



Notes on the Ecology and Morphology of the Cuban Khaki Trope, *Tropidophis hendersoni* Hedges and Garrido (Squamata: Tropidophiidae), with a New Locality Record

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Photographs by the senior author except where indicated.

Hedges and Garrido (2002) described the Cuban Khaki Trope (*Tropidophis hendersoni*) from a single female specimen collected in 1945 in Guardalavaca, Holguín Province, and deposited in the Museum of Comparative Zoology at Harvard University (MZC 47896). This specimen was for a long time identified as *T. haetianus* (Schwartz and Henderson 1991, Tolson and Henderson 1993). The species was listed as Critically Endangered by Rodríguez Schettino and Garrido (2012) in the Red Book of Cuban Vertebrates based on available information, but no data on morphological variation, coloration in life, ecology, or new distributional records have come to light since the original description. The following note is a contribution to these topics based on additional specimens from a new locality. All specimens were deposited in the herpetological collection of Museo Nacional de Historia Natural de Cuba (MNHNCu).

On 14–15 August 2012 and 23–25 October 2013, we conducted two herpetological expeditions to Gibara, Holguín

Province, and found six specimens of *T. hendersoni* (Table 1, Figs. 1–4). This new locality (Fig. 2) is about 68 km NW from Guardalavaca, and is in a sub-coastal karstic plateau with abundant caves. The original habitat surrounding the caves is semideciduous forest on limestone of marine origin. Many of these caves have sinkholes that allow sunshine and rain to enter, conditions conducive to the development of shrubs and vines in some chambers. The cave floor is red soil with rock mounds under sinkholes. Human impact is evident in this area (rubbish dumping, cattle farming, and military use of caves). The highly invasive Sicklebush (*Dichrostachys cinerea*) forms dense thickets, displacing original vegetation.

During the first expedition we found a single female (MNHNCu 4711) at Cueva de Los Panaderos (21°06'21.1"N; 76°08'17.6"W), ~20m asl, in the town of Gibara. This female was active at night (2200 h) on the floor of one of the cave galleries, about 100 m from the entrance. On the night of 24 October 2014, after a brief but heavy rain, we found two

Table 1. Main measurements of six specimens of *Tropidophis hendersoni* from Gibara, Holguín Province, Cuba.

MNHNCu	Sex	SVL (mm)	TL (mm)	Ventral scales	Subcaudal scales	Middorsal enlarged spots (right/left rows)	Dorsal scale row formula
4711	♀	322	37.2	202	33	53/53	25-27-19
5055	♂	331	43.2	202	34	55/55	23-25-19
5056	♂	332	42.5	195	30	50/48	27-27-20
5057	♂	267	31.0	203	32	57/57	25-27-19
5058	♀	327	37.7	204	31	50/50	27-27-20
5059	♀	305	34.7	198	31	50/57	25-27-19



Fig. 1. Adult male Cuban Khaki Trope (*Tropidophis hendersoni*; MNHN Cu 5056; top) and subadult male (MNHN Cu 5057; middle and bottom).

additional individuals in Cueva de Los Panaderos (MNHN Cu 5056–57) and three others (MNHN Cu 5055, 5058, 5059) in Cueva del Santo (21°06'17.7"N; 76°08'14.4"W), between 2100 and 2400 h. The latter is, in fact, a different entrance into the same cave system located 150 m from Cueva de Los Panaderos. The three individuals in Cueva del Santo were col-

lected in an area of fewer than 50 m² that is associated with a sinkhole containing some vegetation, leaf litter, and rocks. Temperature was 28 °C and relative humidity 85%. One snake was coiled in front of a decapitated fruit bat (*Artibeus jamaicensis*) lying on the ground and covered by flies. Frogs (*Eleutherodactylus tonyi* and *E. cf. thomasi*) were active nearby. We suspect that the snake was lying in wait for the frogs to approach in search of insects. Another individual was partially hidden within a hole in a rock, and retreated into the hole when disturbed by our headlamps. A male (MNHN Cu 5055) was observed (Fig. 3) eating an adult frog *Eleutherodactylus cf. thomasi*. When discovered, more than half of the frog's body (head, forelimbs, and part of the trunk) had been swallowed by the snake, and ingestion was completed in less than 10 min. This individual was preserved 15 h later. The frog was recovered and measured ~38.5 mm SVL and 96.4 mm from the tip of the snout to the fourth toe disk of the extended hindlimb; prey total length comprised 29% of snake SVL; measurements are approximate since the frog's head was in an advanced stage of digestion, but the rest of body was almost intact (Fig. 4). The other snakes were found crossing the cave floor. We found no individuals outside the cave system, and the probable association of this snake to this habitat might be explained by the abundance of frogs in the cave.

