

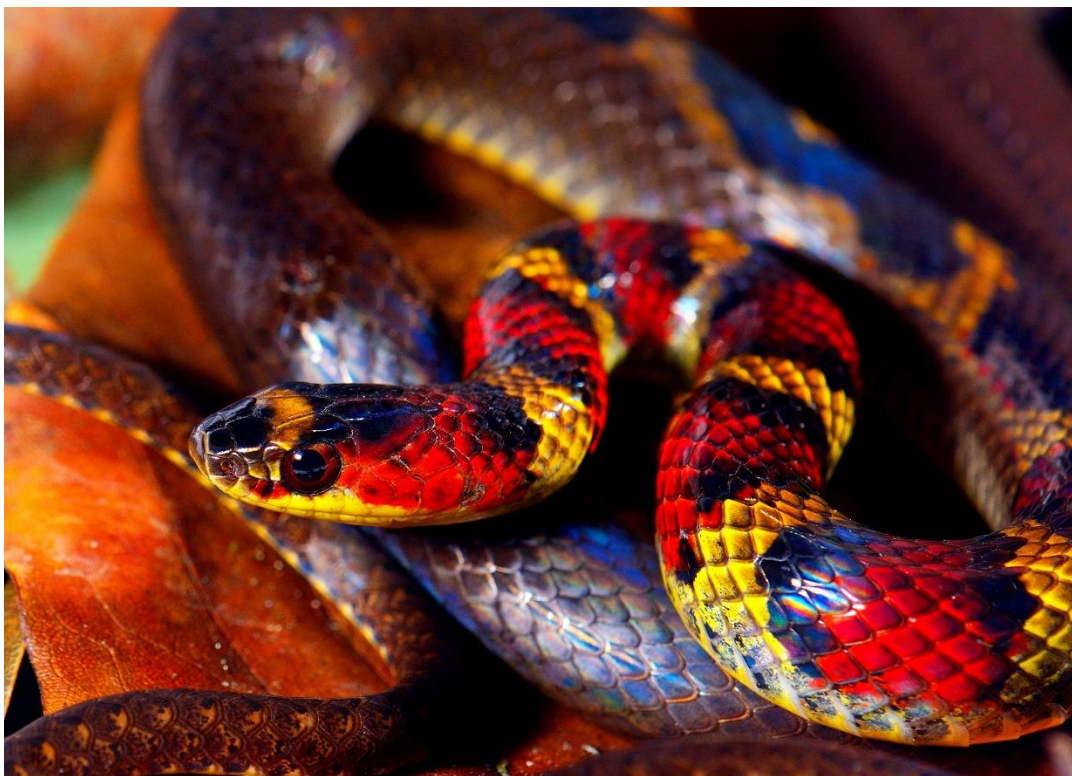
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First country records of the Guatemala Neckband Snake
Scaphiodontophis annulatus (Duméril, Bibron and Duméril,
1854) (Squamata, Sibynophiidae) from Nicaragua

Milton Salazar-Saavedra, Julio Loza, Pedrarias Dávila, Gustavo
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Front page picture: *Scaphiodontophis annulatus*, adult female from El Zapote (Photo Milton Salazar-Saavedra).

First country records of the Guatemala Neckband Snake *Scaphiodontophis annulatus* (Duméril, Bibron and Duméril, 1854) (Squamata, Sibynophiidae) from Nicaragua

Milton Salazar-Saavedra^{1,2,3,4}, Julio Loza^{2,5}, Pedrarias Dávila¹,
Gustavo Adolfo Ruíz Pérez² & Javier Sunyer^{1,2,3}

RESUMEN

Informamos sobre los primeros registros para Nicaragua de la falsa coral roja, *Scaphiodontophis annulatus* (Duméril, Bibron y Duméril, 1854), en base a tres especímenes colectados y tres individuos adicionales fotografiados en el departamento de Nueva Segovia, así como de otro individuo fotografiado en el departamento de Jinotega. Los presentes registros agregan una nueva especie de serpiente para el país y extiende la distribución geográfica de la especie cerca de 240 km al suroeste de su localidad conocida más cercana, en Honduras. También proporcionamos información breve sobre la coloración, ecología y reproducción en algunos de nuestros nuevos registros para el país. Adicionalmente proporcionamos una fotografía de un individuo juvenil de *S. venustissimus* así como una fotografía adicional de un individuo juvenil de *Scaphiodontophis* sp. de nuevas localidades nicaragüenses.

