

A new species of *Eptesicus* (Mammalia: Chiroptera: Vespertilionidae) from the Atlantic Forest, Brazil

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Abstract

A new species of the genus *Eptesicus* Rafinesque (Mammalia: Chiroptera: Vespertilionidae) from Atlantic Forest, Brazil is described. This species is distinct from its congeners based on external and cranial morphometrics, as well as on qualitative traits such as a more reddish coloration, more inflated muzzle and rounder ears.

Key words: *Eptesicus taddeii* new species, Neotropical bat, taxonomy, Atlantic Forest, Brazil

Resumo

Uma nova espécie do gênero *Eptesicus* Rafinesque (Mammalia: Chiroptera: Vespertilionidae) da Floresta Atlântica, Brasil é descrita. Esta espécie é distinta de suas congêneres baseadas na morfometria externa e craniana, bem como em caracteres qualitativos como uma coloração mais avermelhada, focinho mais inflado e orelhas mais arredondadas.

Palavras chave: *Eptesicus taddeii* sp. nov., morcego Neotropical, taxonomia, Floresta Atlântica, Brasil

Introduction

The genus *Eptesicus* Rafinesque includes 23 species that are distributed worldwide (Simmons, 2005). After several taxonomic revision (Cabrera, 1957; Davis, 1965, 1966; Carvalho, 1973; Taddei, 1996; Simmons & Voss, 1998; Barquez *et al.* 1999), only five of those species are currently recognized as occurring in South America (Barquez *et al.*, 1999, Simmons, 2005), of which only four are found in Brazil: *E. brasiliensis* (Desmar-

est), *Eptesicus chiriquinus* Thomas, *E. diminutus* Osgood and *E. furinalis* (d'Orbigny & Gervais) (Tavares *et al.* in press.). In the states of Paraná, Santa Catarina and São Paulo, the following species were recorded: *E. diminutus*, *E. furinalis* e *E. brasiliensis* (Reis *et al.*, 2000; Miretzki, 2003; Cherem *et al.*, 2004; Peracchi *et al.*, 2006; Tavares *et al.* in press). In a recent study on the mammals of the Devonian Scarp of the state of Paraná, we collected 20 specimens of a bat of the genus *Eptesicus* that is similar to *E. brasiliensis*. These specimens were compared with those of the mastozoological collections of the Universidade Federal do Paraná (DZUP) and the Museu de Zoologia da Universidade de São Paulo (MZUSP). A close inspection indicated qualitative and morphometric (external and cranial) differences between these specimens and those representing *E. brasiliensis* (the most similar described species) or any other known *Eptesicus*, suggesting a new taxon. In this study we describe a new species of the genus *Eptesicus*, increasing to 24 its number of species of which six are now present in South America and five in Brazil (Peracchi *et al.* 2006; Tavares *et al.* in press). The choice of morphological traits and their measurement were carried out according to Barquez *et al.* (1999). The measured traits are: total length, tail length, ear length, forearm length, condylobasal length, zygomatic breadth, greatest skull length, postorbital constriction, braincase breadth, maxillary toothrow length, mandibular toothrow length, mandible length, width across canines and width across molars.

***Eptesicus taddeii* sp. nov.**

(Figures 1a, 1c and 1f)

Description.—A similar species to *Eptesicus brasiliensis*, although possessing a longer forearm (44.1–48.7 mm) (N = 23) and a larger greatest skull length (17.3–18.4 mm) (N = 23). *Eptesicus taddeii* sp. nov. is a medium-sized bat, with an more inflated muzzle than *E. brasiliensis*, and a “naja-shaped” (dorsal-ventrally compressed) penis, a feature common to the genera *Eptesicus* Rafinesque e *Histiotus* Gervais. The ears are small and subtriangular, with their terminal portion being rounder than in *E. brasiliensis* and an average height of 15.6 mm (N = 23); the tragus has a lobule in its base, a slightly acuminate tip and smooth edges. The upper lips have a row of hairs. The tail has an average length of 47.9 mm (N = 22), exceeding the uropatagium by at most 1.7 mm; the plagiopatagium is inserted at the base of the fingers; the hindfoot is well developed.

