. celiae* would be considered to have six rows of spots, which is more typical of species in the *maculatus* group. However, DNA sequences of the mitochondrial rRNA genes indicate that *T. celiae* is most closely related to species in the *T. melanurus* group (SBH, unpubl.).

Besides the two additional species of *Tropidophis* found at the type-locality of *T. celiae* (*T. melanurus* and *T. semicinctus*), several other species also occur along the north coast of La Habana and Matanzas provinces (*T. feicki*, *T. maculatus*, and *T. pardalis*) and should be considered to be sympatric with *T. celiae* (Schwartz and Henderson, 1991). Six species of *Tropidophis* also are sympatric in eastern Cuba (Hedges and Garrido, 1992), and this represents the largest number of congeneric species of snakes occurring in sympatry in the West Indies. In addition, several other undescribed species of *Tropidophis* are known (S. B. Hedges and O. H. Garrido, unpubl.). Unfortunately, the apparent rarity of most species of *Tropidophis* and concomitant

lack of ecological data limit our understanding of this remarkable adaptive radiation of snakes.

#### COMPARATIVE MATERIALS EXAMINED

*Tropidophis maculatus.*—Cuba: Ciudad de La Habana, La Habana, USNM 309775; Pinar del Río Prov., Soroa, MNHNCU 3422.

*Tropidophis melanurus.*—Cuba: Guantánamo Prov., 9.4 km ENE Acueducto, 245 m, MNHNCU 3423; Bernardo, 600 m, MNHNCU 3424; 3.5 km E Tortuguilla, 10 m, MNHNCU 3425; 2 km N La Municipión, 730 m, MNHNCU 3426; Pinar del Río Prov., Cueva del Indio, MNHNCU 3428; Cueva de San Miguel, MNHNCU 3429–30.

*Tropidophis semicinctus.*—Cuba: Cienfuegos Prov., Cienfuegos, USNM 56347; Sancti Spiritus Prov., 7 mi. W Trinidad, USNM 139418.

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