

## First record of the rare snake *Cercophis auratus* (Schlegel, 1837) (Serpentes: Colubridae: Dipsadinae) in a relictual forest enclave at Caatinga

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### ABSTRACT

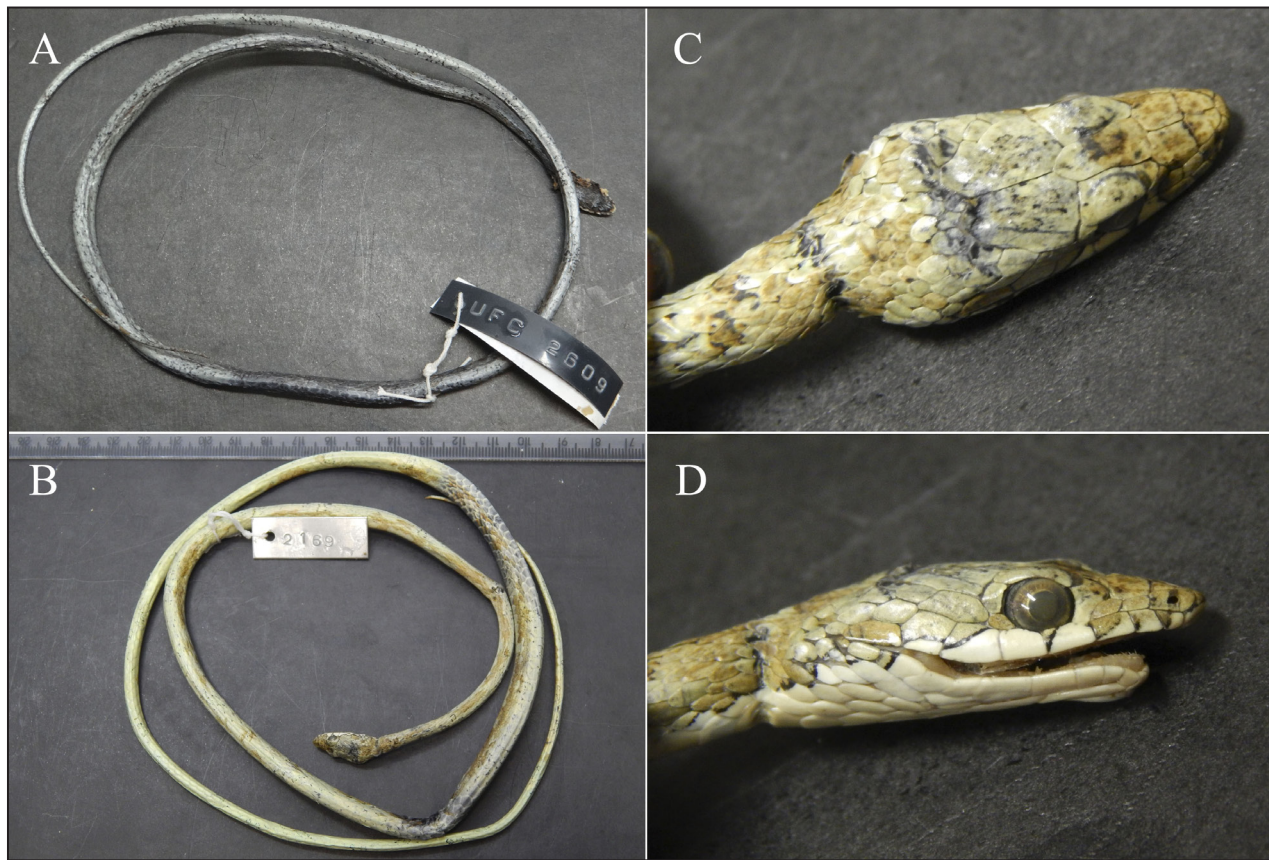
*Cercophis auratus* is a rare snake with known disjunct distribution between coastal Atlantic Forest to eastern Amazonia and Guiana Shield. Here we provide a new record of this species from a relictual highland of rainforest inside the xeric Caatinga ecoregion. This new record fill a gap of 1700 kilometers between southern (Barra do Choça – BA) and northern (Augusto Corrêa – PA) in the distribution of *C. auratus* (Schlegel, 1837), and bring insights about the past connective bridge between Amazonia and Atlantic forests.

