

# New easternmost and southernmost records of *Pseudoboa coronata* Schneider, 1801 (Serpentes: Dipsadidae: Pseudoboini), with a distribution map

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**Abstract:** The snake species *Pseudoboa coronata* has wide distribution from central Brazil to coastal Venezuela and the Guianas, eastern Bolivia, Colombia, Ecuador, and Peru. In this note, the known distribution range of *P. coronata* is extended eastward to the border between the states of Bahia and Pernambuco, and southward to Cachoeira Alta, state of Goiás, both in Brazil. Considering the limited biogeographic information for most taxa, reports like this add significant data for future studies on biogeography, taxonomy, and conservation biology.

**Key words:** Amazon Scarlet Snake, biogeography, Caatinga, Cerrado, distribution extension

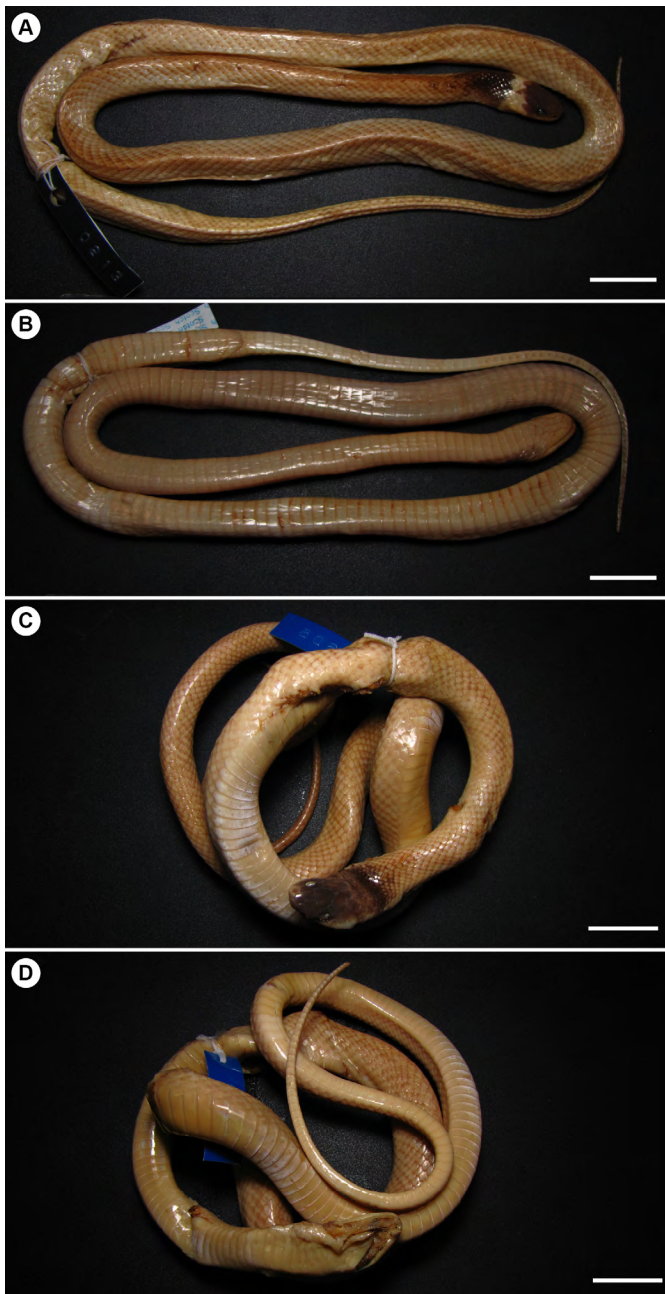
Pseudoboini Bailey, 1967 is a monophyletic clade of Neotropical snakes containing the genera *Boiruna*, *Clelia*, *Drepanoides*, *Mussurana*, *Oxyrhopus*, *Paraphimophis*, *Phimophis*, *Pseudoboa*, *Rhachidelus*, *Rodriguesophis*, and *Siphlophis* (Grazziotin et al. 2012). Its type genus, *Pseudoboa* Schneider, 1801 currently has six recognized species: *Pseudoboa coronata* Schneider, 1801; *Pseudoboa haasi* (Boettger, 1905); *Pseudoboa martinsi* Zaher, Oliveira & Franco, 2008; *Pseudoboa neuwiedii* (Duméril, Bibron & Duméril, 1854); *Pseudoboa nigra* (Duméril, Bibron & Duméril, 1854); and *Pseudoboa serrana* Morato, Moura-Leite, Prudente & Bérnils, 1995 (see Gaiarsa et al. 2013 for a summary of geographic distribution and natural history of Pseudoboini).

