



## *Bothrops taeniatus* Wagler, 1824 (Serpentes, Viperidae): additional country record and list of voucher specimens for Bolivia

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### Abstract

We present a new country record and range extension for the snake species *Bothrops taeniatus* Wagler, 1824 (Serpentes, Viperidae). The specimen represents the northeastmost record in Bolivia and fills the distributional gap between the known Brazilian and Bolivian populations. There is a paucity of published information on locality data and information on this species and this account contributes to the knowledge of its distributional status.

### Keywords

*Bothrops*, Neotropics, Pando, primary rainforest, reptile, squamata, snake, venomous.

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## Introduction

*Bothrops taeniatus* Wagler, 1824 is a strikingly cryptic, medium sized (up to 1.75 meters) Amazonian pit viper (Cunha and Nascimento 1978, 1993; Dixon and Soini 1986; Campbell and Lamar 2004). The species seems to be widely distributed; however, it is reported to be infrequently encountered (possibly due to its extreme cryptic coloration) and is uncommon in museum collections (Cunha and Nascimento 1978, 1993; Dixon and Soini 1986; Campbell and Lamar 2004; Nogueira et al. 2019). While the distribution includes most countries in the amazon region, it seems to be somewhat uncommon from the middle amazon basin (see distribution maps in Campbell and Lamar 2004 and Souza et al. 2013). However,

surveys by Mendes-Pinto and Souza (2011) and Waldez et al. (2013) both report the species in the central amazon basin. Additional factors that may contribute to the species perceived low frequency include lack of sufficient sampling and publication of collection data.

*Bothrops taeniatus* is considered a nocturnal, semi-arboreal species associated with lowland primary forests (Cunha and Nascimento 1978, 1993; Dixon and Soini 1986; Campbell and Lamar 2004). Additional reports indicate that inactive individuals have also been found near the ground in vegetation and on the forest floor during the day (Dixon and Soini 1986; Campbell and Lamar 2004; Souza et al. 2013). Although limited information

exists, examined stomach contents indicate *B. taeniatus* feeds on lizards, small mammals, and also centipedes (Cunha and Nascimento 1978, 1993; Dixon and Soini 1986).

First described by Wagler (1824), *Bothrops taeniatus* has been reported to occur in Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, and Venezuela (Campbell and Lamar 2004 and ref. within; Nogueira et al. 2019). In Brazil *B. taeniatus* has been reported in the states of Acre, Amazonas, Maranhão, Mato Grosso, Pará, Roraima, Rondônia and Tocantins (Cunha and Nascimento 1975; Souza et al. 2013; Nogueira et al. 2019).

While the distributional range of *B. taeniatus* includes Bolivia, very few specimens have been collected from the country and deposited into museums as voucher specimens. Furthermore, there is limited geographical data from Bolivia that has been published on this species. Herein, we describe a specimen of *B. taeniatus* collected from the department of Pando, Bolivia, that represent a range extension and additional country record for this rare species. In addition, we present a list of previously collected voucher specimens from Bolivia. We were able to locate three additional specimens that have been collected in Bolivia and deposited in museum collections.

## Methods

Scale counts and scutellation follow Dowling (1951) and Peters (1964). Paired subcaudals were counted on one side only as were head scale counts for paired scales. Counts of dorsal scale formula were taken at three standardized locations and separated by a slash (/): head length behind occiput, mid body, and head length anterior to cloaca. An en dash (–) indicates the range in variability. Measurements were taken using a flexible ruler to the nearest millimeter. Sex was determined by the probe method following McDiarmid et al. (2012). Specimen identification was determined by comparing and analyzing meristic data, morphometrics, coloration, figures, drawings, and photographs from description and taxonomic information by Cunha and Nascimento (1975, 1978, 1993), Dixon and Soini (1986), Pérez-Santos and Moreno (1988), Campbell and Lamar (2004), and Harvey et al. (2005). The datum used for geographic coordinates is WGS84.

