

REVISTA NICARAGUENSE DE BIODIVERSIDAD

N° 45.

Abril 2019

First country records of the invasive Brahminy Blindsnake
Indotyphlops braminus (Daudin, 1803) (Squamata,
Typhlopidae) from Nicaragua

Layo Leets-Rodríguez, Henry Julián López-Guevara, and
Javier Sunyer



PUBLICACIÓN DEL MUSEO ENTOMOLÓGICO
ASOCIACIÓN NICARAGÜENSE DE ENTOMOLOGÍA
LEON - - - NICARAGUA

La Revista Nicaragüense de Biodiversidad (ISSN 2413-337X) es una publicación que pretende apoyar a la divulgación de los trabajos realizados en Nicaragua en este tema. Todos los artículos que en ella se publican son sometidos a un sistema de doble arbitraje por especialistas en el tema.

The Revista Nicaragüense de Biodiversidad (ISSN 2413-337X) is a journal created to help a better divulgation of the research in this field in Nicaragua. Two independent specialists referee all published papers.

Consejo Editorial

Jean Michel Maes
Editor General
Museo Entomológico
Nicaragua

Milton Salazar
Herpetonica, Nicaragua
Editor para Herpetología.

Eric P. van den Berghe
ZAMORANO, Honduras
Editor para Peces.

Liliana Chavarría
ALAS, El Jaguar
Editor para Aves.

Arnulfo Medina
Nicaragua
Editor para Mamíferos.

Oliver Komar
ZAMORANO, Honduras
Editor para Ecología.

**Estela Yamileth Aguilar
Álvarez**
ZAMORANO, Honduras
Editor para Biotecnología.

Indiana Coronado
Missouri Botanical Garden/
Herbario HULE-UNAN León
Editor para Botánica.

Foto de Portada: *Indotyphlops braminus* (photograph by Yuri Aguirre).

First country records of the invasive Brahminy Blindsnake *Indotyphlops braminus* (Daudin, 1803) (Squamata, Typhlopidae) from Nicaragua

Layo Leets-Rodríguez¹, Henry Julián López-Guevara¹, and
Javier Sunyer^{2, 3}

RESUMEN

Informamos sobre los primeros registros para Nicaragua de la invasora culebrilla de las macetas, *Indotyphlops braminus* (Daudin, 1803), basados en cinco especímenes colectados en un período inferior a dos meses en la misma localidad del Departamento de Managua. Los presentes registros corresponden a la primera especie de serpiente y sexta especie de herpetofauna de origen exótico registrada en Nicaragua.

Palabras clave: Bosque bajo seco; Centroamérica; culebrilla de las macetas; exótica; invasor; Managua; serpiente.

ABSTRACT

We report on the first records from Nicaragua of the invasive Brahminy Blindsnake, *Indotyphlops braminus* (Daudin, 1803), based on five juvenile specimens collected in under a two-month period at the same locality in the department of Managua. The present records correspond to the first snake species and sixth herpetofaunal species of exotic origin recorded in Nicaragua.

Key words: Central America; exotic species; Flowerpot Snake; Lowland Dry Forest; Managua.

¹Herbario del Departamento de Biología de la Universidad Nacional Autónoma de Nicaragua-Managua (UNAN-Managua), Managua, Nicaragua.

²Museo Herpetológico de la UNAN-León (MHUL), Departamento de Biología, Facultad de Ciencias y Tecnología, Universidad Nacional Autónoma de Nicaragua-León (UNAN-León), León, Nicaragua.

³Grupo HerpetoNica (Herpetólogos de Nicaragua), Nicaragua.

