

SHORT COMMUNICATION

New Paraguayan records of *Xenarthra* with a review of the species present in Ñeembucú department

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Abstract This article provides an update of the distribution of the *Xenarthra* fauna of Paraguay. *Tamandua tetradactyla* is confirmed to occur in all Paraguayan departments. New departmental records of *Myrmecophaga tridactyla* are reported for Ñeembucú, Paraguari, and San Pedro. *Dasyopus novemcinctus* is reported for Ñeembucú department for the first time. Two previous species (*Dasyopus hybridus* and *Cabassous tatouay*) considered to occur in Ñeembucú department based on specimens in the Basel Natural History Museum are now considered doubtful. A public interest in reports of Myrmecophagidae in Paraguay is noted and it is suggested that it could be utilized to benefit the conservation of these species in the Oriental region, where both species are rarely encountered.

Keywords: *Cabassous tatouay*, *Dasyopus hybridus*, *Dasyopus novemcinctus*, *Myrmecophaga tridactyla*, *Tamandua tetradactyla*

Nuevos registros de *Xenarthra* de Paraguay con una revisión de las especies presentes en el departamento de Ñeembucú

Resumen Este artículo brinda una actualización de la distribución conocida de la fauna de xenartros del Paraguay. *Tamandua tetradactyla* es confirmado como presente en todos los departamentos del país. Se reportan nuevos registros departamentales de *Myrmecophaga tridactyla* para Ñeembucú, Paraguari y San Pedro. *Dasyopus novemcinctus* es reportado del departamento de Ñeembucú por primera vez. Dos especies (*Dasyopus hybridus* y *Cabassous tatouay*), previamente consideradas como de ocurrencia en Ñeembucú en base a ejemplares del Museo de Historia Natural de Basilea, ahora se consideran dudosas para el área. Se nota un interés del público en reportes de Myrmecophagidae en Paraguay y se sugiere que puede ser utilizado para beneficiar la conservación de estas especies en la Región Oriental del Paraguay, donde ambas especies son raramente encontradas.

Palabras clave: *Cabassous tatouay*, *Dasyopus hybridus*, *Dasyopus novemcinctus*, *Myrmecophaga tridactyla*, *Tamandua tetradactyla*

The distribution and status of the *Xenarthra* fauna of Paraguay has been previously reviewed (Smith, 2012; Abba *et al.*, 2017; Smith & Ríos, 2018), but reports of the superorder from the Oriental region of Paraguay, east of the Paraguay River, continue to be scarce and noteworthy when they occur. Particularly poorly-sampled from a mammalogical perspective is Ñeembucú department in southwestern Paraguay. This department is comprised of a mosaic of aseasonally-inundated Humid Chaco palm savannas, islands of gallery forests, and swamps (Viré & Martínez Fretes, 2014). Smith & Ríos (2018) reported the presence of just two species of *Xenarthra* in Ñeembucú department, both on the basis of specimens in the Basel Natural History Museum: the lesser long-nosed armadillo *Dasypus hybridus* (Wetzel & Mondolfi, 1979; considered to be a subspecies of *D. septemcinctus* by Feijó *et al.*, 2018) and the greater naked-tailed armadillo *Cabassous tatouay* (Wetzel, 1980).

The results of recent fieldwork in Ñeembucú department update the findings of Smith & Ríos (2018) with new records of xenarthrans from across the department, and we take the opportunity to report other new noteworthy *Xenarthra* records from

eastern Paraguay. Additionally, we provide new details about the Paraguayan *Xenarthra* specimens in the Basel Natural History Museum that revise our understanding of this group in Ñeembucú department, and a review of recent reports of xenarthrans in local media.

Giant anteater *Myrmecophaga tridactyla* (Pilosa: Myrmecophagidae) (FIG. 1)

To date there are confirmed records of giant anteaters from just eight of the 17 political departments in Paraguay (Smith & Ríos, 2018). This includes specimen records from the three Chaco departments west of the Paraguay River (Alto Paraguay, Boquerón, and Presidente Hayes), as well as Amambay and Caaguazú in the Oriental region (east of the Paraguay River), and reliable non-specimen records from three other departments in the Oriental region (Concepción, Canindeyú, and Caazapá). The species has recently been considered to be absent or virtually extinct south of 26°S in Paraguay and is nationally considered Vulnerable (A4ac) (Abba *et al.*, 2017). Here we provide three new recently documented departmental records for this species.