A comprehensive search for voucher specimen information consisted of reviewing published scientific papers, journals, books, and government reports. The following online databases were also searched: VertNet (<http://www.vertnet.org/>), ARCTOS (<https://www.arctosdb.org/>), GBIF (<https://www.gbif.org/>), and speciesLink (<http://www.splink.cria.org.br/>). In addition, international and Bolivian museums were contacted for voucher specimen information.

The specimen from Pando is deposited in the herpetology collection of Centro de Investigación de Recursos

Acuáticos (CIRA) in Trinidad, Beni, Bolivia (see Eversole et al. 2019 for additional information). Specimen collection was approved by the Texas A&M University-Kingsville (TAMUK; #2018-05-22) and Texas A&M International University (TAMIU; #2018-3) Animal Care and Use Committees, and permitted by the Dirección General de Biodiversidad y Áreas Protegidas de Bolivia.

## Results

### *Bothrops taeniatus* Wagler, 1824

Figures 1, 2

**New record.** BOLIVIA • 1 ♂, snout to vent length, 72.4 cm; tail length, 12.3 cm; live weight, 79.0 g.; Departamento Pando, Provincia Nicolás Suárez; 11.0631°S, 068.0413°W; 14 June 2019, at approximately 20:48 h; RL Powell, CB Eversole, D Lizarro, EA Surovic, G Calderón Vaca leg.; specimen found approx. 20 cm from the ground in a small bush on the edge of a trail in primary rainforest during a herpetofaunal survey; CIRA-800.

**Identification.** The specimen was identified following Cunha and Nascimento (1975, 1978, 1993), Dixon and Soini (1986), Pérez-Santos and Moreno (1988), Campbell and Lamar (2004), and Harvey et al. (2005), based on the following diagnostic characters: dorsal scales keeled, in 25–30/25–29/20–23 rows; head scales with seven supralabials and 10–12 infralabials; loreal scale present; one supraocular, 1–2 postocular scales, and a single elongate subocular; supracephalic scales small and keeled without enlarged frontal or parietals; temporal scales present; large eye with elliptical pupil; facial pit present between the eye and nostril; lacunolabial scale present; 203–254 ventral scales, cloacal scale undivided with 66–91 mostly undivided subcaudals (some individuals may have a few divided subcaudals); complex lichenose pattern; general dorsal color can range from light brownish grey to greenish yellow; a series of 25–40 speckled black and olive irregular bands or blotches along the dorsum; row of white or yellow irregular spots located along the junction between the dorsal and ventral scales; and ventral color heavily pigmented and continuation of lichenose mottled appearance with black and cream speckling throughout and numerous small yellow cream spots.

## Discussion

Two historical references that focus specifically on the snake species of Bolivia have included *Bothrops taeniatus* in the distributional range: Ofidios de Bolivia (Kempff-Mercado 1975), listed as *Bothrops castelnaudi* Duméril, Bibron & Duméril, 1854, and Herpetologica Boliviana (Fugler and Cabot 1995). However, both of these publications fail to include a reference to any voucher specimens or list detailed geographic information to substantiate the claim. A list of specimens and geographical distribution of *B. taeniatus* collected in