E-mails: layo.leets@unan.edu.ni, henry.lopez@unan.edu.ni, and jsunyermaclennan@gmail.com

INTRODUCTION

The Brahminy Blindsnake, *Indotyphlops braminus* (Daudin, 1803), formerly referred to as *Ramphotyphlops braminus*, is a minute, fossorial, and parthenogenetic snake species of the family Typhlopidae that is often mistaken for an earthworm (Wallach, 2009; Hedges, 2014). Its small size (one of the smallest and lightest known snake species in the world with a maximum SVL of 203 mm, and a maximum midbody diameter of 4.2 mm), subterranean habits, and unisexual parthenogenetic reproduction, makes this snake a very successful colonizer, which is considered as the most widely distributed snake on Earth (Wallach, 2009; Mateo, 2013; Hedges, 2014; Rato et al., 2015; Zamora-Camacho, 2017).

Native from southeastern India, *Indotyphlops braminus* currently has a cosmopolitan distribution that includes over 84 tropical and subtropical countries throughout the world where it has dispersed mostly through the plant nursery trade and hence the species is also commonly known as the Flowerpot Snake (Wallach, 2009; Mateo, 2013; Hedges, 2014; GISD, 2015; Rato et al., 2015; Zamora-Camacho, 2017). In Mesoamerica, this invasive snake species has been introduced to Mexico, Guatemala, El Salvador, Belize, and Honduras, primarily around urbanized areas, up to 2,150 m elevation (Köhler, 2008; Wallach, 2009; Mateo, 2013). There also have been other reported sightings without verification or voucher specimens of this species from Costa Rica (Wallach, 2008), where the species has not been listed as a member of the country's herpetofauna in its most-updated country checklist (Savage and Bolaños, 2009). Here we report on the first records of the exotic Brahminy Blindsnake, *I. braminus*, from Nicaragua.

METHODS

The snakes were collected and photographed during opportunistic finds in under a two-month period (from 11 June to 2nd August 2017) on the property of the house of the senior author, at El Crucero, Municipio de Managua, Nicaragua. The specimens' identification was verified with the use of the dichotomous keys and descriptions provided by Köhler (2008) and we follow Wallach (2009) for terminology and scale counts. We collected five juvenile specimens, which will be stored at the Museo Herpetológico de la UNAN-León under the voucher numbers MHUL 187-91, Universidad Nacional Autónoma de Nicaragua-León (UNAN-León), León, Nicaragua. At least one of these five MHUL specimens is planned to be stored at a yet undetermined foreign herpetological collection. The collection permit DGPN/DB-IC-025-2017 was provided by the personnel of MARENA (Ministerio de Ambiente y Recursos Naturales), Managua, Nicaragua. Geocoordinates are based on datum WGS84.

RESULTS

Five (5) new records of *Indotyphlops braminus*: Nicaragua: Managua: Municipio de Managua, El Crucero, Reparto Santa Ana (12.05886°N, 86.31615°W; 470 m above sea level, datum WGS84). On 11 June 2017, LLR and HJLG collected one juvenile specimen (MHUL 187; Figs 1 and 2A), while active at 1600 h at ground level on the backyard of a house. On 27 June 2017, LLR collected one juvenile individual (MHUL 188; Fig. 2B) at 1800 h, which was trapped alive at ground level in a compact spider web inside the kitchen of the same house. On 1 July 2017, LLR and HJLG collected one juvenile individual (MHUL 189; Fig. 2C) at 1800 h, while active at ground level in the same backyard. On 27 July 2017, LLR collected one juvenile individual (MHUL 190) at 0600 h, while active at ground level in the same backyard. On 2 August 2017, LLR collected one juvenile individual (MHUL 191) at 1800 h, while active at ground level in the same backyard.



Figure 1. Photograph of a preserved juvenile individual of *Indotyphlops braminus* (MHUL 187) from Reparto Santa Ana, El Crucero, Departamento de Managua, Nicaragua. Original picture by Yuri Aguirre

We saw five juvenile individuals of *Indotyphlops braminus* in under a two-month period at the same locality, which corresponds to the house of the senior author. All five records were separated by ca. 2 linear meters, four in the house's backyard and one on the kitchen floor. The general area contains abundant vegetation and is situated in an urban area in Lowland Dry Forest (Fig. 3; Holdridge 1967; Savage 2002).