Palabras clave: Centroamérica; distribución; extensión de rango; Jinotega; Nueva Segovia; reproducción; Reserva Natural Dipilto-Jalapa; Reserva Silvestre Privada Cerro Jesús; *Scaphiodontophis venustissimus*.

¹Museo Herpetológico de la UNAN-León (MHUL), Departamento de Biología, Facultad de Ciencias y Tecnología, Universidad Nacional Autónoma de Nicaragua-León (UNAN-León), León, Nicaragua.

²Grupo HerpetoNica (Herpetólogos de Nicaragua), Nicaragua.

³IUCN SSC Amphibian Specialist Group (ASG), Nicaragua.

⁴Red Mesoamericana y del Caribe para la conservación de Anfibios y Reptiles (Red MesoHerp).

⁵Universidad Nacional Autónoma de Nicaragua-Managua (UNAN-Managua), Managua, Nicaragua.

E-mails: mescrotalus@yahoo.es (corresponding author), juliocesar04388@hotmail.com, davilaprado@gmail.com, garuizp49@yahoo.com, and jsunyermaclennan@gmail.com

ABSTRACT

We report on the first records from Nicaragua of the Guatemala Neckband Snake, *Scaphiodontophis annulatus* (Duméril, Bibron and Duméril, 1854), based on three specimens and three additional photographed individuals from the department of Nueva Segovia, as well as an additional photographed individual from the department of Jinotega. The present records add a new snake species for the country and extends the species' geographical distribution up to ca. 240 km SW from its nearest known locality, in Honduras. We also provide brief information on coloration, ecology, and reproduction on some of our new country records. Furthermore, we provide a photograph of a juvenile individual of *S. venustissimus* as well as an additional photograph of a juvenile individual of a *Scaphiodontophis* sp. from new Nicaraguan localities.

Key words: Central America; distribution; Jinotega; Nueva Segovia; range extension; reproduction; Reserva Natural Dipilto-Jalapa; Reserva Silvestre Privada Cerro Jesús; *Scaphiodontophis venustissimus*.

INTRODUCTION

Coral-mimic snakes of the genus *Scaphiodontophis* Taylor and Smith, 1943 are relatively uncommon, moderate-size, terrestrial, and diurnal snakes, which are characterized by having very long (up to 50% of total length) and disproportionately thick tails that are extremely fragile (about 70% of adult individuals present broken or missing tails), probably as antipredatorial device (Slowinski and Savage, 1995; Savage and Slowinski, 1996; Savage, 2002). These snakes are specialized for feeding on hard-bodied prey (durophagy), such as skinks, which are rapidly ingested, and undergo remarkable ontogenetic changes in coloration (Savage and Slowinski, 1996; Savage, 2002).

This Central American genus is found in the lowlands and on premontane slopes from Tamaulipas and Oaxaca, Mexico, south to northern and central Colombia, exclusive of the subhumid to semiarid zones of Pacific versant Central America (Smith et al., 1986; Savage and Slowinski, 1996; Savage, 2002) and comprises two species (McCranie, 2006; Köhler, 2008): *Scaphiodontophis annulatus* (Duméril, Bibron and Duméril, 1854), distributed in northern Central America, and *S. venustissimus* (Günther, 1894), distributed in southern Central America. The two species are known to occur only in sympatry in eastern Honduras (McCranie, 2006; Köhler, 2008).