*Pseudoboa coronata* differs from its congeners by having 17 dorsal scale rows and uniform reddish or reddish brown dorsum in both juveniles and adults (Zaher et al. 2008). This South American species ranges from central Brazil through the Amazon basin to coastal Venezuela and the Guianas, as well as cis-Andean Colombia, Ecuador, Peru,

and Bolivia (Gaiarsa et al. 2013). In Brazil it is recorded from Cerrado areas in the states of Goiás and Tocantins, and from Amazon Forest in Acre, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, and Roraima (e.g., Silva Jr. et al. 2005; Zaher et al. 2008; Bernarde et al. 2013). Despite its wide distribution range, *P. coronata* is considered to be rare, at least in some Amazonian areas (Cunha and Nascimento 1993). Here we present an eastward and southward extension of the currently known range of *P. coronata*, as well as a literature review and updated map of distribution records.

The range extensions are based on specimens housed in the snake collection of Fundação Ezequiel Dias (FUNED), in Belo Horizonte, state of Minas Gerais, Brazil (Resende and Cotta 2013). In 2011, while examining the specimens from FUNED's collection, we identified two *Pseudoboa coronata*: FUNED 213 (Figure 1A and 1B), from the Usina Hidrelétrica Luiz Gonzaga (a hydroelectric power plant, previously called Itaparica), located in the São Francisco river on the boundary of the states of Bahia (at Glória, Rodelas, and Abaré counties) and Pernambuco (at Petrolândia, Floresta, Itacuruba, and Belém do São Francisco counties); and FUNED 902 (Figure 1C and 1D), from Cachoeira Alta, Goiás.

The record from Luiz Gonzaga power plant is the first of *P. coronata* for the Caatinga ecoregion (Desert and Xeric Shrublands biome [Olson et al. 2001]), and also its new easternmost record (previously Nova Vida, BR-316, 25 km do Gurupi, state of Maranhão, Brazil) (Zaher et al. 2008). The record from Cachoeira Alta is the second record for Goiás and the southernmost record of *P. coronata* (previously in Santa Cruz de la Sierra, Bolivia [Fugler and Cabot 1995]). Morphological data of these two specimens are presented in Table 1. Specimens were identified with the aid of the dichotomous key and color patterns in Zaher et al. (2008).



**Figure 1.** Specimens of *Pseudoboa coronata* used in this study. A and B: FUNED 213 (Luiz Gonzaga Hydroelectric Power Plant, Bahia/Pernambuco); C and D: FUNED 902 (Cachoeira Alta, Goiás). Scale bars = 20 mm. Photos by H.C. Costa.

An updated map of distribution records of *Pseudoboa coronata* is presented in Figure 2, based on the new specimens and literature sources. Details about locality records are presented in Table 2. Some references that mention the occurrence of *P. coronata* with poor locality data were not used (i.e., Boulenger 1896; Avila-Pires 2005; Embert 2007; Rivas et al. 2012). When possible, coordinates were inferred from original mapped points (i.e., Chippaux 1986; Pérez-Santos and Moreno 1988; Starace 1998), although not all of them are associated with a voucher specimen in the original reference (e.g., some records from Pérez-Santos and Moreno 1988). Fugler and Walls (1978) cite an