The general coloration may vary from reddish brown to red. Hairs in the dorsum measure ca. 7 mm in length and are bicolored, with basal two-thirds being brown and the tips red. The ventral region is paler than the dorsum. This bicolored pattern is even more conspicuous in the ventral region, with each hair being in its basal half and red in its terminal half. The naked parts of the rostrum, ears and membranes are black, even in the most reddish specimens. As is the case in other species in the genus, *E. taddeii* sp. nov. has sexual size dimorphism, with females tended to be larger than males (Table I).

TABLE I. External and cranial dimensions of the type series of *Eptesicus taddeii* sp. nov.

Individual / variable	Sex	Total length	Tail length	Ear length	Forearm Length	Condylol-basal Length	Zygomatic breadth	Greatest Skull length
DZUP 098	M	108.70	50.10	16.25	46.90	17.45	12.20	18.15
DZUP 229	M	108.10	43.45	17.00	46.60	17.40	12.90	18.40
DZUP 246*	M	104.80	44.40	14.80	46.80	-	12.15	17.85
DZUP 247	F	116.70	42.60	15.70	46.45	16.85	12.15	17.40
DZUP 248	M	110.60	52.50	14.40	46.40	17.05	12.00	17.55
DZUP 249	M	107.95	48.80	-	48.60	16.70	12.15	18.15
DZUP 250	M	102.20	46.25	14.60	46.85	17.00	12.25	18.00
DZUP 251	M	117.55	49.75	14.65	47.20	16.90	12.00	17.40
DZUP 252	M	99.10	42.50	15.30	44.80	16.45	11.45	17.10
DZUP 253	F	103.50	45.45	16.30	46.00	16.95	11.65	17.40
DZUP 254	F	102.90	42.70	15.10	-	16.00	-	-
DZUP 255	M	-	-	13.00	44.60	-	-	17.35
DZUP 256	F	113.20	52.80	15.65	44.15	17.35	-	18.65
DZUP 257	F	108.90	49.50	16.50	47.50	17.20	12.40	17.95
DZUP 258	F	111.80	52.30	16.25	46.10	16.80	12.60	17.70
DZUP 259	F	110.45	52.50	17.20	45.80	16.95	12.65	18.30
DZUP 260	F	106.50	46.60	17.10	45.40	17.25	12.60	18.10
DZUP 261	F	102.45	44.70	15.50	47.10	16.65	-	17.90
DZUP 262	F	110.40	47.70	15.30	45.40	16.85	12.00	17.60
DZUP 263	F	107.90	46.45	16.90	47.80	16.40	11.70	17.70
DZUP 264	F	112.20	51.60	16.00	48.70	16.65	12.15	17.90
DZUP 265	F	110.70	48.70	16.70	47.30	16.95	12.20	18.00
DZUP 266	F	113.90	53.30	14.90	48.40	16.55	12.70	18.20
MZUSP 26455	F	-	-	14.00	45.10	16.70	12.10	17.60
Means and stadard deviation		108.6 ± 4.78	47.9 ± 3.65	15.6 ± 1.09	46.52 ± 1.26	16.86 ± 0.35	12.2 ± 0.37	17.88 ± 0.36

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TABLE I (continued)

