

## Reptiles and amphibians of a poorly known region in southwest Amazonia

Frederico Gustavo Rodrigues França<sup>1\*</sup>

Nathocley Mendes Venâncio<sup>2</sup>

<sup>1</sup>Departamento de Engenharia e Meio Ambiente, Centro de Ciências Aplicadas e Educação  
Universidade Federal da Paraíba, CEP 58297-000, Rio Tinto – PB, Brazil

<sup>2</sup>Departamento de Ciências da Natureza  
Universidade Federal do Acre, Rio Branco – AC, Brazil

\*Corresponding author  
frederico@ccaee.ufpb.br

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### Resumo

**Répteis e anfíbios de uma região pouco conhecida do sudeste da Amazônia.** Amazônia é a maior floresta tropical do mundo e possui uma enorme biodiversidade. Entretanto, algumas regiões ainda são pouco conhecidas. Este trabalho apresenta um inventário da herpetofauna de uma destas regiões, o município de Boca do Acre, no sudoeste do Amazonas. O inventário foi realizado em dois períodos, uma amostragem durante o meio da estação chuvosa e outra ao final da mesma estação. Diversos métodos foram empregados para as amostragens, como armadilhas de interceptação e queda, procuras visuais diurnas e noturnas, procuras de carro em trechos da BR 317, e registros oportunistas. Cinquenta e seis espécies de anfíbios e 53 de répteis foram registradas durante o inventário. Vinte e sete espécies foram capturadas nas armadilhas de interceptação e queda e 38 foram encontradas na BR317, sendo as serpentes o grupo mais impactado por atropelamentos. A curva de acumulação de espécies não atingiu a estabilidade indicando que o inventário não está completo. Os resultados demonstram a grande riqueza de espécies desta região, sua importância para a biodiversidade da Amazônia, e a urgência em sua preservação.

**Unitermos:** Amazônia, anfíbios, inventário, répteis, riqueza

### Abstract

The Amazon is the largest tropical forest of the world and it is extremely rich in biodiversity. However, some portions of the biome are still poorly known. This work presents an inventory of the herpetofauna of Boca do Acre municipality, a still preserved region located in southwest Amazonas state. The inventory was carried out in two periods, a sampling during the middle of the rainy season and another one at the end of the rains. Diverse survey methods were employed, such as pitfall traps, diurnal and nocturnal visual searches, car searches on the BR 317 highway, and opportunistic registrations. We recorded 56 amphibians and 53 reptiles during the field work. We captured 27 species in pitfall traps, and 38 were found along the BR 317, alive or dead on the road, being snakes principally affected by road-kills. The species accumulation curves did not reach stability, indicating that the inventory was not complete. Our results show the high species richness of this region, its importance for the Amazonian biodiversity, and the urgency of its preservation.

**Keywords:** Amazonia, amphibians, inventory, reptiles, richness

## Introduction

Amazonia is the largest tropical rainforest of the world, and it encompasses 7,000,000km<sup>2</sup>. Its plant diversity and structural variation allows an enormous richness of amphibians and reptiles (Vogt et al., 2001). The number of Amazonian amphibians can reach 340 species (Duellman, 1999), and at least 163 species are found in Brazil (Azevedo-Ramos and Galatti, 2001). In addition, more than 273 reptiles occur in Brazilian Amazonia (Ávila-Pires et al., 2007). Moreover, these numbers of species are constantly on the increase, since new places are being surveyed and new species described. While some regions have been intensively surveyed, such as Pará State (Cunha et al., 1985; Cunha and Nascimento, 1993; Ávila-Pires and Hoogmoed, 1997; Frota et al., 2005), Central Amazonas (Zimmerman and Rodrigues, 1990; Martins and Oliveira, 1998; Lima et al., 2006; Vitt et al., 2008; Ilha and Dixo, 2010) and Rondônia (Vanzolini, 1986; Nascimento et al., 1988; Jorge-da-Silva, 1993; Bernarde and Abe, 2006; Bernarde, 2007; Bernarde and Macedo, 2008; Macedo et al., 2008), other places remain unknown (Azevedo-Ramos and Galatti, 2001).

The southwest of Amazonia contains a high diversity of amphibians and reptiles, but the studies on this region are very incipient (Azevedo-Ramos and Galatti, 2002). The region is drained by three major tributaries of the Amazon River: Juruá, Purus, and Madeira. The most precise inventories show a richness of at least 140 species for Alto Juruá (Souza et al., 2002; Souza, 2009), more than 90 species for Médio Madeira (Heyer, 1977; Vogt et al., 2007), and more than 110 species for Alto Purus (Rodríguez, 2003).

Inventories are important tools for Amazonian conservation, since biological surveys stimulate the discovery of new species, revealing endemic areas and the current levels of biodiversity. Consequently, conservation efforts can be appropriately directed towards the biome (Kress et al., 1998; Soares-Filho et al., 2006). In this study we present a preliminary list of amphibians and reptiles of Boca do Acre municipality, which has previously been recognized as a priority area for herpetofauna surveys in Brazilian Amazonia (Azevedo-Ramos and Galatti, 2001; Vogt et al., 2001).