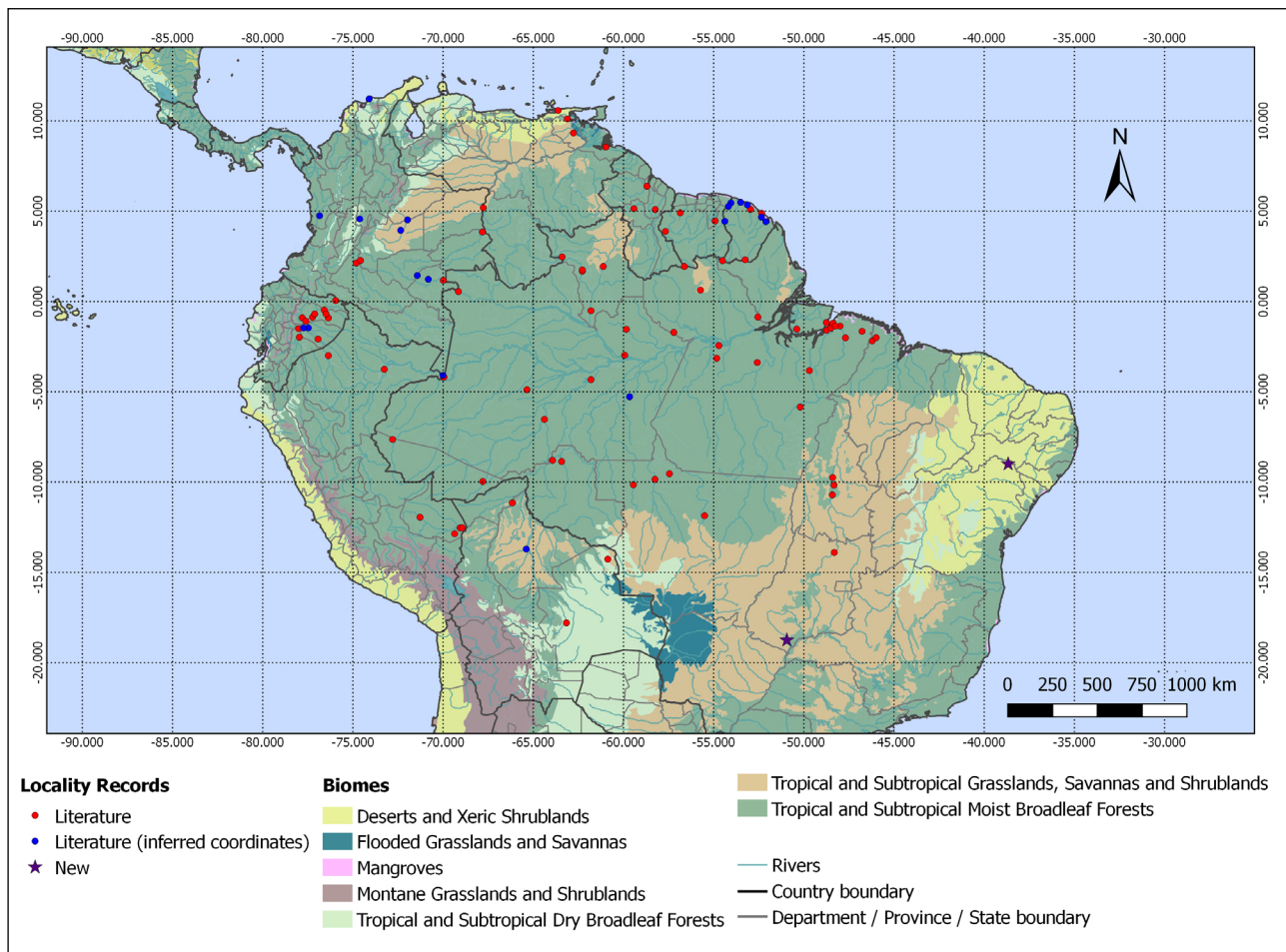
**Table 1.** Morphological data of two specimens of *Pseudoboa coronata* from FUNED's snake collection: FUNED 213 (Usina Hidrelétrica Luiz Gonzaga, Bahia-Pernambuco border) and FUNED 902 (Cachoeira Alta, Goiás). SL+O = supralabials contacting the eye; IL+C1 = infralabials contacting the first pair of chinshields; IL+C2 = infralabials contacting the second pair of chinshields.

