



NOTE

Higher than the others: *Bothrops bilineatus* (Wied-Neuwied, 1821) (Serpentes: Viperidae) a new altitudinal record and range extension in Bolivia

Más alto que los demás: *Bothrops bilineatus* (Wied-Neuwied, 1821) (Serpentes: Viperidae) un nuevo récord altitudinal y extensión de rango en Bolivia

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ABSTRACT

We report a new altitudinal record for *Bothrops bilineatus* (Wied-Neuwied, 1821) in the department of Cochabamba, Bolivia, based on a verifiable record from the Yungas ecoregion of the department. This work not only corroborates the highest record for Bolivia at 1277 m asl, but also extends the record of the species by more than 50 km to the southeast, from the closest record in Villa Tunari, Cochabamba, Bolivia. The first record of the species for the Yungas ecoregion in Bolivia is formally confirmed. The highest record for the species in South America is also confirmed.

Keywords: Carrasco National Park, Cochabamba, Crotalinae, new record, Yungas.

RESUMEN

Reportamos un nuevo registro altitudinal para *Bothrops bilineatus* (Wied-Neuwied, 1821) en el departamento de Cochabamba, Bolivia, ba-

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sado en un registro verificable proveniente de la ecorregión de Yungas del departamento. Este trabajo no sólo corrobora el registro más alto para Bolivia a 1277 metros, sino que también extiende el registro de la especie en más de 50 km al sureste, desde el registro más cercano en Villa Tunari, Cochabamba, Bolivia. Se confirma formalmente el primer registro de la especie para la ecorregión de Yungas en Bolivia. También se confirma el registro más alto para la especie en América del Sur.

Palabras clave: Cochabamba, Crotalinae, nuevo registro, Parque Nacional Carrasco, Yungas.

Bothrops bilineatus (Wied-Neuwied, 1821), is a widely distributed species through the Amazonian forests of Bolivia, Colombia, Ecuador, Peru, Brazil, Venezuela, Guyana, French Guiana and Suriname (Campbell and Lamar, 1989; Pazmiño-Otamendi and Rodríguez-Guerra, 2020). Two subspecies are recognized for *B. bilineatus*: *B. b. bilineatus* and *B. b. smaragdinus* (Campbell and Lamar, 1989; Harvey, Gonzales, Aparicio, 2005; Bernarde et al., 2021).

According to Dal Vechio, Prates, Grazziotin, Zaher, Rodrigues (2018), *B. bilineatus* (Wied-Neuwied, 1821) comprises four clades which are distributed as follows in South America: 1. Atlantic Forest, 2. Guiana Shield, 3. Western Amazonia and 4. Central Amazonia. The registered populations of *B. bilineatus* for Bolivia correspond to the “Western Amazonia” clade belonging to the subspecies *B. b. smaragdinus* Hoge, 1966. The distribution in Bolivia of this subspecies *B. b. smaragdinus*, mainly comprises the ecoregion of the southwest Amazonia of the departments of Beni, Cochabamba, La Paz, Pando and Santa Cruz and the seasonally flooded savanna of the department of Beni (Harvey et al., 2005; Embert, 2007); There is no precise information on the vertical distribution of this species in Bolivia, but according to Campbell and Lamar (1989), it should not exceed 1000 m asl.

The arboreal adaptations that *B. bilineatus* possesses, such as: a prehensile tail and a cryptic color pattern, make it a very skilled species at camouflaging itself among its surroundings; there are records of caudal luring. These snakes have diurnal and nocturnal habits, with a preference for areas with abundant foliage, being recorded among branches, bushes, trees and/or vines. The most common records of this species include the lowland forests of the Amazonia, both in primary and secondary forests (da Fonseca, de Souza Oliveira, Correa, Bernarde, 2019; Pazmiño-Otamendi and Rodríguez-Guerra, 2020; da Fonseca, Correa, de Souza Oliveira, de Oliveira, Bernarde, 2021).

During a monitoring trip carried out by the park rangers on 12 September 2024 at 11:44 hours, an adult female (760 mm total length; MHNC-R 3250; Figure 1 A and B), was found active during day time perching in vegetation at a height of 1 m, adjacent to a mature secondary montane forest in Arepucho (17°22'41.12"S; 65°13'11.16"W, 1277 m asl; Figure 2), Carrasco National Park, Cochabamba, Bolivia in the Yungas



Figure 1. In life *Bothrops bilineatus smaragdinus* (A-B. MHNC-R 3250), registered at Arepucho, Carrasco National Park, Cochabamba, Bolivia. Photographs by Edwin Coaquira.