## Material and Methods

### Study area

The municipality of Boca do Acre is located in southwest Amazonas state, a neighbor of the municipalities of Labrea and Pauini, and of Acre State. The region comprises 22,349km<sup>2</sup>, with altitudes reaching 100 to 150m. The climate is type Am in the Köppen classification (Nimer, 1989) and precipitation is 1,500-2,000mm per year, mostly between October and April. The Acre River and Purus tributaries Inauini and Pauini are the principal rivers that drain the region. The BR317 highway crosses the entire municipality, connecting the town of Boca do Acre, AM to Rio Branco, AC.

Six point localities along the BR 317 were used for sampling (Figures 1 and 2): site 1 (09°01'34"S, 67°14'12"W) and site 2 (09°0'47"S, 67°10'52"W): two preserved forest patches with more than 4,000ha, both contiguous with the Amazonian rainforest, where pitfalls were placed. Both are located approximately 4km from the BR317; site 3 (09°01'33"S, 67°14'24"W) and site 4 (09°01'46"S, 67°05'27"W): two permanent swamp areas neighboring the preserved forest sites 1 and 2; site 5 (08°46'48"S, 67°21'13"W): a disturbed forest patch of approximately 500ha inside the town; and site 6 (08°50'03"S, 67°18'17"W): a disturbed and permanent swamp on the outskirts of the town.

### Data collection

The study was conducted in two periods: i) 04 to 13 January 2008 and ii) 31 March to 12 April 2008, totaling 23 sampling days in the middle and end of the rainy season, respectively. In both periods, four sampling methods were applied: car searches along the BR317 (approximately 1000km were covered during the study, mostly at the end of the day or in the evening), pitfall traps, visual and acoustic surveys (approximately 56h surveys), and incidental encounters (Heyer et al., 1994; Franco et al., 2002). The same six sites were surveyed in both sample periods. For pitfall traps, we used 40 buckets (20L) with drift fences in each period. The pitfalls were open during the entire inventory and were checked every day. Voucher specimens were collected and

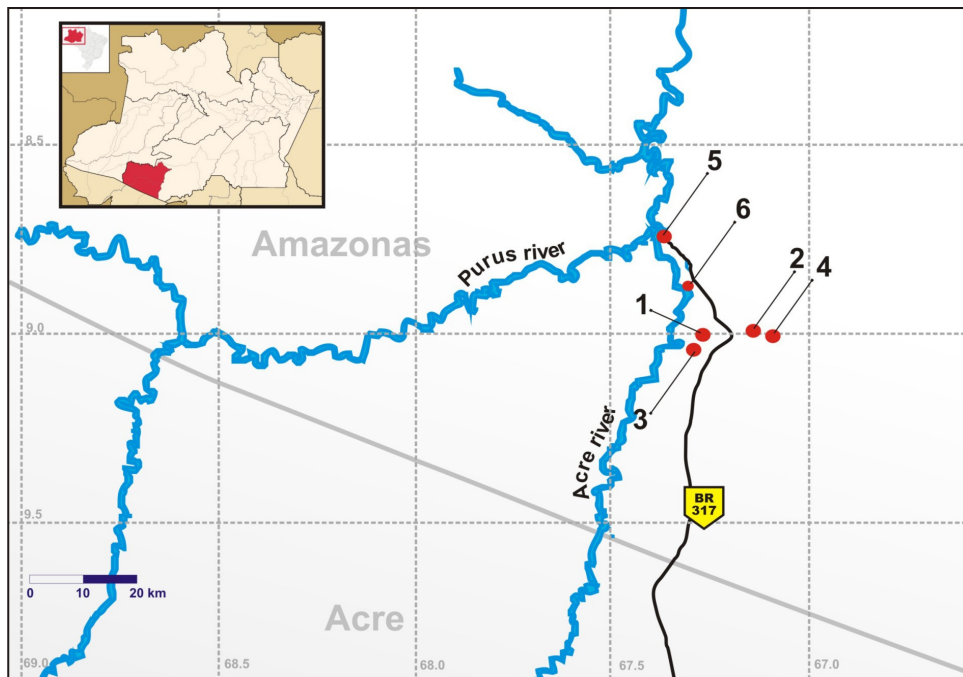


FIGURE 1: Study area showing the municipality of Boca do Acre, state of Amazonas, the six sampling sites along the BR317 highway, and the two principal rivers, Purus and Acre.



FIGURE 2: Sampling sites of Boca do Acre: A) Site 1 showing partial pitfalls; B) Site 6 showing the disturbed swamp; C) BR317 highway; D) Site 3 showing the swamp areas neighboring site 1.

deposited at the Coleção Herpetológica da Universidade de Brasília (CHUNB) with collecting permit (IBAMA 0200100058/07-01).