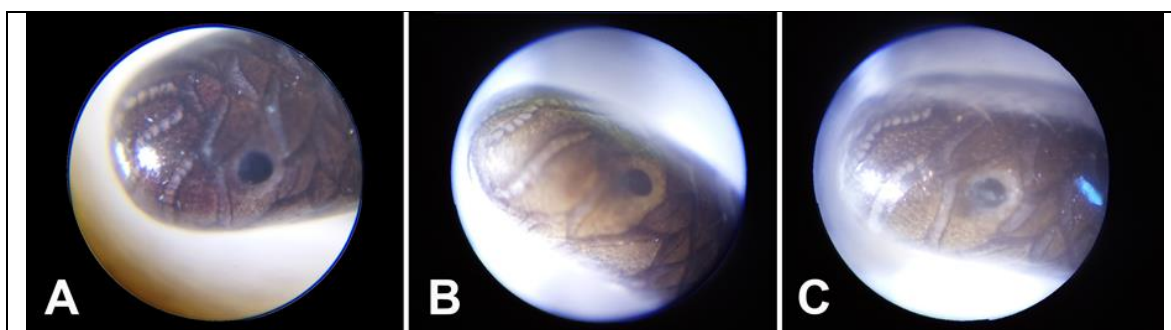


Figure 2. Head closeup of three preserved juvenile specimens of *Indotyphlops braminus* from Reparto Santa Ana, El Crucero, Departamento de Managua, Nicaragua: A) MHUL 187; B) MHUL 188; and C) MHUL 189. Photos LLR

Identification. All five individuals are characterized by the following: homogenous diameter throughout its cylindrical body with smooth and equal-sized scales both dorsally and ventrally; snout rounded in dorsal and lateral views; eye small and vestigial; edges of anterior head shields with distinct rows of whitish glands; and a very short tail slightly longer than broad that ends in an apical spine. Specific body measurements and scale counts for the five specimens are detailed in Table 1.

Table 1. Selected body measurements and scale counts for five Nicaraguan juvenile specimens of *Indotyphlops braminus* collected at Reparto Santa Ana, El Crucero, Departamento de Managua.