Other reptiles collected in the general area were *Arrhyton taeniatum*, *Arrhyton* sp., *Tropidophis melanurus*, *T. wrighti*, *Sphaerodactylus nigropunctatus* ssp., *Tarentola americana*, *Anolis allisoni*, *A. angusticeps*, *A. centralis*, *A. jubar gibarensis*, *A. lucius*, *A. porcatus*, and *A. sagrei*. Amphibians were represented by the previously mentioned two species of *Eleutherodactylus* and *E. atkinsi*, *E. feichtingeri*, *E. ronaldi* (new locality record), *Osteopilus septentrionalis*, and *Peltophryne peltacephala*. The Gracile Banded Trope (*Tropidophis wrighti*) was frequently found active in vegetation (as many as 20 individuals were seen in a few hours in just one night), foraging on thin branches at heights of 0.5–5 m above the ground, in sharp contrast with the more terrestrial habits of *T. hendersoni*. Sleeping anoles are known prey of *T. wrighti*, and arboreal foraging of this species might reduce competition with the more terrestrial species. At Cueva de Los Panaderos, we found a small juvenile *T. melanurus*, another terrestrial species and the largest known member of the genus. Cuba is the only place in the world with such a morphological and ecological radiation of *Tropidophis* (Hedges 2002).

Morphological data.—All individuals were quite similar, and pattern agrees with the original description, suggesting little variation of this character in adult individuals. Size for both sexes was longer than that reported for the holotype. Females were 305 and 327 mm SVL, respectively (vs. 280 mm in the holotype); adult males were 331 and 332 mm SVL and one subadult male (MNHN Cu 5057) was 267 mm SVL. Adult males had well developed pelvic spurs and slightly longer tails



Fig. 2. Habitat of the Cuban Khaki Trope (*Tropidophis hendersoni*) in Gibara, Holguín Province, Cuba. Entrance of Cueva de Los Panaderos (left) and an area under a sinkhole with vegetation, leaf litter, and rocks at Cueva del Santo (right). Photographs by Antonio Cádiz.

than females (tail length 42.5–43.2 mm in males; vs. 34.7–37.7 mm in females). Spurs were dark brown, thick at the base, and with a nail-like projection in the distal half. Spurs retracted in small grooves (Fig. 5). In the young male, spurs were not developed but the spur-bearing grooves were evident. Hemipenes were bifurcated in one male (MNHNCu 5056).

Color in life was not available in the original description. The dorsum was tan in most specimens. The subadult male

was more grayish than the others, and the middorsal spots were more conspicuously bordered by paler scales. The venter was paler than the dorsum, cream colored to slightly orange, immaculate or with sparse and widely spaced spots on the borders of some ventral scales. A pale, gray transverse occipital zone (a faded collar) was evident in all specimens, as mentioned in the original description. All individuals had a moderately evident brown postocular stripe extending obliquely



Fig. 3. Adult male Cuban Khaki Trope (*Tropidophis hendersoni*; MNHNCu 5055) ingesting a frog (*Eleutherodactylus* cf. *thomasi*) in Cueva del Santo, Gibara, Holguín Province.



Fig. 4. Ingested frog (*Eleutherodactylus* cf. *thomasi*) recovered from the adult male Cuban Khaki Trope (*Tropidophis hendersoni*; MNHNCu 5055).

over the posterior supralabial scales but not beyond them. A subocular dark bar was most conspicuous and at least a few other bars were present on supralabial and infralabial scales, as mentioned by Hedges and Garrido (2002). The posterior half of the head in dorsal view was marked by a more-or-less triangular or diamond-like dark figure. The nares were crossed by a barely evident brown band. The dorsal pattern consisted of two partially fused enlarged spots along the midline. Spots on the flanks were considerably smaller, irregularly aligned, and less contrasting than the enlarged middorsal spots. About 8–10 spots extended around midbody, which agrees with the condition described by Hedges and Garrido (2002). The tail tip was not distinctively differentiated, but had a slightly more accentuated yellowish cast in some individuals. Preoculars 1/1; postoculars 3/3; supralabials 9/9 (n=3), 9/10 (n=1), and 10/9 (n=2); infralabials 11/10 (n=2), 11/11 (n=4); ventral scales 195–204 (mean = 201); subcaudal scales 31–34 (mean = 32); dorsal scale row formula 23–25–19 (n=1; also the female holotype condition), 25–27–19 (n=3), 27–27–20 (n=2); number of middorsal enlarged spots (right/left rows) from snout to vent 50/48, 50/50, 50/57, 53/53, 55/55, and 57/57 (51/51 in the female holotype). Parietal scales in contact in MNHNCu 5056, partially separated in MNHNCu 5057–5059, or completely separated by one scale in MNHNCu 4711 and 5055. The holotype has the first condition, but this is clearly a variable character. All specimens had weakly keeled dorsal scales at the level of the vent, as in the original description. Some of these measurements are summarized in Table 1.

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Fig. 5. Male Cuban Khaki Trope (*Tropidophis hendersoni*; MNHNCu 5056; top) with pelvic spurs compared with the female (MNHNCu 4711) condition (bottom).

provided access to the holotype of *Tropidophis hendersoni*. Fieldwork was partially financed by the Systematic Research Fund of the Linnean Society of London and the Systematics Association (to LMD), the project “Ecology and Evolution of Cuban Anoles,” Tohoku University of Japan (to AC), and the University of Würzburg, Germany. We are indebted to the Museo de Historia Natural Joaquín de la Vara and members of the Speleological Group of Gibara for logistical support. Robert Henderson kindly reviewed the first draft of this manuscript and provided useful comments.

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