## Data analysis

The collection effort was evaluated by species rarefaction curves calculated using EstimateS 8.0.0 Software with the non-parametric Mao Tau estimator after data randomization 1000 times without replacement (Colwell, 2006). The first curve was calculated using the species richness collected by all sampling methods. We calculated a second curve using the species collected only in pitfall traps, the usually comparable sample method. In addition, we used the Chao 2 richness estimator to determine the expected richness of this area.

Finally, species identification and the distribution range of species was determined by specialists and was based on literature: Peters and Orejas-Miranda (1986), Ávila-Pires (1995), Duellman (1999), Azevedo-Ramos and Galatti (2002), Bartlett and Bartlett (2003), Lima et al. (2006), Vitt et al. (2008), Uetz (2008), Frost (2009).

## Results

We recorded 56 species of amphibians and 53 reptiles during the fieldwork (Table 1; Figures 3 and 4). Three other amphibian species and one snake collected in the same region by Marilene Vasconcelos da Silva and Moisés Barbosa de Souza (Universidade Federal do Acre) were added to the list, totalizing 59 amphibians and 54 reptiles for the region.

TABLE 1: Amphibians and reptiles registered in the municipality of Boca do Acre. Abbreviations are: 1 = first survey period (January 2008); 2 = second survey period (March/April 2008); p = pitfall trap; Pc = personal communication; D = dead on road; Al = alive on road; A = Amazon rainforest; W = west Amazonia; A/AF = Amazonia and Atlantic Forest; A/C = Amazonia and Central Brazil; SW = southwestern Amazonia; C/W = central and west Amazonia; B= all Brazil.

Species	Survey	BR 317	Distribution
<b>Amphibia</b>			
<b>Order Anura</b>			
<b>Family Aromobatidae</b>			
<i>Allobates femoralis</i> (Boulenger, 1884 “1883”)	1, 2, p		A
<i>Allobates marchesianus</i> (Melin, 1941)	1, p		W
<b>Family Strabmantidae</b>			
<i>Pristimantis conspicillatus</i> (Günther, 1858)	1, 2, p		W
<i>Pristimantis fenestratus</i> (Steindachner, 1864)	1		A
<i>Pristimantis ockendeni</i> (Boulenger, 1912)	2		A
<i>Pristimantis peruvianus</i> (Melin, 1941)	1		W
<i>Oreobates quixensis</i> Jiménez de la Espada, 1872	1,2		A
<b>Family Bufonidae</b>			
<i>Rhinella castaneotica</i> (Caldwell, 1991)	1, 2, p		A
<i>Rhinella margaritifera</i> (Laurenti, 1768)	1, 2, p		A/AF
<i>Rhinella marina</i> (Linnaeus, 1758)	1, 2, p	D, Al	A
<b>Family Centrolenidae</b>			
<i>Cochranella midas</i> (Lynch and Duellman, 1973)	1		W
<b>Family Dendrobatidae</b>			
<i>Ameerega hahneli</i> (Boulenger, 1884 “1883”)	1, p		W
<i>Ameerega trivittata</i> (Spix, 1824)	1, 2, p		A
<i>Ranitomeya biolat</i> (Morales, 1992)	2		W
<b>Family Hylidae</b>			
<i>Dendropsophus acreanus</i> (Bokermann, 1964)	1		SW
<i>Dendropsophus leucophyllatus</i> (Beireis, 1783)	1, 2		A