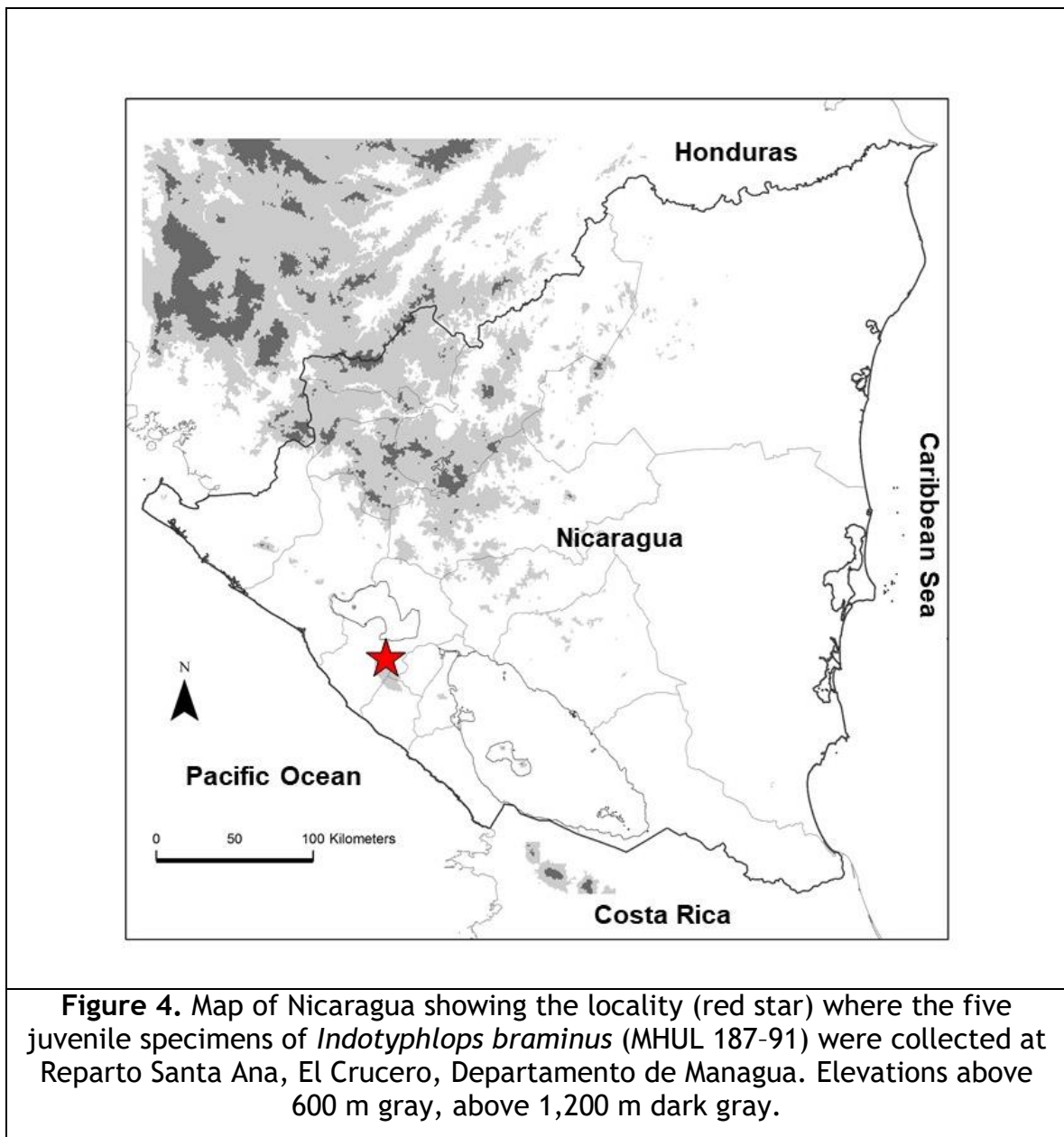
Voucher	Total length (mm)	Body width (mm)	Scale rows at midbody	Caudal scales	Middorsal scales between the rostral scale and the terminal spine
MHUL 187	64	1.8	20	12	320
MHUL 188	63	1.8	20	12	315
MHUL 189	65	2	20	12	325
MHUL 190	65	2	20	12	326
MHUL 191	68	2	20	12	330



Figure 3. General habitat where four of the five juvenile specimens of *Indotyphlops braminus* (MHUL 187, 189-91) were collected at Reparto Santa Ana, El Crucero, Departamento de Managua, Nicaragua. Photo LLR

DISCUSSION

MHUL 187-91 represents the first records of *Indotyphlops braminus* from Nicaragua (Fig. 4), which corresponds to the sixth herpetofaunal species of exotic origin recorded for the country, in addition to *Eleutherodactylus planirostris*, *Hemidactylus frenatus*, *Lepidodactylus lugubris*, *Sphaerodactylus argus*, and *Chelonoidis carbonarius* (Sunyer, 2014; Salazar-Saavedra et al, 2015; Villa, 2015).



The general area where our five individuals of *Indotyphlops braminus* were collected is relatively close to the capital of the country, Managua city, and corresponds to a garden of a house within an urban habitat, an ideal habitat where the species is known to proliferate (Wallach, 2009). Given the relatively low altitude of Nicaragua (under 2,107 above sea level), this species potentially could be found anywhere in the country, particularly around urbanized areas. Further sampling likely will uncover further populations of this invasive species in Nicaragua.