Individual / variable	Greatest Skull length	Postorbital constriction	Braincase breadth	Maxillary tooththrow length	Mandibular Tooththrow length	Mandible length	Width across canines	Width across molars
DZUP 098	18.15	4.20	8.10	7.10	7.70	13.90	6.10	7.70
DZUP 229	18.40	4.10	8.00	7.00	7.60	13.95	5.90	7.55
DZUP 246*	17.85	4.05	8.20	6.70	7.20	13.25	5.60	7.50
DZUP 247	17.40	4.25	8.65	6.75	7.25	13.20	5.60	7.80
DZUP 248	17.55	4.15	7.95	6.85	7.55	13.40	5.70	7.65
DZUP 249	18.15	3.95	8.10	6.70	7.35	13.60	5.60	7.70
DZUP 250	18.00	3.90	8.00	6.45	7.10	13.30	5.65	7.15
DZUP 251	17.40	3.95	8.00	6.85	7.30	13.40	5.70	7.00
DZUP 252	17.10	4.10	8.15	6.75	7.20	13.10	5.55	7.30
DZUP 253	17.40	3.95	7.95	6.80	7.32	13.25	5.50	7.45
DZUP 254	-	4.00	8.10	6.40	7.25	13.00	5.60	7.55
DZUP 255	17.35	4.20	8.15	6.45	7.20	13.00	5.60	7.45
DZUP 256	18.65	4.25	8.50	7.05	7.50	13.85	5.85	7.60
DZUP 257	17.95	4.00	8.40	6.90	7.45	13.80	5.80	7.40
DZUP 258	17.70	4.10	8.00	6.80	7.30	13.55	5.85	7.65
DZUP 259	18.30	4.15	8.35	6.85	7.40	13.70	5.90	7.65
DZUP 260	18.10	4.40	8.05	6.90	7.40	13.60	6.00	7.65
DZUP 261	17.90	4.10	8.25	6.80	7.30	13.30	5.20	7.55
DZUP 262	17.60	3.90	7.70	6.60	7.30	13.60	5.70	7.45
DZUP 263	17.70	3.95	7.90	6.90	7.30	13.40	5.55	7.50
DZUP 264	17.90	3.90	8.00	6.80	7.35	13.60	5.50	7.80
DZUP 265	18.00	3.90	8.15	6.60	-	13.40	5.65	7.60
DZUP 266	18.20	4.30	8.00	6.80	7.35	13.70	5.90	7.60
MZUSP 26455	17.60	4.25	8.40	7.00	7.40	13.40	5.45	7.50
Means and standard deviation	17.88 ± 0.36	4.08 ± 0.15	8.13 ± 0.21	6.78 ± 0.18	7.35 ± 0.14	13.47 ± 0.27	5.68 ± 0.2	7.53 ± 0.18

Note: * Holotypus

Dental formula is I2/3, C1/1, P1/2, M3/3. Upper internal incisors are spatuliform, bilobate, and larger than the external ones. External incisors are small, subconical, reaching the height of the inner cingulum and touching the internal incisors, but not the canines. Lower incisors have a trilobate ridge that runs latero-posteriorly. Upper premolar is well developed and touches the canine and the first molar. First lower premolar touches the cusp of the canine cingulum. The second lower premolar is larger than the first and contacts it, as well as the first lower molar. The first and second upper molars have a subquadrate contour in occlusal view, with the cusps forming a W-shape. The third upper molar has a subtriangular contour. Lower molars have similar shape, decreasing in size from the first to the third. External and cranial measurements are shown in Table I.

Diagnosis.—The body measurements of *Eptesicus taddeii* sp. nov. are intermediate between *Eptesicus fuscus* and two other species, *E. brasiliensis* and *E. chiriquinus*. It is distinct from sympatric species (*E. diminutus*, *E. furinalis* and *E. brasiliensis*) mostly through both morphometric (Table II), and qualitative traits. *Eptesicus taddeii* sp. nov. is qualitatively distinct from *E. brasiliensis* due to the more robust appearance, the more reddish coloration, a larger and more inflated muzzle and rounder ears (Figures 1a and 1b). Skull traits are also distinct in *E. taddeii*, including the nasal opening, that has a V-shape (in *E. brasiliensis* this opening forms a U-shape) (Figures 1c and 1d), the zygomatic arc, that is more angulous than in *E. brasiliensis* (Figure 1c and 1d), and the angular process of mandible that is longer than in *E. brasiliensis* (Figure 1e and 1f). The morphometric traits clearly distinguished *E. taddeii* sp. nov. from *E. brasiliensis* (MANOVA, $F_{10,28} = 14.15$; $p < 0.05$). In addition, discriminant functions correctly classified both species in 100% of the individuals, as well as >90% of the sexes within each species. Although such efficient interspecific differentiation is shown by the set of all measurements, the following traits showed the most pronounced differences: forearm length, condylobasal length, greatest skull length, maxillary toothrow length, mandibular toothrow length and width across canines (Figure 2). The geographical distribution of *E. taddeii* sp. nov. does not seem to overlap with *E. fuscus*, which is widely distributed in North and Central America, occurring only in the northernmost portion of South America, in the Guiana shield and in northern and central Amazon (Piccinini, 1974; Eisenberg, 1989; Kurta & Baker, 1990; Koopman, 1993; Simmons, 2005; Peracchi *et al.*, 2006). However, some of these specimens of *E. fuscus* recorded in Brazil might in fact belong to *E. chiriquinus* (Simmons & Voss, 1998; Tavares *et al.* in press). Also, several measurements were larger in *E. fuscus*, such as: forearm length 46.2–56.6 mm (Hill & Evans, 1985; Eisenberg, 1989); condylobasal length 18.0–18.5 mm; zygomatic breadth 12.7–13 mm; greatest skull length 18.8–19.4 mm; postorbital constriction 4.3–4.4 mm; braincase breadth 8.6–8.8 mm; maxillary toothrow length 7.1–7.4 mm and mandibular toothrow length 7.8–8.0 mm (Hill & Evans, 1985). *E. taddeii* sp. nov. is also geographically isolated from *E. chiriquinus*, which is found in northern South America (Simmons & Voss, 1998; Simmons, 2005). In addition, some traits of *E. chiriquinus* are smaller than in *E. taddeii* sp. nov., such as: greatest skull