The two species are distinct from one other in color pattern and in number of ventral and subcaudal scales (Smith et al., 1986; Savage and Slowinski, 1996; Savage, 2002; McCranie, 2006). Although both species are extremely variable in coloration, *Scaphiodontophis annulatus* found on the Atlantic slope of Guatemala, Belize, and Honduras present a dorsal banded coral snake pattern of tricolor dyads restricted to the anterior part of the body, which is replaced by a brown to gray ground color that is usually marked with black-dotted longitudinal stripes on the posterior portion of body and tail, whereas those *S. venustissimus* from the Atlantic slope of Honduras, Nicaragua, Costa Rica, and northwestern Panama present a dorsal banded coral snake pattern of tricolor monads on the entire body and tail (Smith et al., 1986; Savage and Slowinski, 1996; Savage, 2002; McCranie, 2006).

The two species also differ in the number of ventral and subcaudal scales (Smith et al., 1986; Savage and Slowinski, 1996; Savage, 2002; Köhler, 2008): subcaudals 105-121 in males and 92-105 in females in *S. venustissimus* vs. 123-149 in males and 110-126 in females in *S. annulatus*; and combined ventrals plus subcaudals 234-262 in *S. venustissimus* vs. 255-294 in *S. annulatus*. In addition, *S. venustissimus* usually has a pattern consisting of black bands bordered by yellow bands, whereas *S. annulatus* usually has a pattern consisting of yellow bands bordered by black bands (Köhler, 2008).

The Guatemala Neckband Snake, *Scaphiodontophis annulatus*, is distributed in both dry and wet forests from Oaxaca and southern Tamaulipas, Mexico, to eastern Honduras, at elevations from sea level to 1,400 m (McCranie, 2006; Köhler, 2008; Wilson and Johnson, 2010). The species has been assessed as Least Concern (LC) for the IUCN Red List of Threatened Species in view of its wide distribution, presumed large population, and because it is unlikely to be declining fast enough to qualify for listing in a more threatened category (Mandujano and López-Luna, 2013).

All previous records of *Scaphiodontophis annulatus* from Nicaragua are now allocated to *S. venustissimus* (McCranie, 2006; Köhler, 2008; Sunyer and Köhler, 2010; Sunyer, 2014). Here, we report the first confirmed records from Nicaragua of *S. annulatus*, based on three specimens and three additional photographed individuals from five localities in the department of Nueva Segovia, as well as one additional photographed individual from the department of Jinotega, northern Nicaragua.

METHODS

All snake individuals were collected and/or photographed by means of the active searching method during opportunistic field surveys in Nicaragua. Collecting permits were provided by the Ministerio del Ambiente y los Recursos Naturales (MARENA), Managua, Nicaragua. Specimens were preserved in 70% ethanol and were deposited in the collection of the Museo Herpetológico de la UNAN-León (MHUL), Universidad Nacional Autónoma de Nicaragua-León, León, Nicaragua, under the catalogue numbers MHUL 184-86. In describing the characteristics of the snakes, our definitions of scale count and morphological features follows Köhler (2008) and the bilateral characters are reported as right/left. Color pattern formula follows Savage and Slowinski (1996). Locality records for other Nicaraguan *Scaphiodontophis* were obtained from Savage and Slowinski (1996), Köhler (2001), and HerpetoNica (2015). Institutional acronyms for museum collections follow those of Sabaj-Perez (2016).

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Fig. 1 (Page 6). A-F) Individuals of *Scaphiodontophis annulatus* from the department of Nueva Segovia, Nicaragua: A) an adult female from El Zapote (MHUL 184); B) an adult female from Finca Las Nubes (MHUL 185; inset same individual shortly after preservation); C) a young male from Reserva Silvestre Privada Cerro Jesús (MHUL 186); D) an individual from El Moradón; E) an individual from Finca El Jardín; and F) an individual from Reserva Silvestre Privada Cerro Jesús; and G) an individual of *S. annulatus* from La Pavona abajo, department of Jinotega. Photos: A, C) Milton Salazar-Saavedra; B) Julio Loza y Lenny Jiménez; D) Pedro Rojas; E) Hollman Medina; F) Nidia Damaris Molina; and G) Calef de Jesús Jirón Garmendia.