Figura 1. En vida *Bothrops bilineatus smaragdinus* (A-B. MHNC-R 3250), registrado en Arepucho, Parque Nacional Carrasco, Cochabamba, Bolivia. Fotografías por Edwin Coaquira.

ecoregion (Ibisch and Mérida 2003). The specimen was collected under permission of MMAyAVMA-DGBAP-004 and VMABCCGDF N° 16/19 issued by Ministerio de Medio Ambiente y Aguas and deposited at the herpetological collection of the Museo de Historia Natural Alcide d'Orbigny, Cochabamba, Bolivia.

The specimen exhibiting the following combination of characters: (1) second supralabial and prelacunal usually fused to form one lacunolabial; (2) prehensile tail; (3) intersupraoculars 5-9 keeled; (4) supralabials 7; (5) infralabials 8; (6) scale rows at midbody 30; (7) ventral scales 212; (8) subcaudal divided 78; (9) black postocular stripe; (10) back pale green with small black spots; (11) dorsal bands absent; (12) discontinuous yellow para-ventral stripe extends along the body; (13) 650 mm SVL. Taken together these characters are consistent with those described by Peters and Orejas-Miranda (1970), Campbell and Lamar (1989) and Harvey et al. (2005) for *B. b. smaragdinus*.

The available information for *B. b. smaragdinus* in Bolivia comes from the work of Fugler et al. (1985), Harvey et al. (2005) and the maps of Embert (2007) and Nogueira et al. (2019). According to this information, the distribution of *B. b. smaragdinus* in Bolivia mainly includes the Amazonian forests of the departments of Beni, Cochabamba, La Paz, Pando and Santa Cruz. Although Nogueira et al. (2019) provide information on the