length 15.8–17.3 mm; braincase breadth 7.3–8.2 mm and maxillary tooththrow length 6.1–7.7 mm (Simmons & Voss, 1998).

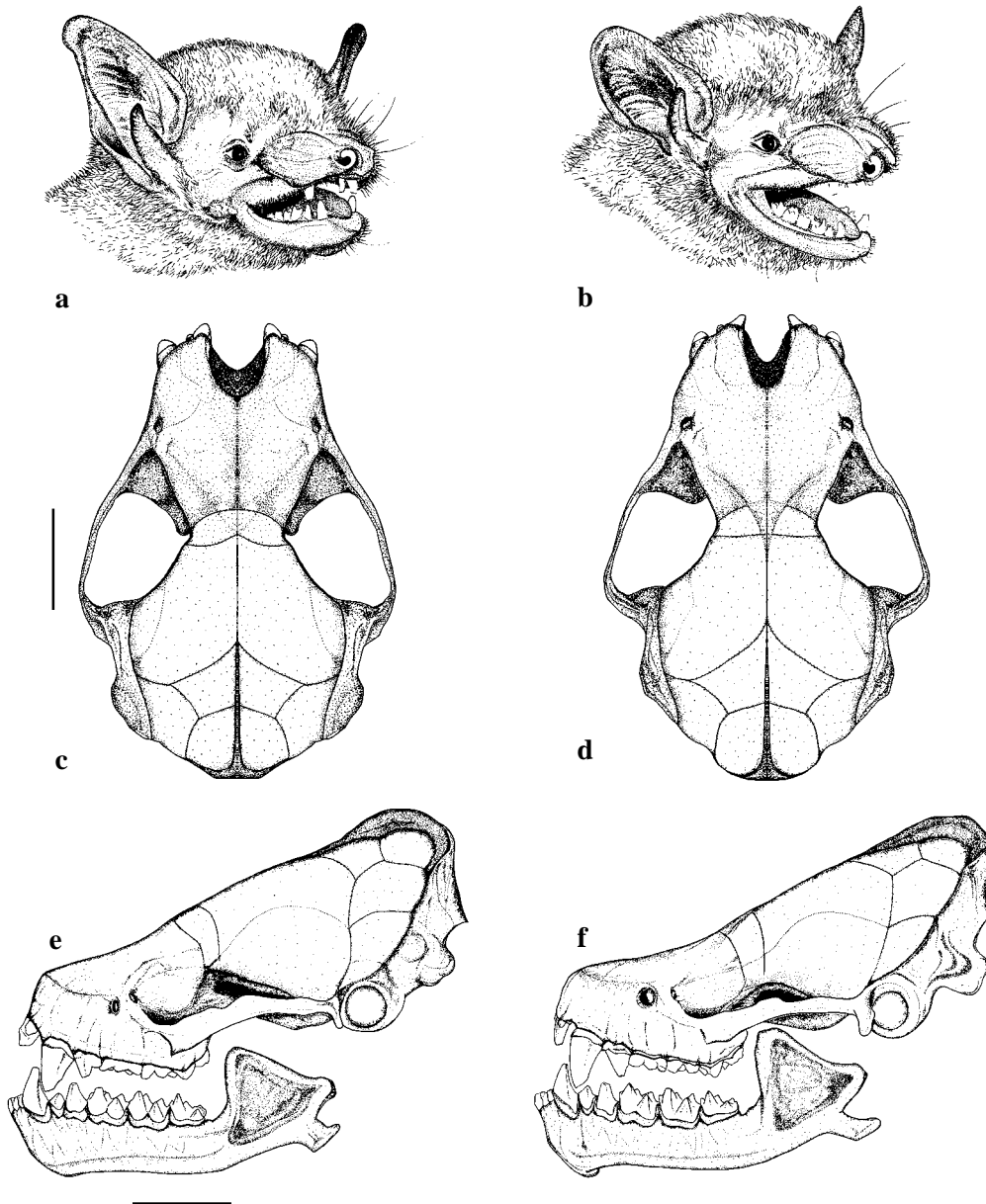


FIGURE 1. Differences between *Eptesicus brasiliensis* and *Eptesicus taddeii* sp. nov. Faces of *E. brasiliensis* (1a) and *E. taddeii* sp. nov. (1b). Skulls in dorsal view of *E. brasiliensis* (1c) and *E. taddeii* sp. nov. (1d). Skulls and mandibles in lateral view of *E. brasiliensis* (1e) and *E. taddeii* sp. nov. (1f). Bar scale = 0.4 mm.