RESULTS

Seven (7) new records of *Scaphiodontophis annulatus* from Nicaragua:

Nicaragua: Nueva Segovia: San Fernando: Reserva Natural Dipilto-Jalapa, El Zapote (13.13.73083°N, 86.36417°W, datum WGS 84; 1,279 m above sea level), 20 June 2018, Milton Salazar-Saavedra and Ramiro Espinales collectors, 1 adult gravid female (MHUL 184; Fig. 1A). Total length 680 mm; SVL 388 mm; ventrals 149; subcaudals 117. Color pattern basic formula: A/DS/S/sp. The snake was found active at 10:40 h at ground level in a pasture with dispersed trees.

Nicaragua: Nueva Segovia: Ocotal: Reserva Natural Dipilto-Jalapa, comunidad Dipilto Viejo, Finca Las Nubes (13.75797°N, 86.50250°W, datum WGS 84; 1,425 m above sea level), 28 May 2018, Lenny Jiménez collector, 1 adult female (MHUL 185; Fig. 1B Total length 680 mm; SVL 380 mm; ventrals 153; subcaudals 117. Color pattern basic formula: A/DS/S/sp. The snake was found active during daytime at ground level in a coffee plantation with dispersed trees.

Nicaragua: Nueva Segovia: Jalapa: Reserva Natural Dipilto-Jalapa, Reserva Silvestre Privada Cerro Jesús (13.97206°N, 86.17428°W, datum WGS 84; 1,123 m above sea level), 28 December 2017, Gabriel Antonio Gonzales Molina and Milton Salazar-Saavedra collectors, 1 young male (MHUL 186; Fig. 1C). Total length 346 mm; SVL 194 mm; ventrals 135; subcaudals 147. Color pattern basic formula: A/DS/S/sp. The snake was found active at ground level in a coffee plantation.

Nicaragua: Nueva Segovia: Wiwilí: Comarca El Moradón (13.74278°N, 85.82846°W, datum WGS 84; 325 m above sea level), 20 March 2018, Pedro Rojas photographer, 1 individual (Fig. 1D). The snake was found active during daytime at ground level near a stream.

Nicaragua: Nueva Segovia: Las Manos: Reserva Natural Dipilto-Jalapa, buffer area of the Reserva Natural Dipilto-Jalapa, near the Nicaraguan political border with Honduras, Finca El Jardín (13.78942°N, 86.55671°W, datum WGS 84; 1,270 m above sea level), 27 July 2017, Hollman Medina photographer, 1 individual (Fig. 1E). The snake was found active during daytime (0845 h) at ground level in a shade coffee plantation with dispersed trees.

Nicaragua: Nueva Segovia: Jalapa: Reserva Natural Dipilto-Jalapa, Reserva Silvestre Privada Cerro Jesús (13.97290°N, 86.17329°W, datum WGS 84; 1,195 m above sea level), 23 February 2016, Nidia Damaris Molina and Milton Salazar-Saavedra photographers, 1 individual (Fig. 1F). The snake was found active during daytime at ground level in a coffee plantation.

Nicaragua: Jinotega: El Cuá: La Pavona abajo, Castillo Norte, 850 m above sea level, 19 May 2018, Calef de Jesús Jirón Garmendia and Lenin Antonio Flores Garmendia photographers, 1 individual (Fig. 1G). The snake was found active during daytime at ground level in a coffee plantation.

The locality of El Moradón is included within Lowland Moist Forest, the locality of La Pavona Abajo is included within Premontane Moist Forest, and all other mentioned localities from the department of Nueva Segovia are included within Lower Montane Moist Forest (Holdridge 1967; Savage 2002; Fig. 2).