<i>Dendropsophus minutus</i> (Peters, 1872)	Pc		B
<i>Dendropsophus miyatai</i> (Vigle and Goberdhan-Vigle, 1990)	1		W
<i>Dendropsophus rhodopeplus</i> (Günther, 1859 “1858”)	1, 2		W
<i>Dendropsophus sarayacuensis</i> (Shreve, 1935)	1		W
<i>Dendropsophus triangulum</i> (Günther, 1869)	2		C/W
<i>Hypsiboas cinereascens</i> (Spix, 1824)	1		A
<i>Hypsiboas geographicus</i> (Spix, 1824)	1		A
<i>Hypsiboas lanciformis</i> (Cope, 1871)	1, 2		A
<i>Hypsiboas microderma</i> (Pyburn, 1977)	2		W
<i>Hypsiboas punctatus</i> (Schneider, 1799)	1, 2		A
<i>Hypsiboas raniceps</i> Cope, 1862	2	Al	B
<i>Pseudis limellum</i> (Cope, 1862)	1, 2		A
<i>Phyllomedusa hypochondrialis</i> (Daudin, 1800)	1, 2		A/C
<i>Phyllomedusa palliata</i> Peters, 1873 “1872”	1, 2		SW
<i>Phyllomedusa tomopterna</i> (Cope, 1868)	1, 2		A
<i>Phyllomedusa vaillantii</i> Boulenger, 1882	1, 2	Al	A
<i>Scarthyla goinorum</i> (Bokermann, 1962)	Pc		W
<i>Scinax boesemani</i> (Goin, 1966)	2		A
<i>Scinax cruentommus</i> (Duellman, 1972)	1		W
<i>Scinax funereus</i> (Cope, 1874)	2		SW
<i>Scinax garbei</i> (Miranda-Ribeiro, 1926)	1		C/W
<i>Scinax ruber</i> (Laurenti, 1768)	1, 2		A/C
<i>Sphaenorhynchus lacteus</i> (Daudin, 1800)	2		A
<i>Trachycephalus resinifictrix</i> (Goeldi, 1907)	1		A
<i>Trachycephalus venulosus</i> (Laurenti, 1768)	1, 2	Al	B
<b>Family Leiuperidae</b>			
<i>Engystomops freibergeri</i> (Donoso-Barros 1969)	1, p		A
<b>Family Leptodactylidae</b>			
<i>Leptodactylus andreae</i> Müller, 1923	1, 2, p		A
<i>Leptodactylus bolivianus</i> Boulenger, 1898	1		A
<i>Leptodactylus didymus</i> Heyer, García-Lopez & Cardoso, 1996	1		B
<i>Leptodactylus diedrus</i> Heyer, 1994	1		W
<i>Leptodactylus hylaedactylus</i> (Cope, 1868)	2		A
<i>Leptodactylus knudseni</i> Heyer, 1972	1, 2		A
<i>Leptodactylus leptodactyloides</i> (Andersson, 1945)	1	Al	A
<i>Leptodactylus lineatus</i> (Schneider, 1799)	Pc		A
<i>Leptodactylus pentadactylus</i> (Laurenti, 1768)	1, 2	Al	A
<i>Leptodactylus rhodomystax</i> Boulenger, 1884 “1883”	1		A
<i>Leptodactylus stenodema</i> Jiménez de la Espada, 1875	1, 2		A
<i>Leptodactylus wagneri</i> (Peters, 1862)	1, 2		W
<b>Family Microhylidae</b>			
<i>Chiasmocleis bassleri</i> Dunn, 1949	2, p		SW
<i>Ctenophryne geayi</i> Mocquard, 1904	2, p		A
<i>Elachistocleis ovalis</i> (Schneider, 1799)	1, 2	Al	A/C
<i>Hamptophryne boliviana</i> (Parker, 1927)	2, p		A
<b>Order Gymnophiona</b>			
<b>Family Caeciliidae</b>			
<i>Typhlonectes compressicauda</i> (Duméril and Bibron, 1841)	2		A
<b>Reptilia</b>			
<b>Order Crocodylia</b>			
<b>Family Alligatoridae</b>			

<i>Caiman crocodilus</i> (Linnaeus, 1758)	1, 2	Al	A/C
<i>Paleosuchus palpebrosus</i> (Cuvier, 1807)	1, 2		A/C
<b>Order Squamata</b>			
<b>Family Polychrotidae</b>			
<i>Anolis fuscoauratus</i> D'Orbigny, 1837	1, 2, p		A
<i>Anolis nitens</i> (Wagler, 1830)	1, 2, p		A
<i>Anolis punctatus</i> Daudin, 1802	2		A
<i>Anolis trachyderma</i> Cope, 1876	2		W
<b>Family Sphaerodactylidae</b>			
<i>Coleodactylus amazonicus</i> (Andersson, 1918)	1, 2, p		A
<i>Gonatodes hasemani</i> Griffin, 1917	1, 2		W
<i>Gonatodes humeralis</i> (Guichenot, 1855)	1, 2, p		A
<b>Family Gekkonidae</b>			
<i>Hemidactylus mabouia</i> (Moreau de Jonnès, 1818)	1, 2	Al	B
<b>Family Phyllodactylidae</b>			
<i>Thecadactylus solimoensis</i> Bergmann & Russell, 2007	1		W
<b>Family Teiidae</b>			
<i>Ameiva ameiva</i> (Linnaeus, 1758)	1, 2, p	Al	B
<i>Kentropyx pelviceps</i> Cope, 1868	1, 2, p		W
<i>Tupinambis</i> sp.	2	Al	SW
<i>Tupinambis teguixin</i> (Linnaeus, 1758)	1, 2	Al	A
<b>Family Gymnophthalmidae</b>			
<i>Alopoglossus atriventris</i> Duellman, 1973	1, 2, p		W
<i>Cercosaura ocellata</i> Wagler, 1830	2, p		A
<i>Cercosaura argulus</i> Peters, 1863	1, 2		SW
<i>Iphisa elegans</i> Gray, 1851	1, 2, p		A
<i>Leposoma osvaldoi</i> Avila-Pires, 1995	2, p		SW
<b>Family Scincidae</b>			
<i>Mabuya nigropunctata</i> (Spix, 1825)	1, 2, p		A/C
<b>Family Boidae</b>			
<i>Boa constrictor</i> (Linnaeus, 1758)	1, 2	D, Al	B
<i>Corallus hortulanus</i> (Linnaeus, 1758)	1, 2	D	B
<i>Epicrates cenchria</i> (Linnaeus, 1758)	2	D	A
<i>Eunectes murinus</i> (Linnaeus, 1758)	2	Al	B
<b>Family Colubridae</b>			
<i>Chironius carinatus</i> (Linnaeus, 1758)	1, 2	D, Al	A
<i>Chironius exoletus</i> (Linnaeus, 1758)	2	D, Al	B
<i>Chironius multiventris</i> Schmidt & Walker, 1943	1, 2	D	A
<i>Dendrophidion dendrophis</i> (Schlegel, 1837)	2		A
<i>Spilotes pullatus</i> (Linnaeus, 1758)	1	Al	B
<b>Family Dipsadidae</b>			
<i>Atractus latifrons</i> (Günther, 1868)	1	D	A
<i>Clelia clelia</i> (Daudin, 1803)	1	D	A
<i>Dipsas catesbyi</i> (Sentzen, 1796)	1, 2	D	A
<i>Dipsas pavonina</i> (Schlegel, 1837)	2	D	A
<i>Helicops angulatus</i> (Linnaeus, 1758)	1, 2	Al	A/C
<i>Helicops polylepis</i> Günther, 1861	2	D	A
<i>Hydrodynastes gigas</i> (Duméril, Bibron & Duméril, 1854)	1, 2	D	B
<i>Leptodeira annulata</i> (Linnaeus, 1758)	1, 2	D, Al	B
<i>Liophis reginae</i> (Linnaeus, 1758)	1, 2, p	D, Al	B
<i>Liophis</i> sp.	2	D, Al	W