Key Words: Relictual rainforest; Northeastern Brazil; Gaps; Distribution.

The monotypic snake *Cercophis auratus* (Schlegel, 1837) was described from Paramaribo, Suriname on the basis of a single specimen. Fifty years later, Peracca (1897) described *Uromacerina ricardinii* (= *C. auratus*, see below) based on individual from São Paulo State, Brazil. Since then, several studies expand specie's range to the states of Rio Grande do Sul, Santa Catarina, Paraná, Rio de Janeiro, Espírito Santo, and Bahia along the Atlantic coast of Brazil (Hoge, 1957; Lema, 1973; Müller and Ritter, 1978; Zamprogno, 1997; Argôlo, 2001). In addition, Cunha and Nascimento (1982) reported on two specimens of *C. auratus* to Cacoal Farm, municipality Augusto Corrêa, Pará State, eastern Amazon Forest, highlighting a disjunct distribution of the species among Amazonia and Atlantic rainforest. Recently, Hoogmoed *et al.* (2019) synonymized *U. ricardinii* with *Cercophis auratus* (Schlegel, 1837), updating its morphological variation and geographic distribution. *Cercophis auratus* is an arboreal and diurnal species, anurophagic and with seasonal reproduction (Morato and Bernils, 1989; Marques, 2000). The lack of knowledge about this snake in museum collections results in the almost totality of knowledge being restricted to external morphology and distribution data.

In the course of revision of the herpetological collection of Universidade Federal do Ceará, Brazil, we identified two specimens of *Cercophis auratus* previously considered with uncertain identifications (CHUFC 2169, 2609; Fig. 1). The color pattern and general external morphology data from the specimens falls within the spectrum of variation as reported by Hoogmoed *et al.* (2019) to *C. auratus*, see Table 1. Both specimens are from municipality of Pacoti (04°13'30"S; 38°55'24"W; 736 m above sea level; asl hereafter), state of Ceará, Brazil (Fig. 2). The Pacoti Municipality makes part of the Maciço de Baturité, a relictual moist forest enclave rounded by xeric Caatinga (Figueiredo and Barbosa, 1990). These new records of *C. auratus* extends the species range in 1200 km airline to the north from the municipality Barra do Choça (14°57'32"S; 40°32'56"W; 850 m a.s.l) in the Bahia State (Argolo, 2001), and 936 km airline to the southeast from Cacoal Farm, municipality Augusto Corrêa (01°01'18"S; 46°38'06"W; 20 m a.s.l) in the Pará State, (Cunha and Nascimento, 1982).

There are moist forest enclaves known to occurs in Pernambuco, Paraíba and Ceará States along their highlands regions at northeastern portion of Brazil, and being each of them composed by mixed



**Figure 1.** General view of *Cercophis auratus* based on the specimens from municipality of Pacoti, state of Ceará, Brazil. Dorsal view of body (A) of the individual female (CHUFC 2609), and lateral view of body (B) and dorsal (C) and lateral views (D) of head of the individual female (CHUFC 2169).

biota from Caatinga, Amazonia and Atlantic forest (Figueiredo and Barbosa, 1990; Borges-Nojosa and Caramaschi, 2003; Rodal *et al.*, 2008; Batalha-Filho *et al.*, 2013). Such forest relics represent putative past connections between Amazonia and Atlantic forest (Haffer, 1969; Vanzolini and Williams, 1970). These rainforest ecoregions are currently separated by known South American Dry Diagonal composed by Caatinga, Cerrado and Chaco (Ab'Saber, 1977), and

has been considered as a natural barrier to migration of rainforest species. Many evidences support the past contact between Atlantic and Amazonia rainforest (Rodal *et al.*, 2008; Batalha-Filho *et al.*, 2013), suggesting wetter periods in Pleistocen that granted the expansion of moist forest in area actually covered by open vegetation (Auler *et al.*, 2004).