Fig. 2. Overview of Reserva Silvestre Privada Cerro Jesús (Left) and El Zapote (Right), both suitable habitats in Lower Montane Moist Forest formations for *Scaphiodontophis annulatus*, Reserva Natural Cordillera Dipilto-Jalapa, Departamento de Nueva Segovia, Nicaragua. Photos/ Milton Salazar-Saavedra.

One (1) new record of *Scaphiodontophis venustissimus* from Nicaragua:

Nicaragua: Atlántico Sur: Bluefields: Reserva Natural Punta Gorda, Río Pijibaye (11.43994° N, 83.88701° W, datum WGS 84; 30 m above sea level), 3 December 2013, Milton Salazar-Saavedra and Daniel Urbina photographers, 1 juvenile individual (Fig. 3A). Total length 243 mm; SVL 19.5 mm; ventrals 152; incomplete tail. The snake was found active at dawn (18:20 h) at ground level in a crop clearing within a secondary forest patch.

One (1) new record of *Scaphiodontophis* sp. from Nicaragua:

Nicaragua: Jinotega: El Cuá: Reserva Natural Macizos de Peñas Blancas, Centro de Entendimiento de la Naturaleza (13.27131° N, 85.71997° W, datum WGS 84; 570 m above sea level), Scarleth Vanegas photographer, 1 juvenile individual (Fig. 3B). The snake was found active during daytime at ground level. The snake was not collected and no ventral scale counts were taken, which, combined with the juvenile coloration of the individual, which is similar in both species of the genus, does not allow us to reach a species-level identification.



Fig. 3. A) A juvenile *Scaphiodontophis venustissimus* from Río Pijibaye, Reserva Natural Punta Gorda, Departamento de Atlántico Sur, Nicaragua; and B) A juvenile *Scaphiodontophis* sp. from the Reserva Natural Macizos de Peñas Blancas, Departamento de Jinotega, Nicaragua. **Photos/ A) Milton Salazar-Saavedra and B) Scarleth Vanegas**

DISCUSSION

MHUL 184-186 and Fig. 1 document the first records of *Scaphiodontophis annulatus* from Nicaragua and the southernmost records for the species, with a range extension of up to ca. 240 km SW from its closest reported locality, in southeastern Honduras (McCranie, 2006).

Ruiz and Buitrago (2003), Sunyer et al. (2014), and HerpetoNica (2015) predicted the occurrence of *Scaphiodontophis annulatus* in northern Nicaragua. Köhler (2008) also included a small portion of extreme northern Nicaragua in his distribution map for the species. Similar habitats to those where we found our new country records are found farther south in Nicaragua, and we therefore find likely that the species might be found in sympatry with *S. venustissimus* along the northern mountains and Atlantic lowlands of Nicaragua.

The genus *Scaphiodontophis* is poorly recorded in Nicaragua and is only known from 15 localities in the country, which include seven historical localities and eight new localities herein provided (Table 1; Fig. 4). Savage and Slowinski (1996) included in their species distribution map a locality of *S. venustissimus* somewhere between the departments of Atlántico Norte and Atlántico Sur (question mark in Fig. 3). It is conceivable that this locality corresponds to Cupitna Camp (see locality 9 in Fig. 3), located nearby Pearl Lagoon by Köhler (2001), although erroneously included within the department of Atlántico Norte (corresponds to Atlántico Sur).