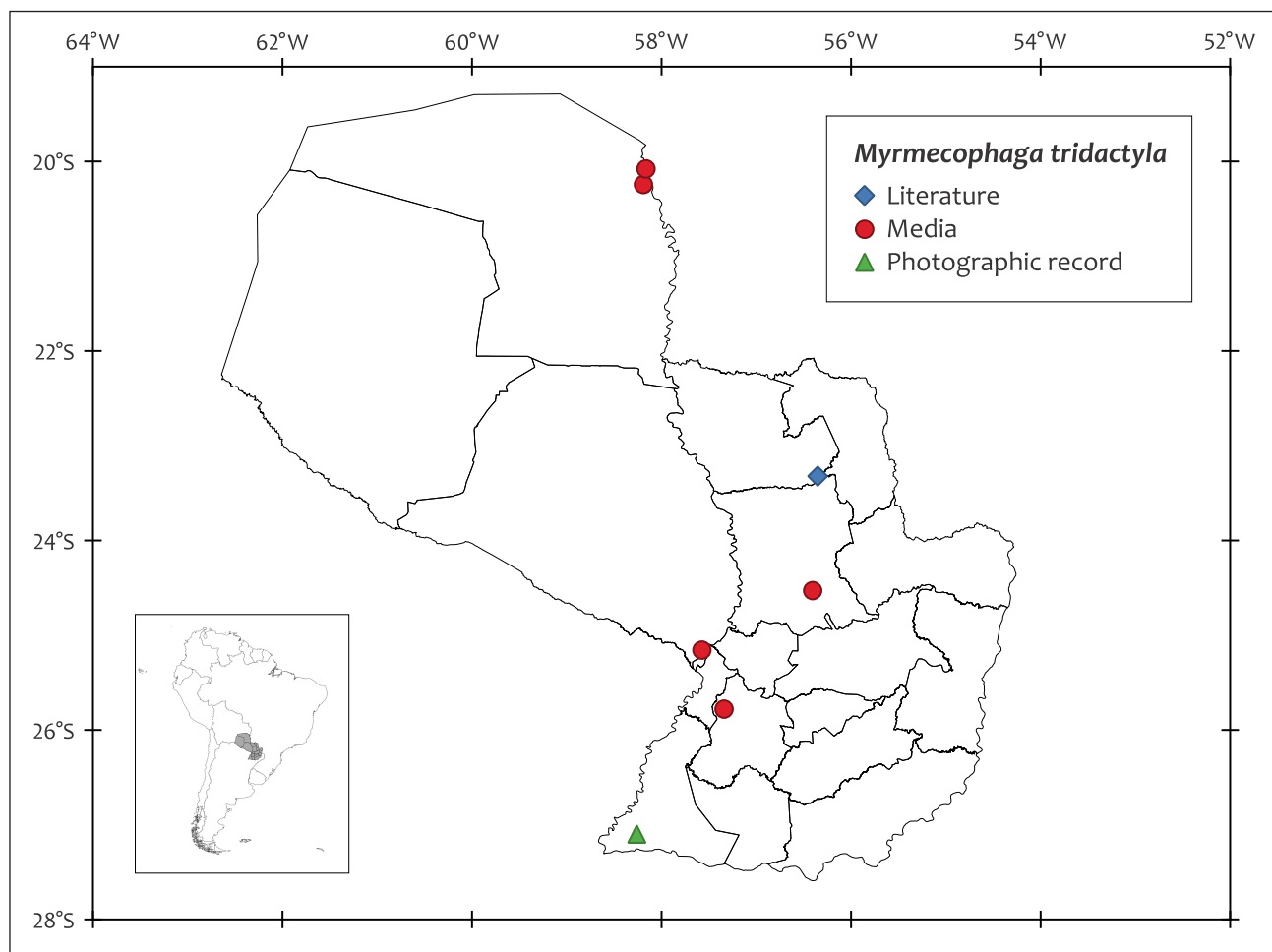


FIGURE 1. New records of *Myrmecophaga tridactyla* reported from Paraguay (additional to those in Smith & Ríos, 2018).