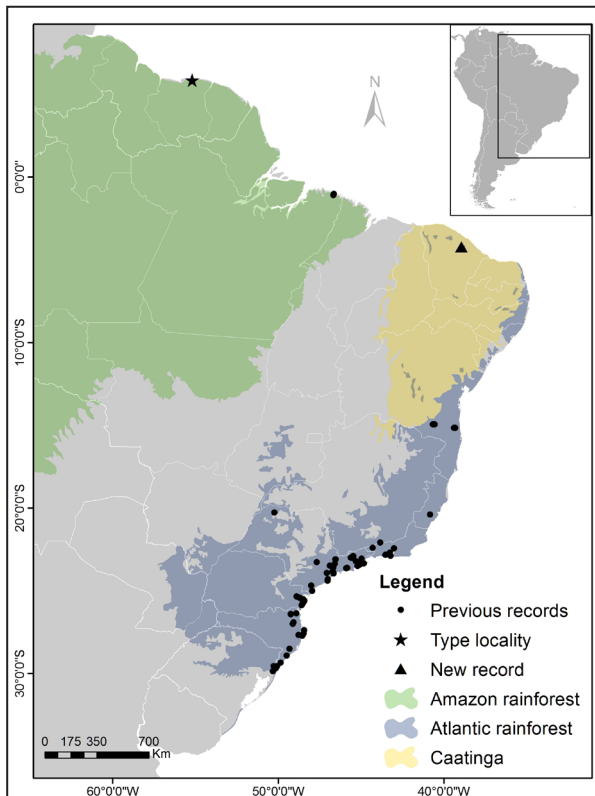
There are many taxa with disjunct distribution along Amazonia and relictual forests on the Caatinga

**Table 1.** Sex, meristic and morphometric data of the two specimens of *Cercophis auratus* from municipality Pacoti, Ceará State, Brazil, and the range variation in the character found in this species according Hoogmoed *et al.*, 2019. The exemplar CHUFC 2609 has a crushed head. SVL: Snout-vent-length.

	Voucher number		Range variation
	CHUFC 2169	CHUFC 2609	
Sex	F	F	F or M
Dorsals	15/15/11	15/15/11	15/15/11 or 15/13/11
Ventrals	143	141	135 - 150
Subcaudals	155	153	144 - 171
Preocular	1	1	1
Postocular	2	2	2 or 3

Supralabials	8	NA	7 - 9
Infralabials	10	NA	8 - 11
Loreal	1 (divided)	NA	1 (divided)
Temporals	1 + 2 + 3	NA	1 + 2 + 2 or 3
Anal	Divided	Divided	Divided
Maxillary teeth	18 + 2	NA	18 + 2 - 23 + 2
SVL (mm)	455	307	max. 508
Tail length (mm)	380	253	max. 412
Total length (mm)	835	560	max. 905
Tail/Total length (%)	45	45	42 - 54
Tail/SVL (%)	83	82	65 - 97
Color	Grey-brown	Grey	Bronze, brown, grey or grey-brown

ga (e.g. *Caecilia tentaculata*, Borges-Nojosa *et al.*, 2017), between relictual forests and Atlantic forest (e.g. *Stenolepis ridleyi*, *Enyalius bibronii*, *Strobilurus torquatus*, *Euryoryzomys russatus*, Borges and Caramaschi, 2003; Gurguel-Filho *et al.*, 2015) or in the three rainforest types (e.g. *Anolis fuscoauratus*, *Kentropix calcarata*, *Lachesis muta*, *Drymoluber dichrous*; Nogueira *et al.*, 2019; Borges and Caramaschi, 2003).



**Figure 2.** Distribution of *Cercophis auratus*. Star represent the type-locality and the new records of the species are marked by a triangle. The dots represent previously known records to *C. auratus* based on Hoogmoed *et al.* (2019) and Nogueira *et al.* (2019).

Therefore, the new records for *Cercophis auratus*, a species previously known along Atlantic forest with two disparate records on Amazonia, augment the disjunct pattern between both rainforest biomes, reinforcing putative past connections between Amazonia and Atlantic forest (Rodal *et al.*, 2008; Batalha-Filho *et al.*, 2013).

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