<i>Liophis typhlus</i> (Linnaeus, 1758)	1, p		A
<i>Oxyrhopus melanogenys</i> (Tschudi, 1845)	1, 2	D, Al	A
<i>Philodryas argentea</i> (Daudin, 1803)	Pc		A
<i>Philodryas viridissima</i> (Linnaeus, 1758)	2	Al	A
<i>Pseudoeryx plicatilis</i> (Linnaeus, 1758)	2	D	A
<i>Siphlophis compressus</i> (Daudin, 1803)	2	D	A/AF
<i>Xenopholis scalaris</i> (Wucherer, 1861)	2, p		A/AF
<b>Family Viperidae</b>			
<i>Bothrops atrox</i> (Linnaeus, 1758)	1, 2	D, Al	A
<i>Lachesis muta</i> (Linnaeus, 1766)	1	D	A
<b>Family Elapidae</b>			
<i>Micrurus lemniscatus</i> (Linnaeus, 1758)	2	D, Al	A
<i>Micrurus remotus</i> Roze, 1987	2		W
<b>Family Typhlopidae</b>			
<i>Typhlops reticulatus</i> (Linnaeus, 1758)	1, 2	D	A
<b>Order Testudinata</b>			
<b>Family Podocnemididae</b>			
<i>Podocnemis unifilis</i> Troschel, 1848	2		A
<b>Family Testudinidae</b>			
<i>Chelonoidis denticulata</i> (Linnaeus, 1766)	2		A

During the first sample, 42 amphibians and 33 reptiles were recorded, and during the second sample, 39 amphibians and 46 reptiles, 34 species being added to the full amount by the second sample. Hylid and leptodactylid frogs accounted for the highest number of species of amphibians (27 and 12 species), followed by strabomantids (five), microhylids (four), bufonids and dendrobatids (three each), and one centrolenid, leiuperid and caeciliid. For Reptiles, the snake family Dipsadidae accounted for the highest number of species (17), followed by Colubridae and Gymnophthalmidae (five), Polychrotidae and Teiidae (four), Boidae (four), Sphaerodactylidae (three), Alligatoridae, Viperidae and Elapidae (two) and finally Gekkonidae, Scincidae,

Phyllodactylidae, Podocnemididae, Testudinidae, Typhlopidae (one). Species rarefaction curves did not show asymptotic tendencies, indicating that the inventory was not complete (Figure 5).

We recorded seven species of amphibians and 31 reptiles in the searches on BR317 highway (Table 1). The toad *Rhinella marina* was the species most impacted by the highway, with seven dead individuals. More species were found dead on the road (DOR – 53%) than alive (AOR – 47%), and snakes were more susceptible to being killed by cars (21 out of 26 snake species found on the road were DOR). Turtles and crocodilians were commonly found in ponds and lakes near the highway, but only two individuals of *Caiman crocodilus* were seen crossing the BR317.



FIGURE 3: Some amphibian species from municipality of Boca do Acre, AM: A, *Dendropsophus sarayacuensis*; B, *Dendropsophus leucophyllatus*; C, *Dendropsophus rhodopeplus*; D, *Ranitomeya biolat*; E, *Ameerega trivittata*; F, *Sphaenorhynchus lacteus*; G, *Hypsiboas geographicus*; H, *Phyllomedusa hypochondrialis*; I, *Phyllomedusa palliata*; J, *Hypsiboas microderma*; K, *Cochranella midas*; L, *Oreobates quixensis* (all photos by F. G. R. França).