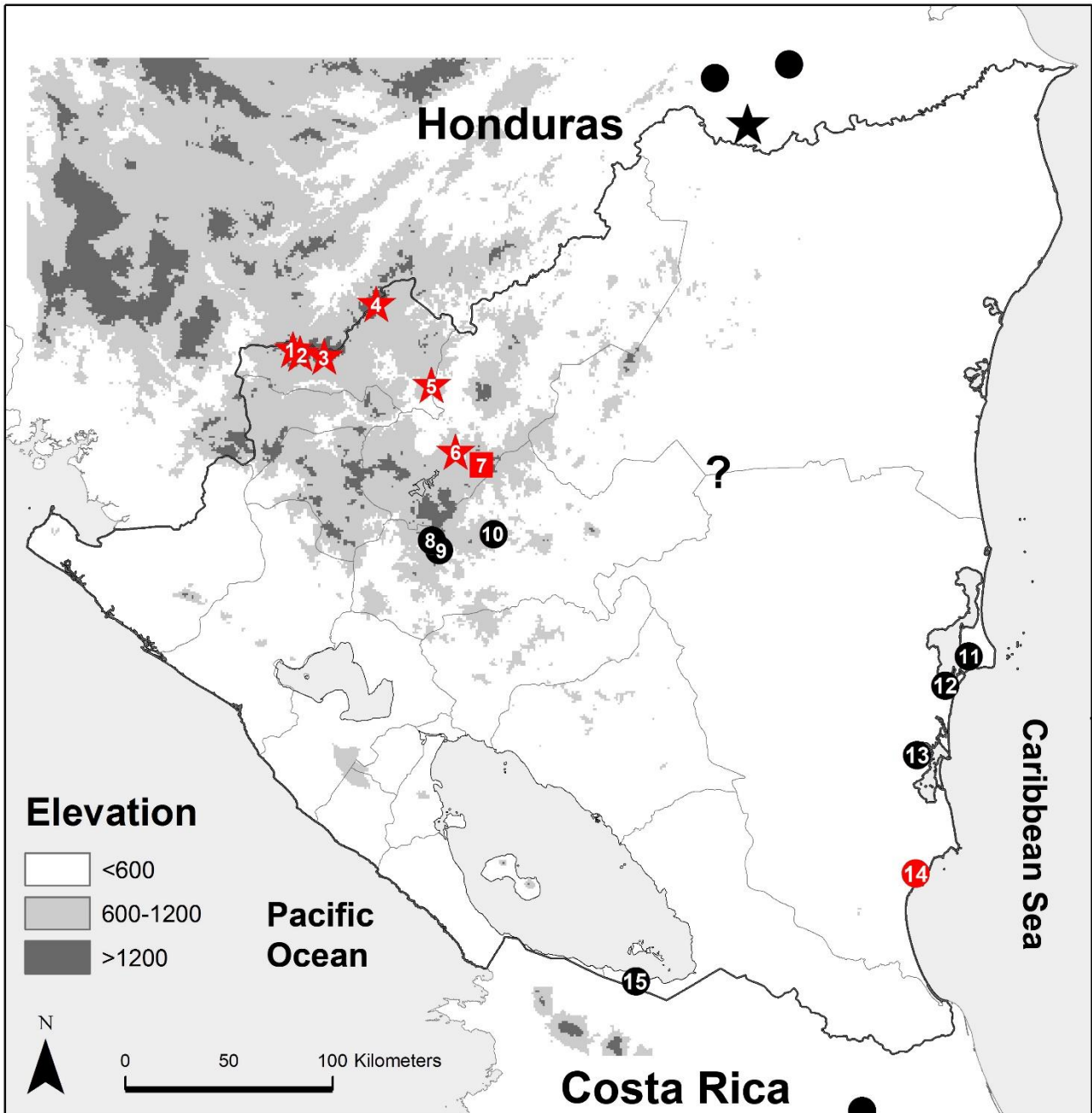


Fig. 4. Map of Nicaragua showing records of the snakes of the genus *Scaphiodontophis*: *S. annulatus* (stars), *S. venustissimus* (circles), and *Scaphiodontophis* sp. (square). Historical records (Savage and Slowinski, 1996; Köhler, 2001; and HerpetoNica, 2015) are shown in black and new records provided herein in red. Localities: 1 - Finca El Jardín; 2 - Finca Las Nubes; 3 - El Zapote; 4 - Reserva Silvestre Privada Cerro Jesús; 5 - El Moradón; 6 - La Pavona abajo; 7 - Reserva Natural Macizos de Peñas Blancas; 8 - La Cumplida; 9 - Montañas de San Ramón; 10 - Hacienda Rosa de Jericó (type locality of *S. venustissimus*); 11 - Cupitna Camp; 12 - Pearl Lagoon; 13 - Bluefields; 14 - Reserva Natural Punta Gorda; and 15 - Reserva de Vida Silvestre Los Guatuzos. See Table 1 for locality details. Nearby Costa Rican records are taken from Savage (2002) and those from Honduras from McCranie (2006). See text for question mark.

