

BRIEF REPORTS

Filling gaps in the distribution of the white-winged vampire bat, *Diaemus youngii* (Phyllostomidae, Desmodontinae): new records for southern Amazonia

Mônica A. PEDROSO^{1*}, Patrício A. da ROCHA², Marcus V. BRANDÃO³, Guilherme S. T. GARBINO⁴, Carolina O. de MORAES⁵, Caroline C. AIRES^{5,6}

¹ Universidade Federal de Sergipe, Programa de Pós-Graduação em Ecologia e Conservação, Campus São Cristóvão, CEP: 49100-00. Jardim Roza Elze, Sergipe, Brazil.

² Universidade Federal da Paraíba, Programa de Pós-Graduação em Zoologia, Campus I, Departamento de Sistemática e Ecologia, CEP: 58051-900. Castelo Branco, João Pessoa, Paraíba, Brazil.

³ Universidade Federal de São Carlos, Programa de Pós-Graduação em Diversidade Biológica e Conservação, Campus Sorocaba, CEP: 18052-780. Itinga, Sorocaba, São Paulo, Brazil.

⁴ Universidade Federal de Minas Gerais, Programa de Pós-Graduação em Zoologia, Departamento de Zoologia, Instituto de Ciências Biológicas, CEP: 31270-901. Pampulha, Belo Horizonte, Minas Gerais, Brazil.

⁵ Universidade de Mogi das Cruzes, Campus da Sede, CEP: 08780-911. Vila Partenio, Mogi das Cruzes, São Paulo, Brazil.

⁶ Universidade de São Paulo, Museu de Zoologia, Laboratório de Mastozoologia, CEP: 04299-970. Ipiranga, São Paulo, São Paulo, Brazil.

* Corresponding author: monicaapp@hotmail.com

ABSTRACT

Bats of the subfamily Desmodontinae are the only hematophagous mammals, represented by three species. Among them, *Diaemus youngii* has the fewest records in Brazil, being poorly known demographically and ecologically. We report the first record of *D. youngii* for Mato Grosso state, in central-western Brazil, and provide additional records for the states of Rondônia and Tocantins, in northern Brazil, extending the known distribution of *D. youngii* in the southern Amazon region.

KEYWORDS: rainforest, hematophagous bat, Mato Grosso, Rondônia, Tocantins

Preenchendo lacunas na distribuição do morcego-vampiro de asas brancas, *Diaemus youngii* (Phyllostomidae, Desmodontinae): novos registros para o sul da Amazônia

RESUMO

Os morcegos da subfamília Desmodontinae compreendem às únicas três espécies de mamíferos hematófagos. Entre elas, *Diaemus youngii* é a espécie com menor número de registros no Brasil, sendo pouco conhecida demográfica e ecologicamente. Nós relatamos o primeiro registro de *D. youngii* para o estado do Mato Grosso, no centro-oeste do Brasil, e fornecemos registros adicionais para os estados de Rondônia e Tocantins, no norte do Brasil. Os registros ampliam a distribuição conhecida de *D. youngii* no sul da região amazônica.

PALAVRAS-CHAVE: floresta pluvial, morcego hematófago, Mato Grosso, Rondônia, Tocantins

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Bats of the subfamily Desmodontinae are very relevant to public health, as they are the only hematophagous mammals and major reservoirs and vectors of rabies virus (Johnson *et al.*, 2014). The subfamily contains three species, *Desmodus rotundus* É. Geoffroy, 1810; *Diphylla ecaudata* Spix, 1823; and *Diaemus youngii* (Jentink, 1893) (Gardner 2008). *Diaemus youngii* has the fewest records in Brazil (Kwon and Gardner, 2008), being poorly known demographically and ecologically. The species is listed as “least concern” by the International Union for Conservation of Nature (IUCN) global assessment, mainly due to its wide geographic range (Aguiar *et al.*, 2006; Greenhall and Schutt, 1996; IUCN, 2017). *Diaemus youngii* occurs over most of the Neotropical region, from northeastern Mexico, to Central and South America, reaching its southern limit in Misiones, Northern Argentina (Kwon and Gardner, 2008). In Brazil, the species is present in several phytogeographies, from Amazonian forests, through open habitats of the Pantanal, Cerrado and Caatinga biomes, to its southern limits in the Atlantic Forest of Paraná state (Brazil). Despite its wide distribution, records of the species are still rare and scattered (Greenhall and Schutt, 1996; Aguiar *et al.*, 2006; Kwon and Gardner, 2008), especially in southern Amazonia, where a single record was known so far (Tavares *et al.*, 2017). We report here the first record of *D. youngii*

for Mato Grosso state, in central-western Brazil, and provide additional records for the states of Rondônia and Tocantins, in northern Brazil, extending the known distribution of the species in the southern Amazon (Figure 1).

