Discovery of the first male specimen of *Tantilla hendersoni* Stafford, 2004 (Squamata: Colubridae), from a new locality in central Belize

Erich P. Hofmann1,*, Russell J. Gray2, Larry David Wilson3 and Josiah H. Townsend1

Abstract. *Tantilla hendersoni* Stafford, 2004 was described based on a single female specimen from Cayo District, Belize, and is the only snake species considered to be endemic to the country. We report the discovery of a second specimen, the first male, of *Tantilla hendersoni* from a new locality in Stann Creek District, and provide a detailed morphological description of the specimen. We also discuss the distribution, conservation, and taxonomic status of the species.

Keywords: *Tantilla hendersoni*, Belize, Centipede snake, Central America, Stann Creek District

Introduction

The genus *Tantilla* (Squamata: Colubridae) is currently composed of 63 species of small, semi-fossorial snakes distributed throughout the Western Hemisphere (Wilson & Mata-Silva, 2015; Batista et al., 2016; Koch & Venegas, 2016). Given their size and secretive nature, few specimens exist for many taxa, and 13 of the 63 described species (20.6%) are known only from the holotype (Wilson & Mata-Silva, 2015; Batista et al., 2016). Three members of the genus have been reported from Belize (Stafford et al., 2010): *T. cuniculator* Smith, 1939; *T. hendersoni* Stafford, 2004; and *T. schistosa* (Bocourt, 1883). *Tantilla moesta* (Günther, 1863) was considered to occur in Belize by Stafford (2004), but not reported for the country by Stafford et al., (2010) or Wilson & Mata-Silva (2015), and no verified reports from Belize are known to us. *Tantilla hendersoni* was described on the basis of a single female specimen (BMNH 2002.3) collected near Las Cuevas in Cayo District (Stafford, 2004), and is considered the only species of snake endemic to Belize (Stafford et al., 2010). Since the discovery of the holotype, one additional individual was photographed near the type locality, but not preserved (Stafford et al., 2010: 385), and no additional specimens of this species have become available for examination.

On 30 August 2016, a single male *Tantilla hendersoni* was collected during field work at the Toucan Ridge Ecology and Education Society (TREES) Field Station near Middlesex in Stann Creek District, Belize (17.0508° N, 88.5689° W; elevation 194 m; datum WGS84; Fig. 1). We provide the following morphological data and color notes for this specimen, the first adult male known for the species, and discuss the distribution, conservation, and taxonomic status of the species.

Methods and materials

The *Tantilla hendersoni* specimen (CM 158957; Figs. 2 & 3) was found deceased in a funnel trap during a study comparing snake community assemblages across anthropogenically altered and undisturbed habitats. The specimen was initially frozen, then later preserved using a 10% formalin solution before final storage in 70% ethanol, and deposited in the Carnegie Museum of Natural History (CM; Pittsburgh, Pennsylvania, USA). All measurements were taken to the nearest 0.1 mm using digital calipers under a microscope, except
snout-vent length and tail length, which were taken to the nearest 1 mm with a stiff ruler.

**Description**

*Tantilla hendersoni* Stafford, 2004

CM 158957: adult male. Dorsal scales in 15-15-15 rows, smooth throughout the length of the body; apical pits absent; ventrals 157; cloacal scute divided; paired subcaudals 70, excluding one unpaired scale and terminal spine; snout-vent length 269 mm, tail length 89 mm, total length 358 mm, tail length/total length ratio 0.249. Head length (from posterior of the jaw to tip of the snout) 8.73 mm, head width 6.31 mm, eye diameter 1.45 mm (0.17 times the length of the head, 2.74 times its distance from the lip).