Plant nurseries are considered the main (if not the only) propagule reservoir and potential vector for introductions of *Indotyphlops braminus*, which is considered a very successful colonist species (Mateo, 2013; GISD, 2015; Rato et al., 2015; Zamora-Camacho, 2017). Among the plant species of exotic origin present in the garden and its surroundings where all five Nicaraguan juvenile specimens of *I. braminus* were collected, we found the following (in parenthesis the plant's Nicaraguan common name; region of origin): *Aglaonema costatum* (Diefembaquia enana; SE Asia); *Alocasia macrorrhiza* (Ocumo bravo; India and Malaysia); *Catharanthus roseus* (Buenas tardes; Madagascar); *Crimun amabile* (Lirio; Sumatra); *Ficus pumila* (Hiedra; China); *Hemigraphis colorata* (Hoja de lata; Java); *Scindapsus aureus* (Malanga dorada; Malaysia); and *Stapelia gigantea* (Flor de lagarto; South Africa).

The measurements and scale counts of all five Nicaraguan juvenile specimens (MHUL 187-91) are within the ranges provided by Ota et al. (1991) and Wallach (2009). Ota et al. (1991) found juveniles of *Indotyphlops braminus* to range in length from 61-119 mm, whereas sexually mature adults had minimum lengths of 95 mm. Our five individuals measured 63, 64, 65, 65, and 68 mm, respectively. The local dispersal capacity of this species is very limited, probably because of its reduced mobility and underground customs, which require loose soils for gallery burrowing (Zamora-Camacho, 2017). Given the similar small size and limited area (all five records are separated by ca. 2 linear meters) where they were all seen in under a two-month period, we find highly probable that our five individuals correspond to almost newly hatched members of a clone, and that other potential newborn individuals (clutch size in the species varies from 1-8; Ota et al., 1991) as well as their breeding unisexual female progenitor potentially can still be in the area and might be able to establish an introduced population in the surrounding gardens of this urban area, if they are not already established.

Blindsnakes (Scolocophidia) are known to be preyed upon by various vertebrates, including carnivorous mammals, birds, snakes, and toads, as well as by various invertebrates such as hammerhead worms, scorpions, and spiders (Mizuno and

Kojima, 2017). Two of the five individuals we found were associated with spiderwebs: MHUL 187 had pieces of spider web along its body and MHUL 188 was trapped alive at ground level in a compact spiderweb, where a small spider was found nearby. Given the extremely small size and weight of *Indotyphlops braminus* that rarely grows over 181 mm (Ota et al., 1991; Wallach, 2009), abundant potential predators of this invasive snake species could be found in the area.

ACKNOWLEDGMENT

We thank Yuri Aguirre for the loan of a photograph and the personnel of the MARENA (Ministerio de Ambiente y Recursos Naturales), Managua, Nicaragua, for providing collecting permits. Larry David Wilson reviewed the final manuscript.

LITERATURE CITED

- Global Invasive Species Database (GISD).** 2015. Species profile *Ramphotyphlops braminus*. Available from: <http://www.iucngisd.org/gisd/species.php?sc=1789> [Accessed 16 November 2018].
- Hedges, S. B., A. B. Marion, K. M. Lipp, J. Marin, and N. Vidal.** 2014. A taxonomic framework for typhlopoid snakes from the Caribbean and other regions (Reptilia, Squamata). *Caribbean Herpetology* 49: 1-61.
- Holdridge, L. R.** 1967. *Life Zone Ecology*. Revised ed. Tropical Science Center, San José, Costa Rica.
- Köhler, G.** 2008. *Reptiles of Central America*. 2nd ed. Herpeton, Offenbach, Germany.
- Mateo, J. A.** 2013. Culebrilla de las macetas - *Ramphotyphlops braminus*. In: *Enciclopedia Virtual de los Vertebrados Españoles*. Salvador, A. and A. Marco. (Eds.). Museo Nacional de Ciencias Naturales, Madrid, Spain.
- Mizuno, T. and Y. Kojima.** 2017. *Indotyphlops braminus* (Brahminy Blindsnake). Predation. *Herpetological Review* 48(2): 451.
- Ota, H., T. Hikida, M. Matsui, A. Mori, and A. H. Wynn.** 1991. Morphological variation, karyotype and reproduction of the parthenogenetic blind snake, *Ramphotyphlops braminus*, from the insular region of East Asia and Spain. *Amphibia-Reptilia* 12(2): 181-193.
- Rato, C., I. Silva-Rocha, E. Gonzalez-Miras, F. Rodriguez-Luque, B. Farina, and M. A. Carretero.** 2015. A molecular assessment of European populations of *Indotyphlops braminus* (Daudin, 1803). *Herpetozoa* 27(3/4): 179-182.