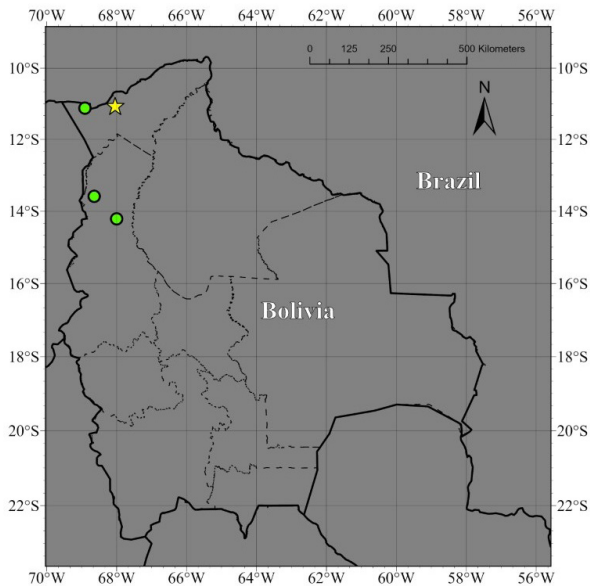


**Figure 1.** Adult male *Bothrops taeniatus* (CIRA-800) collected in Bolivia, Department of Pando, Nicolás Suárez Province. **A.** Full body, live photo. **B.** Dorsal view. **C.** Ventral view.

Bolivia was provided by Harvey et al. (2005), including two voucher specimens (LSUMZ-45976 from Pando, Nicolás Suárez, and CBF-2304 from La Paz, Abel Iturralde). Both of these specimens were collected considerable distance (approximately 95 km west and 350 km south, respectively) from the new locality. Most recently, Nogueira et al. (2019) compiled a list of *B. taeniatus* specimens and distributions that include Bolivia; however, this list is problematic, as several specimens do not have reference voucher numbers and, in addition, the publication includes numerous errors and duplications. One additional voucher specimen deposited

in the Museo de Historia Natural “Noël Kempff Mercado” (MHNNKM-16669 from La Paz, Abel Iturralde) was collected approximately 280 km south of the new record (Nicolás Suárez, Pando). While the distribution of *Bothrops taeniatus* does certainly include Bolivia, it is important to clarify and elucidate the provenance of this inclusion with verifiable museum vouchered specimens.

This additional record of *B. taeniatus* (CIRA-800) represents the northeastmost distribution in Bolivia (Fig. 2), extending the range eastward approximately 95 km in Bolivia, and filling the distributional gap between the known Brazilian and Bolivian populations. Four



**Figure 2.** Map showing the Bolivian distribution of *Bothrops taeniatus*. Green circles indicate records from museum voucher specimens; yellow star indicates the new record from Nicolás Suárez Pando (CIRA-800).

specimens have been collected from Bolivia and subsequently deposited into museum collections (Table 1). Based on the available information, *B. taeniatus* appears to be distributed throughout northern Bolivia in the departments of Pando and the northern region of La Paz and could possibly occur within northern Beni. Clearly, more specimens are needed to delimit the geographic range and to help develop a greater understanding of the natural history of this species.

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## Authors' Contributions

RLP, CBE, DL, EAS, and GCV conducted fieldwork, collected specimens, participated in specimen processing, and data collection. RLP, AVC, DL, and CBE led writing. RLP, CBE, and DL collected photo vouchers. RLP and AVC composed and edited the photo submissions. CBE designed the map. All authors reviewed the final paper before submission.

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**Table 1.** Distribution records of *Bothrops taeniatus* collected from Bolivia. Abbreviations: CBF, Museo Nacional de Historia Natural, Colección Boliviana de Fauna; CIRA, Centro de Investigación de Recursos Acuáticos; LSUMZ, Louisiana State University Museum of Natural Science (LSUMZ); MHNNKM, Museo de Historia Natural “Noël Kempff Mercado”. The coordinates of the CBF and LSUMZ records are estimates based on locality data.

Specimen	Date	Department	Province	Locality	Latitude	Longitude
LSUMZ-45976	7 Aug. 1986	Pando	Nicolás Suárez	12 km by road S Cobija, ca 8 km W on road to Mucden (=Mukden)	11.124°S	068.907°W
CBF-2304	No data	La Paz	Abel Iturralde	Camino entre Tumupasa y San José de Uchupiamonas, Serranía Sadiri; Area Natural de Manejo Integrado Madidi	14.213°S	068.000°W
MHNNKM-16669	2004	La Paz	Abel Iturralde	No additional information	13.5878°S	068.6424°W
CIRA-800	14 Jun. 2019	Pando	Nicolás Suárez	No additional information	11.0631°S	068.04134°W

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