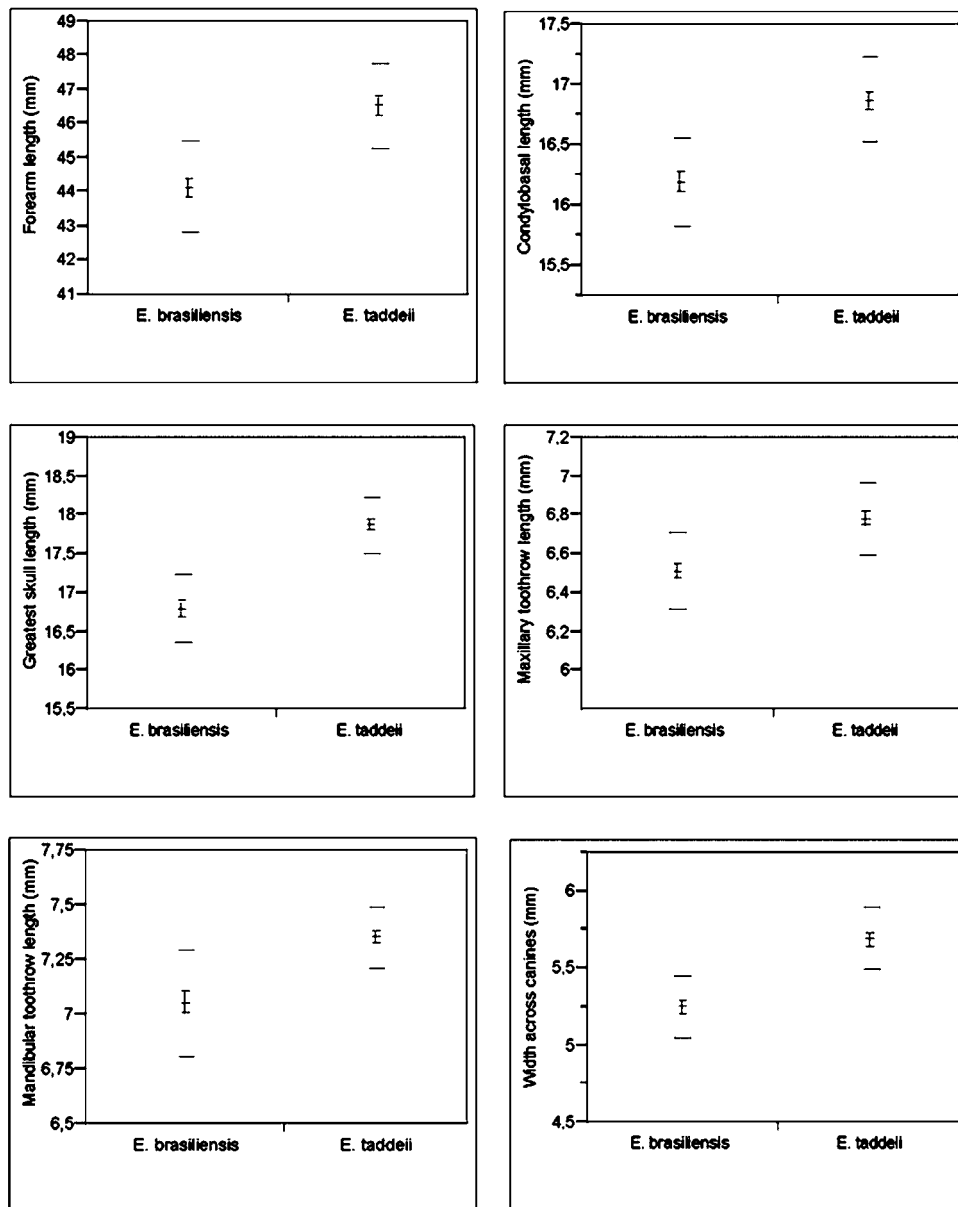


FIGURE 2. Morphological traits with most pronounced differences between *Eptesicus taddeii* sp. nov. and *E. brasiliensis*.

Comparisons.—The new species is distinct from other sympatric *Eptesicus* species (*E. brasiliensis*, *E. furinalis* and *E. diminutus*) mostly based on morphometric traits, usually by being larger. The morphometric comparison between the species is shown in Table II.

TABLE II. External and cranial dimensions of the southern Brazilian species of the genus *Eptesicus*. Measurements of *E. diminutus*, *E. furinalis* and *E. brasiliensis* (from Argentina) were provided by Barquez *et al.* (1999), whereas measurements of *E. brasiliensis* (from Brazil) and *E. taddeii* sp. nov are original to this study.

