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Confirmation of the current occurrence of *Bothrops diporus* (Cope, 1862) in argentinian mesopotamian

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RESUMEN: *Bothrops diporus* es una especie de serpiente endémica en Sudamérica y está mencionada su presencia para el noroeste de Argentina en ambientes naturales típicos del hábitat del Chaco. Para la región Mesopotámica existen registros históricos, pero son escasos desconociendo las causas. En la actualidad los sitios web que almacenan los registros no han evidenciado su presencia en esta área. En esta comunicación se reporta la presencia de un individuo de *Bothrops diporus* en el centro sur de la región, particularmente en la provincia de Entre Ríos a través de observación directa y registro fotográfico. El espécimen se encontró en una zona ecotonal entre el bosque nativo semixerófilo y un área de chacras con destino agrícola dentro de un Área Natural Protegida. Este registro permitió afirmar su presencia en la región y se propone ampliar la distribución.

The genus name *Bothrops*, derives from *bothros* meaning 'pit or pit' and *ops* 'face' and roughly meaning 'with a pit on the face' about the thermoreceptive pit mentioned above. It is a genus composed of approximately 45 species with very diverse characteristics and that live in a wide spectrum of habitats, from tropical and subtropical forests and jungles to arid, semi-arid and desert regions, from sea level to more than 3,000 meters above sea level and some are endemic to oceanic islands (Carrasco *et al.*, 2012). Some have a wide distribution, while others are from restricted areas.

The knowledge about the species that occurs in the different geographical areas is fundamental for the understanding of the complex biodiversity (Arzamendia & Giraudo, 2002).

Bothrops diporus is a snake with a particular distribution range (Figure 1) in the central region of South America (Cacciali *et al.*, 2019). This species is found in Chaco habitats, wet palm-grasslands, semitropical deciduous forest, Araucaria forest, and Pampas grasslands (Campbell & Lamar, 2004). The small 'yarará' is a species related to more xerophilous forests and shrublands (Chaqueños and Espinal) in Santa

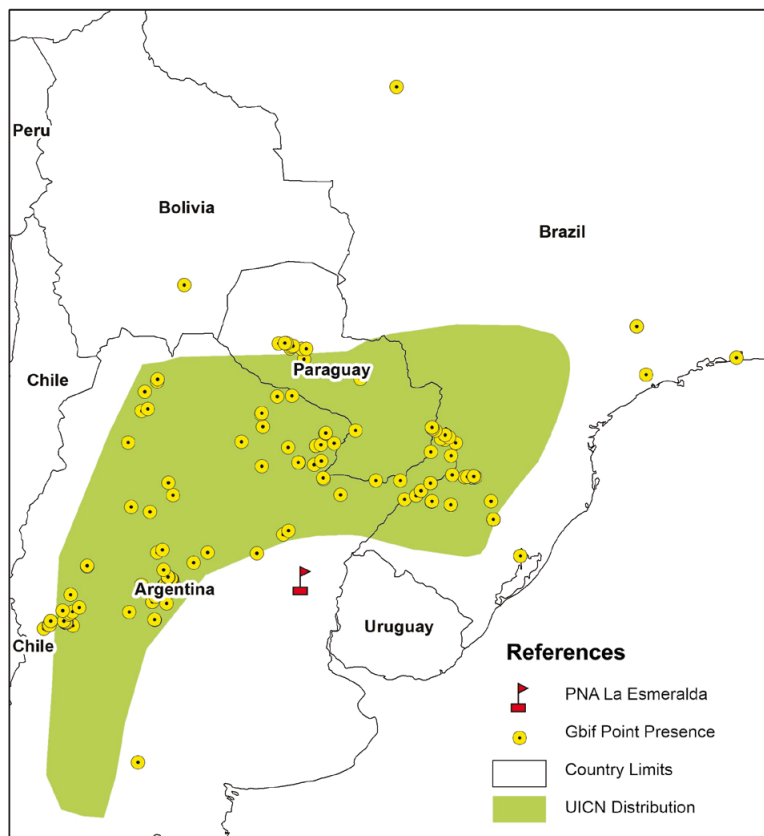


Figure 1: Documented distribution of *Bothrops diporus* in the central region of South America based on IUCN and GBif.org records (18th June 2022, <https://doi.org/10.15468/dl.y9rwpp>).

Figura 1: Distribución documentada de *Bothrops diporus* en la región centro de Sudamérica basado en reportes de UICN y GBif.org (Fecha de consulta: 18 de Junio 2022, <https://doi.org/10.15468/dl.y9rwpp>).

Fe, although it can be observed in other habitats even with anthropogenic disturbances (crops), generally close to natural vegetation (Giraudo *et al.*, 2008). It is present in Bolivia, Brazil, Paraguay and the Argentine Republic in the provinces of Córdoba, La Pampa, La Rioja, Mendoza, Neuquén, San Luis, Catamarca, Chaco, Corrientes, Entre Ríos, Formosa, Jujuy, Río Negro, Salta, San Juan, Santa Fe, Santiago del Estero and Tucumán (Perez & Avila, 2000; Perez *et al.*, 2003; Minoli *et al.*, 2011; Williams *et al.*, 2021) and eventually in the provinces of Buenos Aires, Chubut and Santa Cruz (Stazzonelli *et al.*, 2018) and with doubts about its presence in Misiones (Giraudo *et al.*, 2012). In the province of Entre Ríos, its historical presence was mentioned (Vuoto, 1995;

Scrocchi, 2018) without mentioning the geographical location, with the absence of updated records in public databases in the provinces last decades. This is confirmed by the information presented in Figure 1, where there is an information gap for the region from which the individual is reported.