All specimens analyzed here (Table 1) are deposited in the zoological collection of the Museu de Zoologia of Universidade de São Paulo (MZUSP). Its measurements are in accordance with the ones given in literature (see Greenhall and Schutt, 1996).

The three specimens were mist netted during bat inventories. On July 17, 2014, an adult male *D. youngii* (MZUSP 35712) (Figure 2A) from Abunã, district of Porto Velho, Rondônia state (9°35'S, 65°3'W), was collected by the four main authors of the present study. The predominant vegetation type in that area is alluvial ombrophilous dense forest, with medium and large trees, palms, woody vines, and epiphytes (*sensu* Ivanauskas *et al.*, 2008). The other two specimens refers to unpublished specimens from MZUSP collection. Specimen MZUSP 35713 (Figure 3), represented by a taxidermied skin and separated skull, was collected by Marília Kerr on April, 1997 at the Renato River, a tributary of the Teles Pires River, near the city of Cláudia (11°24'S, 55°2'W), state of Mato Grosso, Brazil. Further details on the

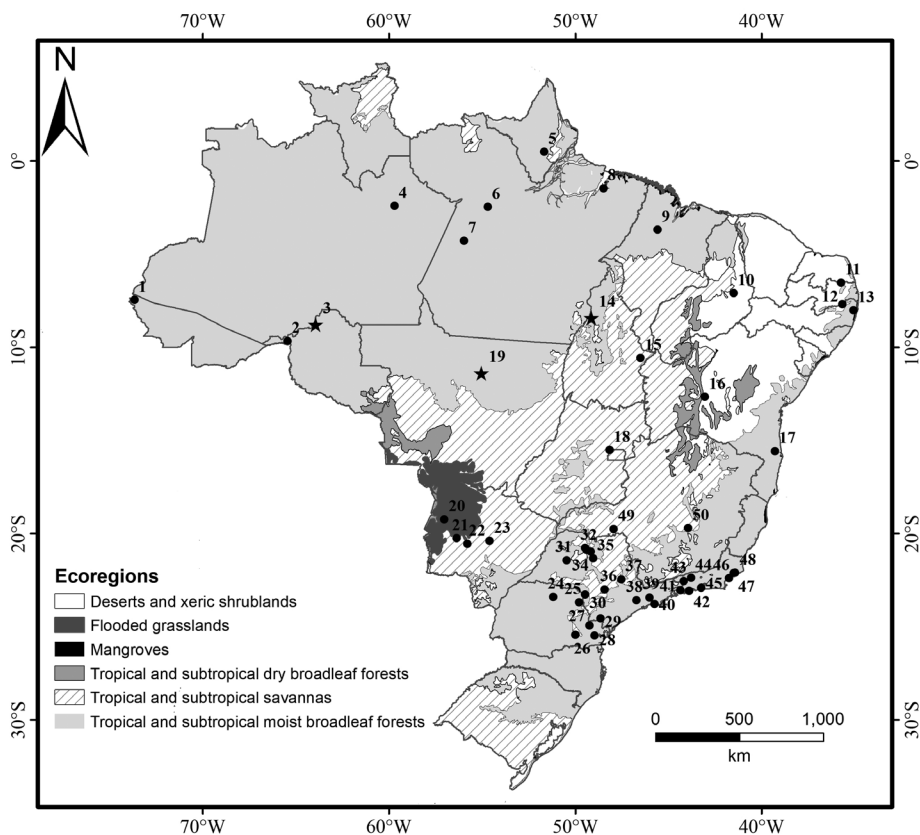


Figure 1. Known occurrence localities for *Diaemus youngii*. Stars represent the new records and circles are records from the literature. For key to code numbers, see Supplementary Material, Table S1.