Variable	<i>E. diminutus</i> (Argentina) (Barquez <i>et al.</i> 1999) N = 16	<i>E. furinalis</i> (Argentina) (Barquez <i>et al.</i> 1999) N = 210	<i>E. brasiliensis</i> (Argentina) (Barquez <i>et al.</i> 1999) N = 9	<i>E. brasiliensis</i> (Brasil) N = 26	<i>E. taddeii</i> sp. nov. (Brasil) N = 24
Total length	86.1 ± 3.68 (81.0–91.0)	97.2 ± 9.58 (80.0–140.0)	108.8 ± 6.27 (101.0–117.0)	104.01 ± 5.38 (94.10–112.5)	108.6 ± 4.78 (99.1–116.7)
Tail length	33.9 ± 1.83 (32.0–37.0)	40.0 ± 3.81 (32.0–49.0)	43.8 ± 4.30 (37.0–49.0)	47.0 ± 3.98 (40.0–52.6)	47.9 ± 3.65 (42.7–53.3)
Ear length	13.3 ± 0.48 (13.3–14.6)	14.2 ± 1.82 (10.0–18.5)	16.0 ± 0.98 (16.0–18.0)	15.0 ± 0.95 (13.1–16.6)	15.6 ± 1.09 (14.0–17.2)
Forearm length	33.2 ± 0.98 (32.1–34.8)	39.8 ± 1.54 (36.5–42.5)	43.0 ± 45.0 (40.5–45.0)	44.1 ± 1.37 (41.2–46.5)	46.5 ± 1.26 (44.1–48.7)*
Condylobasal length	12.7 ± 0.19 (12.4–13.0)	14.7 ± 0.47 (13.6–5.7)	15.8 ± 0.31 (15.6–16.4)	16.2 ± 0.36 (15.5–16.9)	16.86 ± 0.35 (16.0–17.4)*
Zygomatic breadth	9.1 ± 0.15 (8.9–9.3)	10.6 ± 0.43 (9.8–11.8)	12.0 ± 0.07 (12.0–12.1)	11.5 ± 0.41 (11.0–12.2)	12.2 ± 0.37 (11.7–12.9)
Greatest skull length	13.2 ± 0.22 (12.9–13.6)	15.4 ± 0.47 (14.3–16.3)	17.0 ± 0.33 (16.7–17.4)	16.8 ± 0.44 (16.0–17.5)	17.9 ± 0.36 (17.3–18.4)*
Postorbital constriction	3.7 ± 0.15 (3.5–4.0)	3.8 ± 0.18 (3.6–4.4)	4.0 ± 0.12 (3.8–4.1)	4.1 ± 0.16 (3.6–4.2)	4.1 ± 0.15 (3.9–4.4)
Braincase breadth	6.6 ± 0.17 (6.5–7.0)	7.3 ± 0.30 (6.7–8.0)	7.7 ± 0.21 (7.5–8.1)	7.9 ± 0.21 (7.5–8.2)	8.1 ± 0.21 (7.7–8.5)
Maxillary toothrow length	4.8 ± 0.13 (4.6–5.0)	5.7 ± 0.19 (5.3–6.3)	6.4 ± 0.20 (6.2–6.7)	6.5 ± 0.19 (6.3–6.8)	6.8 ± 0.18 (6.4–7.1)*
Mandibular toothrow length	5.1 ± 0.21 (4.8–5.4)	6.1 ± 0.22 (5.6–6.8)	6.8 ± 0.11 (6.7–7.0)	7.0 ± 0.24 (6.6–7.4)	7.3 ± 0.14 (7.1–7.7)*
Length of mandible	9.8 ± 0.30 (9.3–10.1)	11.9 ± 0.38 (11.0–13.0)	13.1 ± 0.23 (12.9–13.5)	12.9 ± 0.42 (12.0–13.5)	13.5 ± 0.27 (13.0–13.7)
Width across canines	4.0 ± 0.12 (3.9–4.2)	4.8 ± 0.21 (4.4–5.6)	5.5 ± 0.15 (5.3–5.7)	5.25 ± 0.19 (5.0–5.5)	5.7 ± 0.2 (5.5–6.1)*
Width across molars	5.6 ± 0.17 (5.5–5.9)	6.5 ± 0.29 (5.7–7.4)	7.3 ± 0.23 (7.1–7.6)	7.3 ± 0.25 (7.1–7.9)	7.5 ± 0.18 (7.0–7.8)

Note: * variable with most pronounced differences

Separation between *E. taddeii* sp. nov. and *E. brasiliensis*