Bothrops diporus commonly known as 'yarára chica', is a venomous terrestrial lancehead pit viper endemic to South America (Chebez *et al.*, 2005). *B. diporus* was initially classified as one of the twelve species of the *B. newwiedi* complex (Silva, 2004; 2008). It is a snake with an aggressive and fast temperament. Due to its abundance, highly aggressive behavior, and wide geographical distribution, *B. diporus* is a major source of

snakebites in Argentina, with the northeastern region representing the part of the country with the highest rate of bites by this species (Esteso, 1985; de Roodt & Casas, 2014).

It does not usually exceed 1.2 m in length, its usual size being between 0.7 and 0.8 m with a diameter of 1.5 to 4 cm. It has a grayish brown color with dark brown drawings simulating a triangle, from the base towards the sides of the body, sometimes the vertices

merge in the middle area forming a strangulated square in the same midline simulating an hourglass. Recently moved, it presents strong brown colors on its back, with slight reddish tones on the flanks. Over time, the tone changes to opaque, with faded scales that give it a rough appearance. The neck is thin, and the head is triangular, which gives it the name 'padlock head' (Esteso, 1990). On the head, spots can be seen on the back of



Figure 2: a) & b) Photographs taken from the anthropic environment for agricultural purposes where the proximity of the specimen to a native forest is observed (a). c) & d) Specimen photographed in the PNA 'La Esmeralda' on a trunk. Detail of e) the head, f) figures on the body and g) the white tail like a rattlesnake.

Figura 2: a) y b) Fotografías tomadas del medio antrópico con fines agrícolas donde se observa la proximidad del ejemplar a un bosque nativo (a). c) y d) Ejemplar fotografiado en el Área Natural Protegida 'La Esmeralda' sobre un tronco. Detalle de e) la cabeza, f) figuras en el cuerpo y g) la cola blanca como una serpiente de cascabel.

the head, smooth and keeled scales with an elongated spot behind the eye. The ventral color is whitish. The tail is almost always dark, but some juveniles may have a whitish or yellowish tip, while others have the same coloration as adults. The clear end of the tail is used as a bait for frogs since when it moves it simulates a worm (Stazzonelli *et al.*, 2018). It does not have two well-defined black lines in the gular region, without a central line in the throat, a belly without spots or little spots with small and diffuse spots. Its tail is between 10 and 18% of the total length (Giraudó *et al.*, 2008).

Defined as solenoglyphic for having two large mobile fangs with an inner hole that allows it to inoculate venom as a hypodermic needle, *Bothrops* cause the greatest number of ophidian accidents in Argentina (Giraudó & Arzamendia, 2009). The venom of this snake generates blood coagulation disorders attributable to thrombin-type enzymes that induce the transformation of fibrinogen to fibrin, registering greater susceptibility in ovine and human species (Maruñak *et al.*, 2010). In addition, its numerous toxic components that act on other systems and tissues generating acute inflammation, hemorrhages and reduction of blood pressure (Ministry of Health, 2014). It has between 8 and 14 offspring (Scrocchi *et al.*, 2006). It consumes mammals as well as amphibians and reptiles (Giraudó *et al.*, 2008), having documented the predation of *Chironius maculoventris* (Barros & Waller, 2015) and *Epictia albipuncta* (Ruiz García *et al.*, 2018).

On June 15th, 2022, during soil movement tasks in the farm, at 5:30 pm, a specimen of *Bothrops diporus* (Figure 2) was found on the southwestern edge of the 'La Esmeralda' Protected Natural Area (31°23'38.96"S / 59°44'5.53"W; 82 masl), which is located

near the town of Pueblo Bellocq Las Garzas Station, La Paz department, Entre Ríos province (Argentina). At the time of observation, the PNA meteorological station recorded an average temperature of 20.2°C and 51% relative humidity, with an unstable weather forecast that caused isolated precipitation. The specimen could not be collected but the photographic record was made. It was on the base of a trunk of *Aloysa gratissima* in a state of alert and coiled. It was between 30 and 40 cm long with an approximate diameter of 2.5 cm. The vegetation of the environment that surrounds the farm corresponds to a wire fence categorized as Open Native Forest (Sabattini *et al.*, 1999) with dominance of *Prosopis* spp. and *Vachellia* spp. Adjacent to the farm, two years ago, there was a native forest that was cleared. Specimens of the same species were found within the PNA from 2020 to the present by means of direct observation without the possibility of photographing them, but on this occasion the necessary material was available.

The Biodiversity Information System of the National Parks Administration (SIB) mentions it for Entre Ríos through the citation of Lavilla *et al.* (2000) but the IUCN map of occurrence does not include Entre Ríos (Cacciali *et al.*, 2019). The record was uploaded to the iNaturalist database (<https://www.inaturalist.org/observations/121934436>).

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