FIGURE 4: Some reptile species from municipality of Boca do Acre, AM: A, *Gonatodes hasemani*; B, *Corallus hortulanus*; C, *Chironius exoletus*; D, *Thecadactylus solimoensis*; E, *Eunectes murinus*; F, *Leptodeira annulata*; G, *Iphisa elegans*; H, *Bothrops atrox*; I, *Oxyrhopus melanogenys*; J, *Cercosaura ocellata*; K, *Liophis* sp.; L, *Micrurus remotus* (all photos by F. G. R. França).

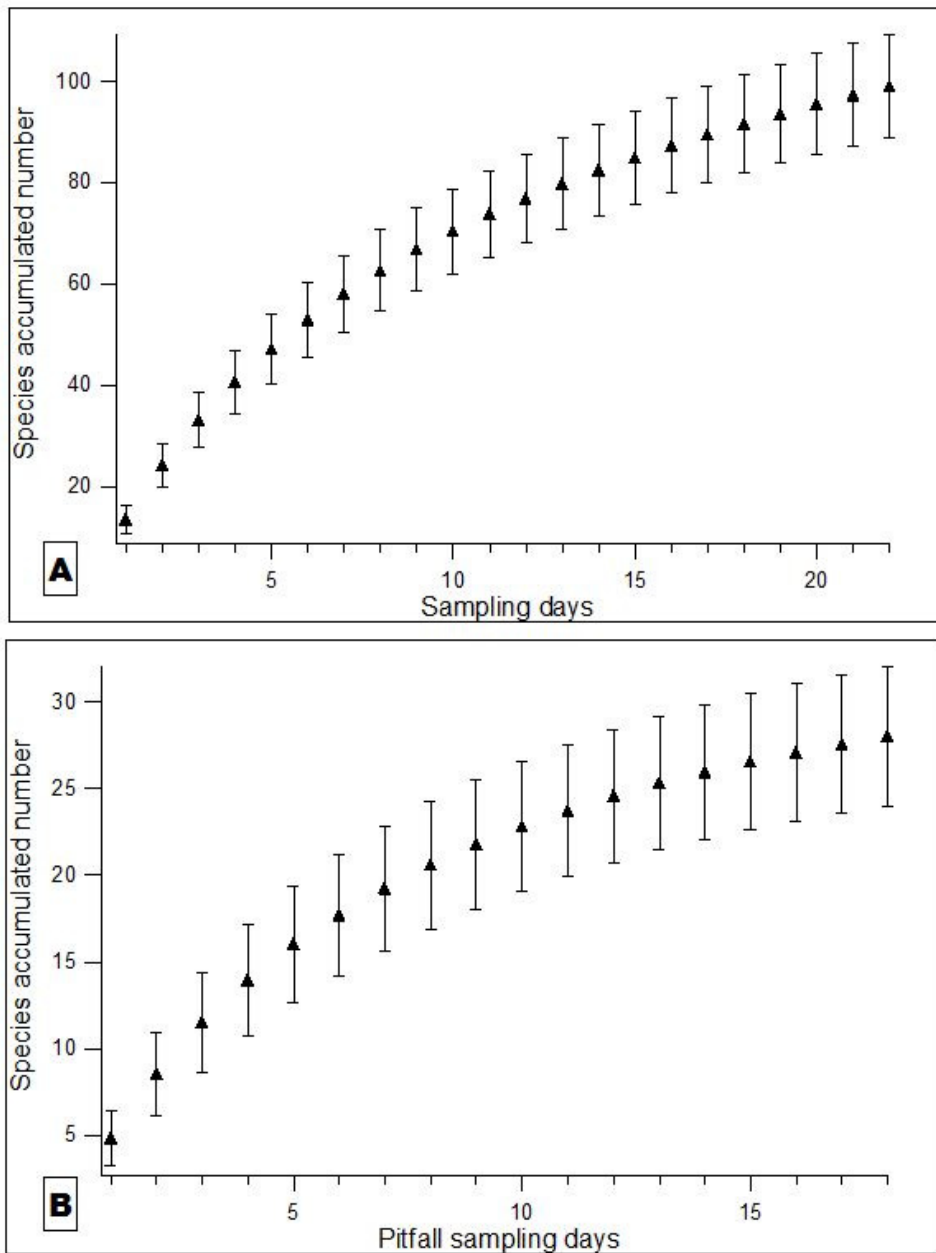


FIGURE 5: Species rarefaction curves for Boca do Acre amphibians and reptiles record. A, all sampling methods; and B, only in pitfall traps.