- 1 Smaller size; forearm length between 40.5–46.5 mm; greatest skull length 16.7–17.5 mm; condylobasal length 15.5–16.9 mm; maxillary tooththrow length 6.3–6.8 mm; mandibular tooththrow length 6.6–7.4 mm; width across canines 5.0–5.7 mm
 *Eptesicus brasiliensis*
 Larger size; forearm length between 44.1–48.7 mm; greatest skull length 17.3–18.4 mm; condylobasal length 16.0–17.4 mm; maxillary tooththrow length 6.4–7.1 mm; mandibular tooththrow length 7.1–7.7 mm; width across canines 5.5–6.1 mm; general coloration from reddish brown to red; more conspicuous (inflated) muzzle and rounder ears (Figure 1a and 1b) *Eptesicus taddeii* sp. nov.

Holotype.—Adult male: skin and skull with the following tags: /Holotype, *Eptesicus taddeii* Miranda; Bernardi & Passos det. 2006/. /Coletor: Miranda, J. M. D. *et al.*; Provenance: São Luiz do Purunã, Balsa Nova, Paraná, Brasil; date: 22.XII.2005/. /DZUP 246/. Deposited in the Mastozoological collection of the Universidade Federal do Paraná, Departamento de Zoologia, Setor de Ciências Biológicas, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.

Paratypes.—12 females, collected in the same location and by the same collectors as the holotype, and deposited in the same collection under the following collection numbers: DZUP 247, 253, 254, 256, 257, 258, 259, 260, 261, 262, 265 and 266. Seven adult males, collected in the same location and by the same collectors as the holotype, and deposited in the same collection under the following collection numbers: DZUP 229, 248, 249, 250, 251, 252 and 255. An adult male, collected in Cerro Azul, State of Paraná, by I. S. Arnoni were deposited in the same collection under the collection number DZUP 098. Two females, collected in Passos Maia, State of Santa Catarina, by J. M. D. Miranda and M. F. M. Azevedo-Barros, were deposited in the same collection as the holotype under the collection numbers DZUP 263 and 264. A female, collected in Ribeira do Iguape, State of São Paulo, was deposited in the mastozoological collection of the Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil, under the collection number MZUSP 26455. The skins and skulls were deposited separately, with the skins preserved in 70% ethanol.