Table 1. Sex, external and cranial measurements (in mm) of the *Diaemus youngii* specimens reported in here here. RO = Rondônia state, MT = Mato Grosso state, TO = Tocantins state.

Parameter ¹	MZUSP 35712 (RO)	MZUSP 35713 (MT)	MZUSP 35358 (TO)
Sex	Male	Male	Male
Body length	76.46	71.15	73.61
Hind foot length	15.35	16.94	16.40
Ear length	17.49	16.06	18.05
Forearm length	54.39	48.94	53.14
Greatest length of skull	25.99	25.83	25.01
Condylbasal length	21.59	20.35	21.09
Mastoid breadth	13.20	11.84	12.69
Zygomatic breadth	14.20	13.94	13.84
Breadth of braincase	13.24	12.90	12.91
Postorbital constriction	6.60	6.00	6.36
Palatal length	8.08	7.82	7.61
Breadth across upp/er canines	6.53	6.35	6.43
Breadth across upper molars	6.80	6.53	6.41
Length of maxillary toothrow	5.56	5.30	5.97
Length of mandible	15.55	14.91	14.99

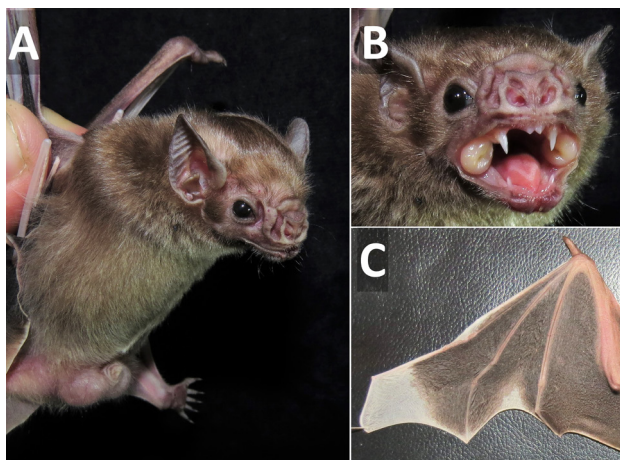


Figure 2. (A) *Diaemus youngii* (MZUSP 35712) caught in Porto Velho, state of Rondônia; (B) detail of the pair of glands located laterally on the inner part of the cheeks; (C) detail of the white spot on the distal tip of dactylopatagium. This figure is in color in the electronic version.



Figure 3. Dorsal, ventral and lateral views of the skull, and lateral view of the mandible of *Diaemus youngii* (MZUSP 35713) from the state of Mato Grosso, Brazil. Scale bar = 10 mm. This figure is in color in the electronic version.

latter collecting locality are available in Gualda-Barros *et al.* (2012). Specimen MZUSP 35358 (preserved in alcohol) was mist netted in Couto Magalhães (8°21'S, 49°10'W), Tocantins state, in October 2014 during a bat inventory near an electric power transmission line (LT Xingu-Estreito) (Figure 1).

Diaemus youngii can be distinguished from the other two desmodontine genera by a suite of morphological characters: a pair of glands located laterally on the inner part of the cheeks (Figure 2B), that are exposed when the bat feels threatened and releases a strong-smelling liquid (Greenhall and Schutt, 1996); a white spot on the distal tip of the dactylopatagium and another spot between digits IV and V (Figure 2C); thumbs with only one basal pad, an absent calcar (in *D. rotundus* the calcar is present, but greatly reduced, and in *D. ecaudata* it is conspicuous) (Kwon and Gardner, 2008); two upper and one lower molar (i1/2, c1/1, p1/2, m2/1= 22) (Figure 3), while *D. ecaudata* has two lower molars (i2/2, c1/1, p1/2, m2/2= 26) and *D. rotundus* has one upper and one lower (i1/2, c1/1, p1/2, m1/1= 20).

Our review of the records of *D. youngii* in Brazil show that records are concentrated in southeastern Brazil, in the states of São Paulo and Rio de Janeiro (Figure 1). This pattern is possibly a result of a collection bias, as in these two states intensive and long-duration surveys have been carried out, and consequently the bat fauna in the two regions is relatively better known (Esbérard and Bergallo, 2005; Garbino, 2016). Based on our review, there is a large sampling gap in the Cerrado of central Brazil, and in the interior Caatinga.