	FUNED 213	FUNED 902
Snout-vent length	644 mm	491 mm
Caudal length	179 mm	173 mm
Sex	Female	Male
Dorsals	17-17-17	18-17-17
Apical pits	2	2
Ventrals	189	180
Subcaudals	72	94
Anal plate	entire	entire
Supralabials	7	7
SL+O	iii-iv	iii-iv
Infralabials	7	8
IL+C1	i-iv	i-v
IL+C2	iv	v
Nasal	divided	divided
Temporals	1+2+2	2+2+2
Preocular	1	1
Postocular	2	2

unlabeled specimen originally deposited at the University of North Carolina at Wilmington (UNC-W) in USA, collected at Mendez, in the Ecuadorian province of Morona Santiago, with a dorsal color pattern (dark brown with narrow cream bands) different from that usually found in *P. coronata*. The referred specimen was not found in the UNC-W collections (Alex Vance, pers. comm.), making it impossible to confirm its identity and, therefore, its record was not considered. The other five Ecuadorian specimens cited by Fugler and Walls (1978) are deposited at the United States National Museum, Smithsonian Institution. We were able to examine photographs of those specimens, but one of them (USNM 204156 from Macuma, Morona Santiago, Ecuador) has a brownish-gray dorsum in preservative, suggesting it was not red in life. Since a careful analysis of this specimen was not possible we were not sufficiently confident to include it in our database. Those specimens cited by Fugler and Walls (1978) and Cole et al. (2013) were the only specimens cited in the literature that were examined by us.

It is worth noting that some old records of *Pseudoboa coronata* were mistakenly based on other species: e.g., Wied (1824) (*P. nigra*), Jan and Sordelli (1870) (plate V, figures 3 and 4: probably *P. neuwiedii*; plate VI, figure 2: *P. nigra*, based on Wied [1824]), and Boulenger (1896) (records from Rio de Janeiro and Petrópolis are of *P. serrana*, according to Morato et al. 1995).

Due to the existence of many biodiversity shortcomings in biological sciences, especially the Wallacean shortfall (limited biogeographic information for most taxa; Whittaker et al. 2005; Cardoso et al. 2011), reports



**Figure 2.** Known records of *Pseudoboa coronata*. Red dots: locality records from which geographic coordinates were given by the original source or had been taken from Costa et al. (2013), Paynter and Taylor (1991), Paynter (1993), IBGE (2011) or Google Earth®. Blue circles: locality records represented as unnamed mapped points or cited as river names in the original source, from which geographic coordinates had to be inferred. Purple stars: new records.

of range extensions add significant data for future studies on biogeography, taxonomy, and conservation biology. Furthermore, the wide range of *Pseudoboa coronata*, its occurrences in a variety of habitats, and the absence of a careful review of its taxonomy support the hypothesis that more than one species could have been treated under the same name.

## ACKNOWLEDGEMENTS

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**Table 2.** Locality records of *Pseudoboia coronata*. Geographic coordinates not provided in the original source were taken from Costa et al. (2013), Paynter and Taylor (1991), Paynter (1993), IBGE (2011), Google Earth®. An asterisk (\*) indicates geographic coordinates inferred for locality records represented as unnamed mapped points or cited only as river names in the original source.