Type locality.—Fazenda Monjolo, District of São Luiz do Purunã, Municipality of Balsa Nova, State of Paraná, Southern Brazil (25°26'58"S and 49°41'51"W).

Etymology.—The species name is a homage to Prof. Dr. Valdir Antônio Taddei in recognition of his great contribution to the study of Neotropical bats.

Distribution.—*Eptesicus taddeii* sp. nov. is hitherto known to occur in the Southern and Southeastern of Brazil. The occurrence records are from: District of São Luiz do Purunã (25°26'58"S and 49°41'51"W), Municipality of Balsa Nova, State of Paraná; State Park of Campinhos (24°49'25"S and 49°15'40"W), Municipality of Cerro Azul, State of Paraná; Municipality of Passos Maia (26°46'48"S and 52°03'34"W), State of Santa Catar-

ina, and locality of Barra do Ribeira (24°42'29"S and 47°33'19"W), Municipality of Iguape, State of São Paulo. This species appears to occur in the Atlantic Rainforest *sensu lato*, with most of the occurrences being included in Araucaria Pine Forests (Figure 3).



FIGURE 3. Known localities for *Eptesicus taddeii* sp. nov. in South America. (1) Locality of Barra do Ribeira, Municipality of Iguape, State of São Paulo; (2) State Park of Campinhos, Cerro Azul Municipality, State of Paraná; (3) District of São Luiz do Purunã, Municipality of Balsa Nova, State of Paraná (Type locality) and (4) Municipality of Passos Maia, State of Santa Catarina.

Remarks.—The species was captured using mist nets (6x2.5 m, 7x2.5 m, and 9x2.5 m), which were set up 0.5 m above the ground. *Eptesicus taddeii* sp. nov. was active all night,

with captures from 6:30 PM to 5:40 AM. Captures occurred both in primary forests and in regenerating forests and forest edges. It appears to be an insectivore, as in the case of most members of the Vespertilionidae family. In addition to the new species, *Eptesicus brasiliensis* and *E. furinalis* were collected in the type locality, in syntopy. Given the high level of morphological similarity between *Eptesicus taddeii* sp. nov. and *E. brasiliensis*, it is likely that specimens of *E. taddeii* sp. nov. are presently misidentified in zoological collections as *E. brasiliensis*. In fact, this was shown to be the case in an analysis of the specimens MZUSP 26455, DZUP 098 and 229, which were inspected during this study and shown to belong to the new species. A broad revision of the genus might increase the currently known distribution of *E. taddeii* sp. nov.

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Appendix I

Specimens examined. – Museums and acronyms: mastozoological collections of the Universidade Federal do Paraná (DZUP) and the Museu de Zoologia da Universidade de São Paulo (MZUSP):

Eptesicus brasiliensis. – Brasil: Minas Gerais, Mariana (MZUSP 1747); Rio de Janeiro, Serra do Macaé (MZUSP 2801); São Paulo, Boracéia (MZUSP 18705), Ilha do Cardoso (MZUSP 27526, 27736, 28355), Parque Estadual da Cantareira (MZUSP 31474, 31475, 31476, 31477, 31478, 31479, 31481, 31483, 31484, 31485, 31488, 31489); Paraná, Balsa Nova – São Luiz do Purunã (DZUP 267, 268, 269, 270, 271), Parque Estadual de Campinhos (DZUP 094), Parque Estadual do Rio da Onça (DZUP 068, 069).

Eptesicus taddeii sp. nov. – Brasil: São Paulo, Barra do Ribeira (MZUSP 26455); Paraná, Balsa Nova – São Luiz do Purunã (DZUP 229, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 265, 266), Parque Estadual de Campinhos (DZUP 098); Santa Catarina, Passos Maia (DZUP 263, 264).