Roosts used by *D. youngii* include caves and cavities in trees (Aguiar *et al.*, 2006; Greenhall and Schutt, 1996), however, contrary to *D. ecaudata* (Rocha *et al.*, 2014) and *D. rotundus* (Oliveira *et al.*, 2009; Greenhall *et al.*, 1983; Flores-Crespo and Arellano-Sota, 1991; Bredt *et al.*, 1999), the species is not commonly found in caves. *Diaemus youngii* has been found in caves in the southeastern Brazilian state of São Paulo, but with a low capture rate (Trajano, 1984), while in the same state, McNab (1969) and Taddei (Information on the specimen found in the Chiroptera Collection, Department of Zoology, State University of São Paulo, São José do Rio Preto “DZSJRP 16615”) sampled the species in cavities in standing trees. In Trinidad, a large colony was found in a hollow *Erythrina micropteryx* tree, and only a single individual was captured in a cave (Goodwin and Greenhall, 1961). Therefore, based on these data, it is suggested that additional records of *D. youngii* may be obtained by searching for roosts in hollow standing trees.

To have additional information on how and where to find the species, data on roost use and colony demographics are of special importance, expanding the knowledge of blood-feeding bats and their biology. The records presented in here contribute to the knowledge on the distribution of *D. youngii* in the Amazon region.

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SUPPLEMENTARY MATERIAL

(only available in the electronic version)

PEDROSO *et al.* Filling gaps in the distribution of the white-winged vampire bat, *Diaemus youngii* (Phyllostomidae, Desmodontinae): new records for southern Amazonia

Table S1. Locality records for *Diaemus youngii* in Brazil. The code numbers refer to the points shown in Figure 1. Datum: SAD69.



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Table S1. Locality records for *Diaemus youngii* in Brazil. The code numbers refer to the points shown in Figure 1. Datum: SAD69.