Country	Province/State	Municipality, Locality	Lat.	Long.	Source
Bolivia	Beni	*Rio Yacuma	-13.71°	-65.39°	Fugler and Cabot 1995
Bolivia	Beni	Tumi Chucua	-11.15°	-66.16°	Fugler and Cabot 1995
Bolivia	Santa Cruz	Parque Nacional Noel Kempff Mercado	-14.27°	-60.87°	Killeen and Schulenberg 1998
Bolivia	Santa Cruz	Santa Cruz de la Sierra	-17.80°	-63.16°	Fugler and Cabot 1995
Brazil	Acre	Cruzeiro do Sul, <i>Floresta do Rio Moa</i>	-07.64°	-72.80°	Bernarde et al. 2013
Brazil	Acre	Rio Branco	-09.97°	-67.80°	Silva et al. 2012
Brazil	Amazonas	Canutama	-06.53°	-64.38°	Zaher et al. 2008
Brazil	Amazonas	Manaus, <i>Reserva Adolpho Ducke</i>	-02.98°	-59.93°	Martins and Oliveira 1998
Brazil	Amazonas	Presidente Figueiredo, <i>Usina Hidrelétrica (UHE) Balbina</i>	-01.54°	-59.84°	Silva Jr. and Sites Jr. 1995
Brazil	Amazonas	Reserva de Desenvolvimento Sustentável Piagaçu-Purus	-04.33°	-61.80°	Waldez et al. 2013
Brazil	Amazonas	*Rio Jaraquí	-05.28°	-59.66°	Zaher et al. 2008
Brazil	Amazonas	Uaupés, <i>Iauareté</i>	00.55°	-69.15°	Hoge et al. 1973
Brazil	Bahia/Pernambuco	Usina Hidrelétrica (UHE) Luiz Gonzaga	-09.00°	-38.67°	this study
Brazil	Goiás	Cachoeira Alta	-18.76°	-50.94°	this study
Brazil	Goiás	Usina Hidrelétrica (UHE) Serra da Mesa / UHE Cana Brava	-13.90°	-48.31°	Silva Jr. et al. 2005
Brazil	Maranhão	Aldeia Araçu, Igarapé Gurupi-Una	-02.18°	-46.21°	Zaher et al. 2008
Brazil	Maranhão	Nova Vida, BR-316, 25 km do Gurupi	-02.00°	-45.99°	Cunha and Nascimento 1978, 1983
Brazil	Mato Grosso	Apiacás	-09.54°	-57.45°	Zaher et al. 2008
Brazil	Mato Grosso	Aripuanã	-10.15°	-59.45°	Zaher et al. 2008
Brazil	Mato Grosso	Cotriguaçu, Fazenda São Nicolau	-09.85°	-58.25°	Kawashita-Ribeiro et al. 2011
Brazil	Mato Grosso	Sinop	-11.86°	-55.50°	Zaher et al. 2008
Brazil	Pará	Agropecuária Treviso, Rio Curuá-Una	-03.15°	-54.83°	Avila-Pires et al. 2009
Brazil	Pará	Almeirim, <i>Monte Dourado</i>	-00.86°	-52.55°	Frota et al. 2005
Brazil	Pará	Ananindeua	-01.37°	-48.38°	Galatti and Yuki 1998
Brazil	Pará	Barcarena, <i>Area under influence of the Projeto Fauna, Refinaria ABC – Rescue Area</i>	-01.59°	-48.73°	Silva et al. 2011
Brazil	Pará	Belém	-01.46°	-48.50°	Cunha and Nascimento 1983, 1993; Zaher et al. 2008
Brazil	Pará	Boa Vista, <i>rio Apéu, próximo de Castanhal</i>	-01.36°	-47.99°	Cunha and Nascimento 1978, 1983
Brazil	Pará	BR-316, km 224	-01.65°	-46.77°	Cunha and Nascimento 1978, 1983
Brazil	Pará	Brasil Novo, <i>Caverna Planaltina</i>	-03.38°	-52.58°	Oliveira et al. 2013