Table 1. Records of the genus *Scaphiodontophis* in Nicaragua.

Species	Department	Locality	Voucher	Reference	Locality in Fig. 4
<i>Scaphiodontophis annulatus</i>	Nueva Segovia	Finca El Jardín	Fig. 1E	Current contribution	1
<i>Scaphiodontophis annulatus</i>	Nueva Segovia	Finca Las Nubes	MHUL 185; Fig.1B	Current contribution	2
<i>Scaphiodontophis annulatus</i>	Nueva Segovia	El Zapote	MHUL 184; Fig.1A	Current contribution	3
<i>Scaphiodontophis annulatus</i>	Nueva Segovia	Reserva Silvestre Privada Cerro Jesús	MHUL 186; Figs.1C, 1F	Current contribution	4
<i>Scaphiodontophis annulatus</i>	Nueva Segovia	El Moradón	Fig. 1D	Current contribution	5
<i>Scaphiodontophis annulatus</i>	Jinotega	La Pavona abajo	Fig. 2G	Current contribution	6
<i>Scaphiodontophis</i> sp.	Jinotega	Reserva Natural Macizos de Peñas Blancas	Fig. 3B	Current contribution	7
<i>Scaphiodontophis venustissimus</i>	Matagalpa	La Cumplida	UMMZ 116541-42	Savage and Slowinski (1996); Köhler (2001)	8
<i>Scaphiodontophis venustissimus</i>	Matagalpa	Montañas de San Ramón	Citation	HerpetoNica (2015)	9
<i>Scaphiodontophis venustissimus</i>	Matagalpa	Hacienda Rosa de Jericó (type locality)	BMNH 1946.1.1.35-36	Günther (1894); Savage and Slowinski (1996); Köhler (2001)	10
<i>Scaphiodontophis venustissimus</i>	Atlántico Sur	Cupitna Camp	AMNH 12438	Savage and Slowinski (1996); Köhler (2001)	11
<i>Scaphiodontophis venustissimus</i>	Atlántico Sur	Pearl Lagoon	ZFMK 1373	Savage and Slowinski (1996); Köhler (2001)	12
<i>Scaphiodontophis venustissimus</i>	Atlántico Sur	Bluefields	USNM 37346	Savage and Slowinski (1996); Köhler (2001)	13
<i>Scaphiodontophis venustissimus</i>	Atlántico Sur	Reserva Natural Punta Gorda	Fig. 3A	Current contribution	14
<i>Scaphiodontophis venustissimus</i>	Río San Juan	Reserva de Vida Silvestre Los Guatuzos	Photograph	HerpetoNica (2015)	15

Scaphiodontophis annulatus is an oviparous snake species that lays clutches of 1-12 (usually 2-4) eggs usually within the decomposing leaf-litter, under rotten logs or in soil depressions (Savage, 2002; Köhler, 2008). MHUL 184 was encountered gravid and was transported to the city of Chinandega where it was kept alive in captivity. During the early morning of 26 June 2018 (six days after encountering the snake), it laid a clutch of 3 eggs (Fig. 5) that measured 24, 26, and 29 mm long, respectively, considerably smaller than the ranges provided in the literature, which are about 33-35 mm long (Campbell, 1998; Savage, 2002; Solórzano, 2004).