Code	Coordinates		State	Locality	Reference
	Lat	Long			
1	7° 27' 00" S	73° 41' 00" W	AC	Parque Nacional da Serra do Divisor, Cruzeiro do Sul	Nogueira <i>et al.</i> (1999)
2	9° 39' 00" S	65° 27' 00" W	RO	Distrito de Abunã, Porto Velho	This study
3	8° 48' 06" S	63° 57' 03" W	RO	UHE Santo Antônio, Porto Velho	Tavares <i>et al.</i> (2017)
4	2° 24' 00" S	59° 43' 00" W	AM	Projeto Dinâmica Biológica de Fragmentos Florestais (PDBFF), Manaus	Bernard (2001)
5	0° 30' 00" S	51° 40' 00" W	AP	Santa Luzia do Pacui, Macapá	Peracchi <i>et al.</i> (1984)
6	2° 27' 02" S	54° 42' 03" W	PA	Taperinha, Santarém	Piccinini (1974)
7	4° 16' 39" S	55° 59' 04" W	PA	Iataituba	Reis & Schubart (1979)
8	1° 27' 21" S	48° 29' 25" W	PA	Utinga, Belém	Handley (1967)
9	3° 41' 00" S	45° 35' 00" W	MA	Tufilândia	Dias <i>et al.</i> (2009)
10	7° 04' 54" S	41° 29' 55" W	PI	Picos	Pinto & Bento (1986)
11	6° 31' 00" S	35° 44' 00" W	PB	Parque Estadual Pedra da Boca, Araruna	Feijó <i>et al.</i> (2010)
12	7° 41' 00" S	35° 39' 00" W	PB	Lagoa da Pedra, Lajes, Umbuzeiro	Feijó & Langguth (2011)
13	8° 00' 00" S	35° 03' 00" W	PE	Estação Ecológica do Tapacurá, São Lourenço da Mata	Mares <i>et al.</i> (1981)
14	8° 25' 29" S	49° 07' 24" W	TO	Estreito, Couto Magalhães	This study
15	10° 34' 00" S	46° 30' 00" W	TO	Estação Ecológica Serra Geral do Tocantins	Gregorin <i>et al.</i> (2011)
16	12° 39' 00" S	43° 03' 00" W	BA	Nas proximidades de Paratinga, Vale Médio do Rio São Francisco	Sá-Neto & Marinho Filho (2013)
17	15° 34' 00" S	39° 17' 00" W	BA	Fazenda São José	Falcão (2007)
18	15° 30' 00" S	48° 10' 00" W	DF	Brazlândia	Aguiar <i>et al.</i> (2006)
19	11° 24' 03" S	55° 02' 58" W	MT	Cláudia	This study
20	19° 13' 10" S	57° 02' 30" W	MS	Nhecolândia	Oliveira <i>et al.</i> (2012)
21	20° 14' 10" S	56° 22' 30" W	MS	Miranda	Oliveira <i>et al.</i> (2012); Leite <i>et al.</i> (1998)
22	20° 32' 23" S	55° 47' 43" W	MS	Aquidauana	Oliveira <i>et al.</i> (2012)
23	20° 23' 11" S	54° 36' 27" W	MS	Instituto São Vicente, Campo Grande	Urbietta <i>et al.</i> (2017)
24	23° 23' 00" S	51° 11' 00" W	PR	Parque Estadual Mata do Godoy	Reis <i>et al.</i> (2003)
25	23° 40' 25" S	49° 47' 36" W	PR	Siqueira Campos	Margarido & Braga (2004)
26	25° 25' 26" S	50° 00' 16" W	PR	Palmeira	Thomas (1899)
27	24° 54' 58" S	49° 14' 33" W	PR	Cerro Azul	Graciolli & Carvalho (2001)
28	25° 28' 00" S	48° 58' 00" W	PR	Estação Roça Nova, Piraquara	Miller (1906)
29	24° 33' 00" S	48° 39' 00" W	SP	Caverna Alambari de Baixo, Iporanga	Trajano (1984)
30	23° 15' 27" S	49° 28' 01" W	SP	Sarutaiá	Uieda (1993)
31	21° 25' 00" S	50° 28' 00" W	SP	Bilac	Garbino (2016)
32	20° 46' 00" S	49° 28' 00" W	SP	APA Grota de Mirassol, Mirassol	Garbino (2016)
33	20° 52' 00" S	49° 24' 00" W	SP	Mata dos Macacos, São José do Rio Preto	Garbino (2016)
34	20° 57' 00" S	49° 10' 00" W	SP	Uchoa	Garbino (2016)
35	21° 19' 00" S	49° 03' 00" W	SP	Itajobi	Garbino (2016)
36	22° 59' 00" S	48° 26' 00" W	SP	Botucatu	Uieda (2005)
37	22° 27' 00" S	47° 32' 00" W	SP	Fazenda Paraguassu, Santa Gertrudes	Sazima & Uieda (1980)
38	23° 34' 00" S	46° 43' 00" W	SP	Butantan, São Paulo	Vieira (1942)

Table S1. Continued

Code	Coordinates		State	Locality	Reference
	Lat	Long			
39	23° 25' 00" S	46° 01' 00" W	SP	Guararema	Garbino (2016)
40	23° 46' 00" S	45° 45' 00" W	SP	Barra do Uma, São Sebastião	Garbino (2016)
41	23° 02' 00" S	44° 21' 00" W	RJ	Ilha da Gipóia, Angra dos Reis	Carvalho et al. (2011)
42	23° 04' 00" S	43° 53' 00" W	RJ	Ilha de Marambaia, Rio de Janeiro	Lourenço et al. (2010)
43	22° 32' 00" S	44° 11' 00" W	RJ	Barra Mansa	Peracchi & Albuquerque (1971)
44	22° 22' 00" S	43° 47' 00" W	RJ	Santuário da Vida Silvestre da Serra da Concórdia, Barra do Piráí	Modesto et al. (2008)
45	22° 54' 00" S	43° 14' 00" W	RJ	U.F.R.R.J., Seropédica	Peracchi & Albuquerque (1984)
46	22° 23' 00" S	41° 45' 00" W	RJ	Parque Nacional da Restinga de Jurubatiba, Macaé	Luz et al. (2011)
47	22° 07' 00" S	41° 29' 00" W	RJ	Carmo	Avilla et al. (2001)
48	22° 06' 00" S	41° 25' 00" W	RJ	Parque Nacional Restinga de Jurubatiba, Quissamã	Bergallo et al. (2004)
49	19° 44' 51" S	47° 56' 21" W	MG	Uberaba	Uieda (1993); Stutz et al. (2004)
50	19° 42' 00" S	43° 56' 00" W	MG	São José da Lapa	Torquetti et al. (2013)

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