Brazil	Pará	Breves, <i>PA-159 km 18, comunidade Tancredo Neves</i>	-01.53°	-50.39°	Zaher et al. 2008
Brazil	Pará	Cachoeira de Arari, <i>Sé</i>	-01.17°	-48.75°	Zaher et al. 2008
Brazil	Pará	Coari, <i>Base Operacional Geólogo Pedro de Moura</i>	-04.89°	-65.35°	Prudente et al. 2010
Brazil	Pará	Estação Ecológica do Grão Pará Centre	00.63°	-55.73°	Avila-Pires et al. 2010
Brazil	Pará	Floresta Estadual de Faro	-01.71°	-57.21°	Avila-Pires et al. 2010
Brazil	Pará	Floresta Nacional de Carajás	-05.85°	-50.20°	Maschio et al. 2012
Brazil	Pará	Ilha do Mosqueiro	-01.20°	-48.39°	Cunha and Nascimento 1978, 1983
Brazil	Pará	PA-252, km 16, partindo da BR-010 para o Acará	-02.01°	-47.69°	Cunha and Nascimento 1978, 1983
Brazil	Pará	Santa Bárbara, Estrada do Mosqueiro	-01.36°	-48.25°	Cunha and Nascimento 1978, 1983
Brazil	Pará	Santarém	-02.44°	-54.71°	Frota et al. 2005
Brazil	Pará	Usina Hidrelétrica (UHE) Tucuruí	-03.83°	-49.69°	Zaher et al. 2008
Brazil	Rondônia	Porto Velho, <i>Usina Hidrelétrica (UHE) Samuel</i>	-08.86°	-63.43°	Silva Jr. 1993
Brazil	Rondônia	Porto Velho, <i>Usina Hidrelétrica (UHE) Santo Antônio</i>	-08.80°	-63.93°	Marçal et al. 2011
Brazil	Roraima <sup>‡</sup>	1 km W da BR-174 / 1-5 km N da BR-210	01.94°	-61.12°	Zaher et al. 2008
Brazil	Roraima	Missão Catrimani	01.68°	-62.28°	Zaher et al. 2008
Brazil	Roraima	Rio Catrimani, Cachoeira do Cujubim	01.75°	-62.28°	Zaher et al. 2008
Brazil	Roraima	Santa Maria do Boiaçu	-00.51°	-61.80°	Zaher et al. 2008
Brazil	Roraima	Serra dos Surucucus	02.47°	-63.40°	Zaher et al. 2008
Brazil	Tocantins	Palmas	-10.17°	-48.33°	Marques et al. 2005
Brazil	Tocantins	Porto Nacional	-10.71°	-48.42°	Zaher et al. 2008
Brazil	Tocantins	Usina Hidrelétrica (UHE) Luís Eduardo Magalhães	-09.75°	-48.40°	Puerto and Barbarini 2004
Colombia	Amazonas	Leticia	-04.19°	-69.95°	Shreve 1947
Colombia	Amazonas	*no further details	-04.09°	-70.01°	Pérez-Santos and Moreno 1988
Colombia	Caqueta	La Arenosa	02.13°	-74.81°	Cortes-Avila and Toledo 2013
Colombia	Casanare	*no further details	04.52°	-71.97°	Pérez-Santos and Moreno 1988
Colombia	Chocó	*no further details	04.75°	-76.85°	Pérez-Santos and Moreno 1988
Colombia	Cundinamarca	*no further details	04.57°	-74.62°	Pérez-Santos and Moreno 1988
Colombia	Guainia	Estrella fluvial de Inirida	03.85°	-67.82°	Renjifo et al. 2009
Colombia	Madalena	*no further details	11.22°	-74.10°	Pérez-Santos and Moreno 1988