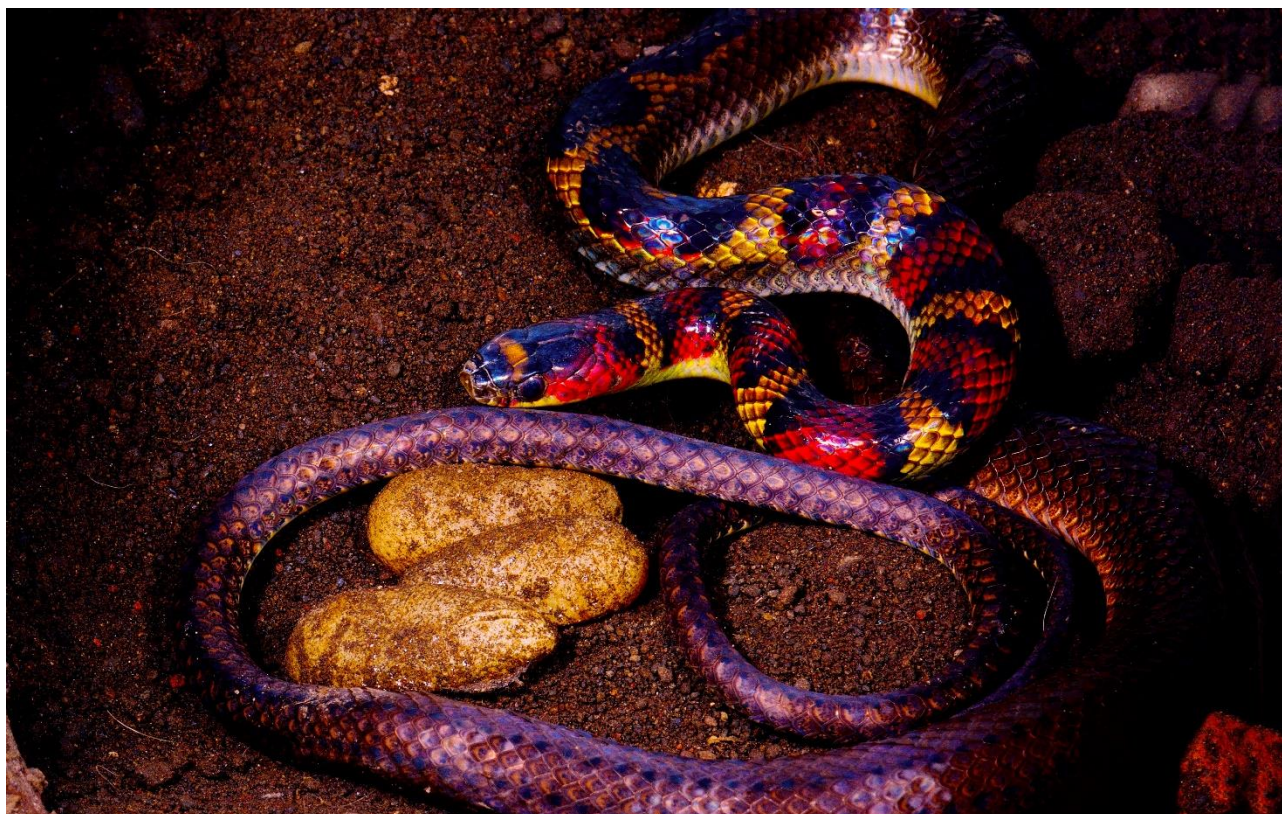


Fig. 5. An adult female *Scaphiodontophis annulatus* (MHUL 184) with a clutch of three eggs from El Zapote, Departamento de Nueva Segovia, Nicaragua. **Photo/ Milton Salazar-Saavedra.**

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Dr. Jean Michel Maes (Editor General, RNB)
Museo Entomológico, Asociación Nicaragüense de Entomología
Apartado Postal 527, 21000 León, NICARAGUA
Teléfono (505) 2311-6586
jmmaes@bio-nica.info
jmmaes@yahoo.com

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