Head is slightly broader than the attenuate body; snout extending beyond the anterior end of the lower jaw; rostral wider than high, extending posteriorly in dorsal view between internasals, portion of rostral visible in dorsal view 0.35 times the length of its distance from the frontal, slightly smaller in length than internasal common suture, with posterior termination at anterior edge of nostril; nasals divided, postnasal 0.79 times the length of prenasals; nostrils relatively large and in broad contact with pre- and post-nasals, with a small suture between both internasals and first supralabial; internasals 2.51 times as wide as they are long, contacting prenasal and postnasal laterally, their length 0.61 times as long as prefrontal common suture, their common suture 0.51 times as long as prefrontal common suture; prefrontals contacting preocular and postnasal laterally, their length 0.51 times snout length, their suture 0.40 times the frontal length; frontal 6-sided, 1.43 times longer than wide, in moderate contact with supracoaculis (length of frontal-supraocular contact 0.58 times supraocular length, 1.37 times prefrontal-supraocular contact length); loreal absent; supraocular large, in contact with upper postocular; parietals 1.46 times longer than wide, their length 0.51 times the length of the head; 1/1 preoculars; 2/2 postoculars; supralabials 7/7; first supralabial in contact with rostral, preocular, and postocular; second in contact with postnasal and preocular; third in contact with preocular and orbit; fourth in contact with orbit and lower postocular; fifth in contact with lower postocular and anterior temporal; sixth in contact with anterior temporal only; and seventh in contact with postnasal and preocular; mental 1.13 times longer than wide, in narrow contact with anterior chin shields; second and third in contact with anterior chin shield, fourth in contact with anterior and posterior chin shields; on the right side, first infralabial in contact with mental and anterior chin shield, second and third in contact with anterior chin shield, fourth in contact with anterior and posterior chin shields; on the right side, first infralabial in contact with mental and anterior chin shield, second only in contact with first and third infralabials, third and fourth in contact with anterior chin shield, fifth in contact with anterior and posterior chin shield; mental 1.13 times longer than wide, in narrow contact with anterior chin shields; anterior chin shields large, 2.01 times longer than wide; posterior chin shield length 0.56 times the length of anterior chin shields; 2 pairs of gulars; 2 preventrals.

The partially everted hemipenis extends to the margin of the 4th and 5th subcaudal, and has a smooth pedicel; numerous small spines surround the apical margin of the truncus; a single, large, hook-like spine is present on the asulcate surface of the truncus, with two large, hook-like spines flanking the sulcus spermaticus on the sulcate surface; sulcus spermaticus centripetal at least to the apical region; apical region not fully everted.

Coloration in preservative (following Köhler, 2012; color numbers in parentheses): ground color Sepia
(286), fading to Vandyke Brown (281) laterally, with a narrow, Cream White (52) middorsal stripe arising 3.5 scale lengths behind the parietals, continuing unbroken to the terminal spine, and entirely confined to vertebral scale row; body is flanked by Smoky White (261) lateral stripes arising 4.5 scale lengths behind temporals, continuing unbroken nearly to the terminal spine, and comprising the upper half of scale row 3 and the lower half of scale row 4; Smoky White nuchal band contacting the parietals and extending approximately 1–1.5 scale lengths around neck, broken in the center by approximately 1 scale width, and separated from the middorsal stripe by approximately 3 scale lengths; venter is uniform Smoky White until approximately midbody, where the extreme lateral edges of the ventrals exhibit the Vandyke Brown ground color, continuing to the cloaca; upper paraventral scales dark, in contrast with lower paraventral scales exhibiting the Smoky White ventral color, continuing to the cloaca; the ventral side of the tail is uniform Smoky White, with the subcaudals exhibiting Vandyke Brown at the extreme edges; the anterior of the terminal spine is Smoky White, transitioning into Dark Grayish Olive (275) on the ventral posteriorly; dorsum of head is Sepia (286) with Brownish Olive (292) mottling extending to the tip of the snout; laterally, a Smoky White spot extends from the venter of the head to the dorsal level of the eye, separated from the nuchal band by approximately 1 scale length, partially encompassing supralabial 6, the anterior temporal, and lower postocular, and fully encompassing supralabial 5; a second Smoky White spot partially encompasses supralabials 2 and 3 and the majority of the postnasal, while fully encompassing the first supralabial; the rostral is Glaucous (272) with pale mottling on the ventral edges; the mental is anteriorly Vandyke Brown, Pale Buff (1) posteriorly; infralabials 1–3/1–4 and 5/6 anteriorly Vandyke Brown, with mottled edges and posteriorly Pale Buff; infralabials 4/5 anteriorly Pale Buff, posteriorly Vandyke Brown; gulars Pale Buff. The gallbladder of the specimen appears to have burst or been punctured during preservation, causing discoloration of the ventral scales in that area.