Continued

Table 2. Continued.

Country	Province/State	Municipality, Locality	Lat.	Long.	Source
Colombia	Meta	*no further details	03.94°	-72.35°	Pérez-Santos and Moreno 1988
Colombia	Meta	San Juan del Losada	02.27°	-74.58°	Cortes-Avila and Toledo 2013
Colombia	Vaupés	*no further details	01.44°	-71.43°	Pérez-Santos and Moreno 1988
Colombia	Vaupés	*no further details	01.23°	-70.82°	Pérez-Santos and Moreno 1988
Colombia	Vaupés	Timbó	01.17°	-69.99°	Kizirian and McDiarmid 1998
Ecuador	Morona Santiago	Chiguaza	-01.98°	-77.97°	Fugler and Walls 1978
Ecuador	Napo	Carretera a 1.5 km de Archidona vía a Quito	-00.90°	-77.81°	Pazmiño-Otamendi 2013
Ecuador	Napo	Estacion Biologica Jatun Sacha	-01.09°	-77.61°	Vigle 2008
Ecuador	Napo	Yachana Reserve	-00.87°	-77.24°	Whitworth and Beirne 2011
Ecuador	Orellana	La Belleza, Comunidad Bocana del Suno	-00.69°	-77.12°	Pazmiño-Otamendi 2013
Ecuador	Orellana	Parque Nacional Yasuní, Bloque 16 de Repsol YPF, en carretera km 57–58	-00.91°	-76.36°	Pazmiño-Otamendi 2013
Ecuador	Orellana	Parque Nacional Yasuní, carretera Maxus 7.8 km	-00.47°	-76.59°	Pazmiño-Otamendi 2013
Ecuador	Orellana	Parque Nacional Yasuní, En pozo Capirón	-00.69°	-76.49°	Pazmiño-Otamendi 2013
Ecuador	Pastaza	Comunidad Santa Rosa	-02.08°	-76.93°	Pazmiño-Otamendi 2013
Ecuador	Pastaza	Puyo	-01.50°	-78.01°	Fugler and Walls 1978
Ecuador	Pastaza	*Río Liguino, tributary of Río Villano, upper Curaray	-01.46°	-77.47°	Fugler and Walls 1978
Ecuador	Pastaza	*Río Villano	-01.46°	-77.74°	Fugler and Walls 1978
Ecuador	Sucumbios	Santa Cecilia	00.05°	-75.96°	Duellman 1978
French Guiana	Camopi	Trois-Sauts	02.31°	-53.25°	Gasc and Rodrigues 1980; Chippaux 1986; Starace 1998
French Guiana	Cayenne	Cayenne	04.89°	-52.34°	Gasc and Rodrigues 1980; Chippaux 1986; Starace 1998
French Guiana	Cayenne	Kourou-Petit Saut	05.10°	-52.96°	Sheehy et al. 2014
French Guiana	Cayenne	*no further details	05.35°	-53.13°	Chippaux 1986; Starace 1998
French Guiana	Cayenne	*no further details	04.67°	-52.35°	Chippaux 1986; Starace 1998
French Guiana	Cayenne	*no further details	04.42°	-52.10°	Starace 1998
French Guiana	Maripasoula	Mitaraca	02.26°	-54.51°	Gasc and Rodrigues 1980; Chippaux 1986; Starace 1998
French Guiana	St.-Laurent-du-Maroni	<i>Maroni (Maroni river?)</i>	04.44°	-54.38°	Gasc and Rodrigues 1980; Starace 1998
French Guiana	St.-Laurent-du-Maroni	*no further details	05.49°	-53.50°	Starace 1998
French Guiana	St.-Laurent-du-Maroni	*no further details	05.46°	-54.04°	Chippaux 1986; Starace 1998
French Guiana	St.-Laurent-du-Maroni	*no further details	05.26°	-54.18°	Starace 1998
Guyana	Cuyuni-Mazaruni	Kartabo	06.38°	-58.70°	Beebe 1946
Guyana	Potaro-Siparuni	Kaieteur National Park	05.14°	-59.42°	Kok 2006
Guyana	Upper Demerera-Berbice	Berbice River	05.09°	-58.24°	Cole et al. 2013
Peru	Loreto	Andoas	-03.00°	-76.36°	Henle and Ehrh 1991
Peru	Loreto	Iquitos	-03.76°	-73.26°	Dixon and Soini 1977
Peru	Madre de Dios	Cuzco Amazonico	-12.54°	-69.06°	Duellman and Salas 1991; Doan and Arizabal 2002; Duellman 2005
Peru	Madre de Dios	Eco Amazonia	-12.53°	-68.94°	Doan and Arizabal 2002
Peru	Madre de Dios	Pakitza, Manu National Park	-11.95°	-71.28°	Catenazzi et al. 2013
Peru	Madre de Dios	Sachavacayoc Centre	-12.86°	-69.36°	Doan and Arizabal 2002
Surinam	Brokopondo	Saracreek, 21 km S of Dam	04.46°	-54.92°	M.S. Hoogmoed, pers. comm.
Surinam	Sipaliwini	Kutari Head	01.94°	-56.62°	M.S. Hoogmoed, pers. comm.
Surinam	Sipaliwini	Road to Amotopo, km 212	03.88°	-57.67°	M.S. Hoogmoed, pers. comm.
Surinam	Sipaliwini	Upper Nickerie River	04.91°	-56.85°	M.S. Hoogmoed, pers. comm.
Venezuela	Amazonas	Puerto Ayacucho/Venado ( <i>S of Samariapo</i> )	05.19°	-67.77°	Gorzula and Senaris 1998
Venezuela	Delta Amacuro	Alrededores de Curiapo	08.55°	-60.97°	Molina et al. 2004
Venezuela	Monagas	Caripito	10.11°	-63.11°	Beebe 1946; Roze 1966; Lasso et al. 2004
Venezuela	Monagas	Sabana de Maturín, cerca Uracoa	09.33°	-62.77°	Roze 1966
Venezuela	Sucre	Benitez, Parcelamiento Guaraúnos	10.58°	-63.62°	Rivas and La Marca 2001

\* Cited as "Rondônia" by Zaher et al. (2008). However, "Roraima" is the correct location, according to the MPEG collection register book (A.L.C. Prudente pers. comm.).

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