## Discussion

The number of amphibians and reptiles recorded during the study indicates a high diversity in the region. Previously, Azevedo-Ramos and Galatti (2002) pointed to the region among the rivers Juruá, Purus and Madeira as a priority area for amphibian conservation in Amazonia due to the high diversity. The amphibian richness found in Boca do Acre can be compared to that from other studies on Amazonia such as Manaus/Ducke

(50 species – Lima et al., 2006), Espigão do Oeste (47 – Bernarde, 2007), Alto Juruá (126 – Souza, 2009), Purus River (43 – Gordo, 2003), Alto Purus (61 – Rodríguez, 2003), Cusco Amazônico (66 – Duellman, 2005), and Médio Madeira (41 – Vogt et al., 2007). Despite the high richness, some species that are generally common throughout Amazonia were not found, such as *Hypsiboas boans*, *Hypsiboas calcaratus*, and *Dendrophryniscus minutus*, suggesting an increase in the number of species

to be identified in future studies. Also for reptiles, out of two species of crocodylians recorded, local people frequently indicated the presence of the black caiman *Melanosuchus niger* in larger rivers. In addition, another six species of turtle had already been found in the Acre and Purus rivers *Chelonoidis carbonaria*, *Podocnemis expansa*, *Podocnemis sextuberculata*, *Peltocephalus dumerilianus*, *Chelus fimbriatus*, and *Phrynops geoffroanus* (Vogt, 2003; Vogt et al., 2007) despite the fact that we were unable to register them.

Snakes and lizards have a high richness in Amazonia, reaching more than 60 species for snakes and 30 for lizards (Ávila-Pires et al., 2007). Nevertheless, the secretive habits and lower abundance of many species, as well as and the lack of efficient traps, make the sampling of entire snake and lizard compositions difficult in short time inventories. Comparing the richness with that from other long term inventories, such as those from Manaus/Ducke (66 species – Martins and Oliveira, 1998), Cusco Amazônico (51 – Duellman, 2005), and Espigão do Oeste (56 – Bernarde and Abe, 2006), the snake fauna of Boca do Acre are still incipient. The same occurs with lizards, comparing to Manaus/Ducke (32 species – Vitt et al., 2008), Cusco Amazônico (26 – Duellman, 2005), and Espigão do Oeste (29 – Macedo et al., 2008). The richness of snakes and lizards will certainly increase with the addition of new inventories in the region. Moreover, this area has ample potential to present unknown species. We captured a different snake species of the *Liophis* genus that requires further studies, and we saw one specimen that looked similar to *Tupinambis longiventris*, but we were unable to confirm the identification. Because this specimen was so different to *Tupinambis teguixin*, we named it *Tupinambis* sp.

In addition, species rarefaction curves did not show an asymptotic tendency during the work. The addition of several species in the last sample days, such as *Ctenophryne geayi*, *Philodryas viridissima*, *Typhlonectes compressicauda* and *Hypsiboas microderma*, could be responsible for the lack of curve stability. The effectiveness of pitfall traps depends on the design of the array, and the number and size of the traps (Cechin and Martins, 2000). Larger pitfall traps plus another kind of trap would be useful to capture other amphibian and

reptile species in future studies. However, despite the fact that the samples are not complete, the high richness already found in this work shows the importance of the Boca do Acre region for the Amazonian diversity of reptiles and amphibians.

Regarding the geographic distribution of the species sampled, most of them are widely distributed in Amazonia (47% amphibians and 53% reptiles), or can exceed the range out of Amazonia to other biomes (17% amphibians and 28% reptiles). Other species have a distribution that is restricted to west or south Amazonia. The major presence of widely distributed Amazonian species has been found by previous studies in other regions of southwest Amazonia (Rodríguez, 2003).

No species recorded in this work is included in the Brazilian list of species threatened by extinction (Machado et al., 2005). However, Aromobatidae frogs (*Allobates femoralis* and *A. marchesianus*), Dendrobatidae frogs (*Ameerega hahneli*, *A. trivittata*, and *Ranitomeya biolat*), turtles (*Podocnemis unifilis* and *Chelonoidis denticulata*), crocodylians (*Caiman crocodilus* and *Paleosuchus palpebrosus*), common tegu (*Tupinambis teguixin*), boid snakes (*Boa constrictor*, *Epicrates cenchria*, *Eunectes murinus*, and *Corallus hortulanus*) and mussurana (*Clelia clelia*) are listed in CITES Appendix 1 (list of species that are not necessarily now threatened with extinction, but that may become so unless trade is closely controlled – CITES, 2008). In addition, the turtles *Podocnemis unifilis* and *Chelonoidis denticulata* are also listed as vulnerable on the IUCN Red List of Threatened Species version 2.3, due to the population reduction, the decline in the quality of the habitat, and the potential level of exploitation. In addition, the entire biodiversity of Amazonia is severely threatened by the increase in deforestation rates (Fearnside, 2005).

All over the world, roads and highways have been radically changing natural landscaping and affecting the animal population dynamics (Lodé, 2000; Trombulak and Frissell, 2000). The principal road impacts on herpetofauna are the road-kill level and the barriers that isolate populations (Andrews, 1990). Snakes figure as the principal victims of road-kills due to their long body shape, their slow terrestrial locomotion, and the use of

roads as thermoregulation sites (Rosen and Lowe, 1994; Dodd et al., 2004). More than 80% of snake species found in this work had some individuals registered on the highway, and they were mostly dead, indicating that the highway can be very prejudicial to this group.