CM 158957 differs from the holotype in the following aspects: 358 mm total length (272 mm total length in holotype); 157 ventrals and 70 subcaudals (opposed to 153 and 64, respectively); 6/7 infralabials (opposed to 6/6); broken nuchal band (opposed to unbroken); Vandyke Brown mottling on the lateral edges of the infralabials (as opposed to immaculate).
Discussion

Stann Creek District represents the second known locality for *Tantilla hendersoni*, approximately 58 km NE of the type locality (Fig. 1) and at approximately 386 m lower in elevation than previously known (holotype collected at 580 m; Stafford 2004). Both the holotype of *T. hendersoni* and CM 158957 were collected in evergreen broadleaf forest (Stafford et al., 2010). While the holotype was collected in undisturbed primary forest, CM 158957 was collected in a reclaimed orange grove; this secondary growth has been left to regenerate for approximately 15 years, and is now dominated by plants in the family Melastomataceae, heavy liana growth, and thick leaf litter. CM 158957 was found during a sampling session that immediately followed Hurricane Earl. This storm made landfall in Belize in early August 2016, with winds of up to 128 km per hour and sustained heavy rains (Guardian US, 2016), causing widespread flooding across the country and greatly altering the forest structure on the TREES property.

The conservation status of *Tantilla hendersoni* remains poorly understood, as the lack of information for the species has prevented an accurate assessment. The IUCN Red List considers *Tantilla hendersoni* “Data Deficient” (Johnson et al., 2014), and Stafford et al. (2010) gave the species an Environmental Vulnerability Score (EVS) of 18, placing it in the upper portion of the “High Vulnerability” category. Johnson et al. (2015) gave it an EVS of 16, placing it in the lower portion of the same category. These values are heavily weighted by the lack of information on geographic and ecological distribution for *T. hendersoni*. It is likely that this is a rare or uncommon species, as previously stated by Stafford (2004); however, given our finding here, it is also probable that the species has escaped detection in other parts of its range, which appears to encompass at least the extent of the Maya Mountains.

Stafford (2004) considered *Tantilla hendersoni* to most closely resemble *T. impensa* and *T. taeniata*, and placed it as a member of the *T. taeniata* species group. This is the largest phenetic group of *Tantilla*, and currently consists of 22 species (Townsend et al., 2013; Batista et al., 2016), although only one other member of this group is found in Belize: *T. cuniculator*, known from lowland elevations in the northern part of the country (Wilson & Mata-Silva, 2015). Six years after the original description, Stafford et al. (2010: 385) called into question the taxonomic status of *Tantilla hendersoni*, stating: “in light of photographs we recently examined from a second, larger specimen from the same locality (ca. 350 mm) … we suspect that BMNH 2002.3 probably represents a juvenile *T. impensa* Campbell (1998), and that differences between these two species (size, color pattern features, and ventral scale numbers) are attributable to a combination of geographic and ontogenetic variation. As and when additional material becomes available, we expect *T. hendersoni* to be relegated to the synonymy of *T. impensa.” CM 158957 differs from *T. impensa* on the basis of ventral scales (157 in CM 158957, opposed to the range for males of 162–165; Wilson & Mata-Silva, 2015) and dark mottling on the lateral edges of the ventrals at midbody (opposed to no mottling; visible in Fig. 2: ventral view). Additionally, CM 158957 maintains the same dark coloration in both the dorsolateral and ventrolateral fields, whereas *T. impensa* features lighter dorsolateral segments when compared to their ventrolateral fields (as in Stafford, 2004: 45). These characters were first used by Stafford (2004) to diagnose *T. hendersoni* from *T. impensa* and supported by the new specimen, supporting the continued recognition of *T. hendersoni* as a valid taxon.

Given the morphological similarities apparent in the *Tantilla taeniata* species group, it is clear that further taxonomic investigation involving morphological and, particularly, molecular techniques is necessary, but the lack of comparative material and sequence data remain as challenging today as when *T. hendersoni* was originally described. As more samples are found, however, the potential for a full evaluation of the systematics of the group grows. It is our hope that this finding will further renew interest in better understanding the evolutionary relationships of these secretive snakes.

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References
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