- Salazar-Saavedra, M., J. César Loza, M. Fernández, J. G. Martínez-Fonseca, Q. Dwyer, and J. Sunyer.** 2015. *Chelonoidis carbonarius* (Spix, 1824): a member of the Nicaraguan herpetofauna. *Miscellaneous Notes. Mesoamerican Herpetology* 2: 571-573.
- Savage, J. M.** 2002. *The Amphibians and Reptiles of Costa Rica: A Herpetofauna between Two Continents, between Two Seas.* The University of Chicago Press, Chicago, Illinois, United States.
- Savage, J. M. and F. Bolaños.** 2009. A checklist of the Amphibians and Reptiles of Costa Rica: Additions and nomenclatural revisions. *Zootaxa* 2005: 1-23
- Sunyer, J.** 2014. An updated checklist of the amphibians and reptiles of Nicaragua. *Mesoamerican Herpetology* 1: 186-202.
- Villa, J.** 2015. Las Ranitas de Cayos Miskitos. *Revista de Temas Nicaragüenses* 89: 6-22.
- Wallach, V.** 2008. Range Extensions and New Island Records for *Ramphotyphlops braminus* (Serpentes: Typhlopidae). *Bulletin of the Chicago Herpetological Society* 43(5): 80-82.
- Wallach, V.** 2009. *Ramphotyphlops braminus* (Daudin): a synopsis of morphology, taxonomy, nomenclature and distribution (Serpentes: Typhlopidae). *Hamadryad* 34: 34-61.
- Zamora-Camacho, F. J.** 2017. On the role of plant nurseries introducing *Indotyphlops braminus* (Daudin, 1803), in Spain. *Herpetozoa* 30(1/2): 69-72.

La Revista Nicaragüense de Biodiversidad (ISSN 2413-337X) es una publicación de la Asociación Nicaragüense de Entomología, aperiódica, con numeración consecutiva. Publica trabajos de investigación originales e inéditos, síntesis o ensayos, notas científicas y revisiones de libros que traten sobre cualquier aspecto de la Biodiversidad de Nicaragua, aunque también se aceptan trabajos de otras partes del mundo. No tiene límites de extensión de páginas y puede incluir cuantas ilustraciones sean necesarias para el entendimiento más fácil del trabajo.

The Revista Nicaragüense de Biodiversidad (ISSN 2413-337X) is a journal of the Nicaraguan Entomology Society (Entomology Museum), published in consecutive numeration, but not periodical. RNB publishes original research, monographs, and taxonomic revisions, of any length. RNB publishes original scientific research, review articles, brief communications, and book reviews on all matters of Biodiversity in Nicaragua, but research from other countries are also considered. Color illustrations are welcome as a better way to understand the publication.

Todo manuscrito para RNE debe enviarse en versión electrónica a:
(Manuscripts must be submitted in electronic version to RNB editor):

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

Costos de publicación y sobretiros.

La publicación de un artículo es completamente gratis.

Los autores recibirán una versión PDF de su publicación para distribución.