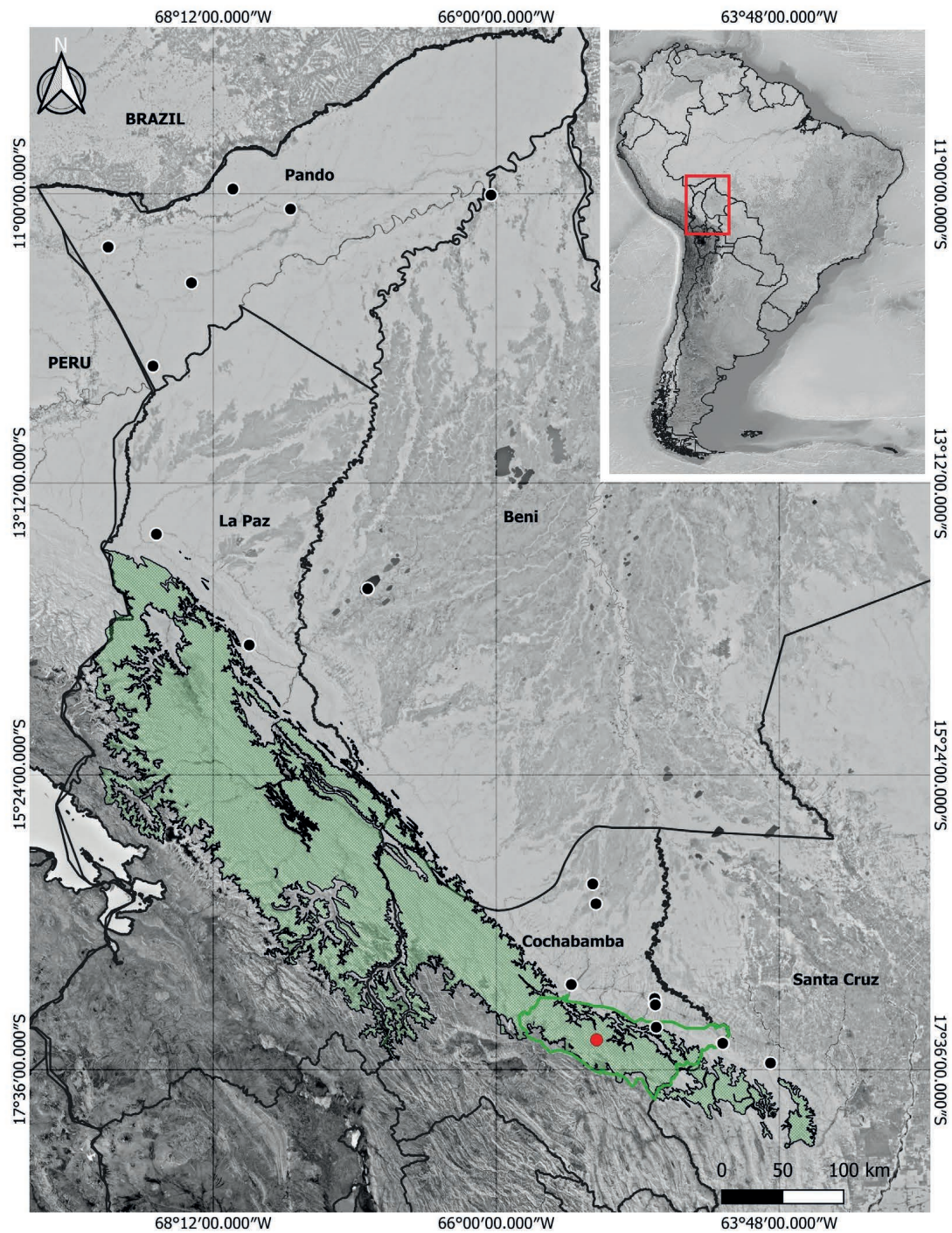


Figure 2. Geographic distribution of *Bothrops bilineatus smaragdinus* in Bolivia (black dots). Red circle: new record for the Yungas ecoregion (green cross line) in Cochabamba department; green line represents the boundaries of Carrasco National Park.

Figura 2. Distribución geográfica de *Bothrops bilineatus smaragdinus* en Bolivia (puntos negros). Círculo rojo: nuevo registro para la ecoregion de Yungas (línea cruzada de color verde) en el departamento de Cochabamba; línea verde representa los límites del Parque Nacional Carrasco.

distribution of *B. bilineatus* in the montane forests (Yungas) of Bolivia, the supplementary information provided by that work on the recording points of this species do not coincide within the limits of the montane forests or Yungas ecoregion, rather they confirm the Amazonian distribution (Southwest Amazonia ecoregion) of this species (see supplementary information provided by Nogueira et al., 2019).

Through the information presented and the reference material cited in this work, we confirm the formal presence of the species in the Yungas ecoregion of the department of Cochabamba, Bolivia. This report extends its distribution 50 km to the southeast (Figure 2) from the closest record from the southwest Amazonia ecoregion, Villa Tunari, Cochabamba, Bolivia (Nogueira et al., 2019). The highest record for the species in Bolivia and South America at 1277 m asl is confirmed. Previously the altitudinal range of this species was from sea level to 1050 m asl (Campbell and Lamar, 1989; Wallach et al., 2014; Pazmiño-Otamendi and Rodríguez-Guerra, 2020).

It is important to mention that although this work extends the distribution of *B. b. smaragdinus* by only 50 km, the ecological implications for this species are very important, since it represents a greater use of habitats (now Yungas) compared to what was reported by Fugler et al. (1985) and Nogueira et al. (2019). The IUCN Red List categorizes *B. bilineatus* with the status of “Least Concern” (Catenazzi, Cisneros-Heredia, Hoogmoed, Nogueira, 2021). Throughout its geographic distribution, this species may be affected by deforestation and habitat reduction, threats which could be reducing its populations, since *B. bilineatus* is a snake that has completely arboreal habits (Bernarde et al., 2021). In addition, the Yungas ecoregion where *B. b. smaragdinus* was registered (this work), it is the area with the maximum number of endemic amphibian species (De la Riva and Reiche, 2014), also one of the most vulnerable ecoregions in Bolivia, due to agricultural expansion (Ibisch and Mérida, 2003) and it is an area of considerable importance in terms of research since in recent years important records of reptiles have been presented (e.g., *Anolis punctatus* in Quinteros-Muñoz, Carpio, Pérez, Onofre, 2022a; *Erythrolamprus macrosomus* in Quinteros-Muñoz, Carpio, Pérez, Gómez-Murillo, 2022b; *Spilotes sulphureus* in Quinteros-Muñoz, Marca, Gómez-Murillo, Espinoza-Echeverría, 2024a; *Phrynonax sexcarinatus* in Quinteros-Muñoz, Carpio, Quispe, Marca, Espinoza-Echeverría, 2024b; *Chironius whipala* in Quinteros et al., 2024c) that were not thought to be distributed in the Yungas ecoregion.

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