In Amazonia, roads and highways are considered to be the main vectors of biome occupation and represent a great dilemma: while reducing population isolation, they are also responsible for deforestation, forest fragmentation and fire impact (Nepstad and Carvalho, 2001; Fearnside, 2005). The municipality of Boca do Acre is located in the Amazonian deforestation arc, and the BR317 highway may be prejudicial to the forest biodiversity. The priority efforts of conservation, such as zoning, protected areas, and governmental programs, are essential to the preservation of this high richness and extremely important Amazonian region.

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## Appendix 1. Voucher specimens

*Allobates femoralis* CHUNB 59333, *Pristimantis conspicillatus* CHUNB 59334, *Pristimantis fenestratus* CHUNB 59467, *Pristimantis ockendeni* CHUNB 59471, *Oreobates quixensis* CHUNB 59320, *Rhinella castaneotica* CHUNB 59407, *Rhinella margaritifera* CHUNB 59290, *Rhinella marina* CHUNB 59394, *Ameerega hahneli* CHUNB 59324, *Ameerega trivittata* CHUNB 59300, *Ranitomeya biolat* CHUNB 59288, *Dendropsophus acreanus* CHUNB 59332, *Dendropsophus leucophyllatus* CHUNB 59438, *Dendropsophus miyatai* CHUNB 59299, *Dendropsophus rhodopeplus* CHUNB 59342, *Dendropsophus sarayacuensis* CHUNB 59434, *Dendropsophus triangulum* CHUNB 59433, *Hypsiboas cinereascens* CHUNB 59473, *Hypsiboas geographicus* CHUNB 59426, *Hypsiboas lanciformis* CHUNB 59312, *Hypsiboas microderma* CHUNB 59474, *Hypsiboas punctatus* CHUNB 59319, *Phyllomedusa hypochondrialis* CHUNB 59397, *Phyllomedusa palliata* CHUNB 59296, *Phyllomedusa tomopterna* CHUNB 59297, *Phyllomedusa vaillantii* CHUNB 59403, *Scinax boesemani* CHUNB 59461, *Scinax cruentommus* CHUNB 59331, *Scinax funereus* CHUNB 59322, *Scinax garbei* CHUNB 59441, *Scinax ruber* CHUNB 59327, *Sphaenorhynchus lacteus* CHUNB 59286, *Trachycephalus venulosus* CHUNB 59413, *Leptodactylus andreae* CHUNB 59314, *Leptodactylus didymus* CHUNB 59432, *Leptodactylus knudseni* CHUNB 59347, *Leptodactylus pentadactylus* CHUNB 59348, *Leptodactylus rhodomystax* CHUNB 59443,

*Leptodactylus stenodema* CHUNB 59342, *Chiasmocleis bassleri* CHUNB 59306, *Ctenophryne geayi* CHUNB 59309, *Typhlonectes compressicauda* CHUNB 59481, *Anolis fuscoauratus* CHUNB 59277, *Anolis nitens* CHUNB 59282, *Coleodactylus amazonicus* CHUNB 59285, *Gonatodes hasemani* CHUNB 59368, *Gonatodes humeralis* CHUNB 59283, *Thecadactylus solimoensis* CHUNB 59371, *Ameiva ameiva* CHUNB 59264, *Kentropyx pelviceps* CHUNB 59265, *Alopoglossus atriventris* CHUNB 59273, *Cercosaura ocellata* CHUNB 59275, *Cercosaura argulus* CHUNB 59378, *Iphisa elegans* CHUNB 59280, *Leposoma osvaldoi* CHUNB 59269, *Mabuya nigropunctata* CHUNB 59373, *Corallus hortulanus* CHUNB 59354, *Epicrates cenchria* CHUNB 59241, *Chironius carinatus* CHUNB 59476, *Chironius exoletus* CHUNB 59367, *Chironius multiventris* CHUNB 59475, *Spilotes pullatus* CHUNB 59350, *Atractus latifrons* CHUNB 59362, *Dipsas pavonina* CHUNB 59246, *Helicops angulatus* CHUNB 59255, *Helicops polylepis* CHUNB 59257, *Hydrodynastes gigas* CHUNB 59249, *Leptodeira annulata* CHUNB 59244, *Liophis reginae* CHUNB 59259, *Liophis* sp. CHUNB 59480, *Liophis typhlus* CHUNB 59360, *Oxyrhopus melanogenys* CHUNB 59251, *Pseudoeryx plicatilis* CHUNB 59240, *Siphlophis compressus* CHUNB 59243, *Xenopholis scalaris* CHUNB 59245, *Bothrops atrox* CHUNB 59242, *Micrurus lemniscatus* CHUNB 59479, *Micrurus remotus* CHUNB 59478, *Typhlops reticulatus* CHUNB 59248.