FIGURE 2. *Myrmecophaga tridactyla* at Desmochados, Ñeembucú department, Paraguay, on 14 June 2023. Photo by Félix Barrios.

Paraguari department. On 5 January 2023 an individual was rescued at Compañía Beni Loma, Carapeguá district, Paraguari department (25°46'48"S, 57°20'24"W) after entering an inhabited area. The animal was wounded, perhaps by dogs, and was captured by Aparicio Ramos. The animal was released by rescuers in an area of natural habitat close to Lago Ypoá. This record was reported in the local press (TABLE 1).

San Pedro department. On 14 January 2023 an adult was captured in the garden of a house in Morombi'i, Guayaibí district, San Pedro department (24°31'44"S, 56°24'18"W) by the house owner Isabelino Fretes Lezcano. Assistance was sought in the national press to relocate the animal after the local fire brigade declared it did not have the expertise to deal with it, but no further details about its fate are known. This record was also reported in the local press (TABLE 1).

Ñeembucú department. On 14 June 2023 at 11:10 h an adult female of this species was captured and photographed in an island of forest at San Roque, Desmochados, Ñeembucú department (27°5'56"S, 58°15'40"W) by Félix Barrios (FIG. 2). The capture was reported to two local police officers, Segundo Paredes and Hugo Rolón, who informed

the MADES (Ministerio del Ambiente y Desarrollo Sostenible) and were advised to release the animal where it was found. None of the witnesses had previously encountered the species in this area. This record was reported on the local radio but did not make the national press.

These records add Ñeembucú, Paraguari, and San Pedro departments to the species' current known range in Paraguay. In addition, we take the opportunity to draw attention to an early published reference (Telfer, 1938), overlooked by Smith & Ríos (2018), which shows photographs of the species at Zanja Moroti, Concepción department (23°19'16"S, 56°21'7"W).

Southern tamandua *Tamandua tetradactyla* (Pilosa: Myrmecophagidae) (FIG. 3)

Ñeembucú department. The presence of the southern tamandua in Ñeembucú department was first confirmed by a photograph of an albinistic individual at Isla Umbú on 19 June 2018 (Ríos *et al.*, 2019). To that we add the following additional recent records: 1) A specimen record from the department, a roadkill adult female (CZPLT-M 954) collected on Ruta IV (at 26°52'30"S, 57°53'56"W) on 7 November 2019 by Rebecca Smith and

TABLE 1. Records of Myrmecophagidae reported in the Paraguayan press since 2015. Note that the date refers to the date of publication of the story and not to the date of the incident reported. Those marked with a * are discussed in the main text.

Locality	Department	Link to story	Date of story	GPS Coordinates
<i>Myrmecophaga tridactyla</i>				
Bahía Negra	Alto Paraguay	https://www.moopio.com/un-oso-hormiguero-se-pasea-sin-temor-en-hospital-de-bahia-negra.html	Undated	20°14'35"S, 58°11'28"W
Estación Los Tres Gigantes	Alto Paraguay	https://guyra.org.py/rescatan-a-una-pequena-jurumi-en-la-estacion-los-tres-gigantes/	3 Jun 2018	20°4'41"S, 58°9'50"W
* Carapeguá	Paraguarí	https://www.abc.com.py/nacionales/2023/01/05/carapegua-bomberos-rescatan-un-oso-hormiguero-y-lo-liberan-en-humedales-del-ypoa/	5 Jan 2023	25°46'48"S, 57°20'24"W
Remansito Km 24	Presidente Hayes	https://www.snt.com.py/noticia/rescatan-a-un-oso-hormiguero/	28 Sep 2022	25°9'25"S, 57°34'26"W
* Guayaibí	San Pedro	https://www.ultimohora.com/oso-hormiguero-aparece-el-patio-una-casa-guayaibi-n3043620	16 Jan 2023	24°31'44"S, 56°24'18"W
<i>Tamandua tetradactyla</i>				
Acaray Km 12	Alto Paraná	https://www.itaipu.gov.py/es/sala-de-prensa/noticia/rescatan-oso-melero	12 Mar 2015	25°28'55"S, 54°41'49"W
Ciudad del Este	Alto Paraná	https://www.ultimohora.com/rescatan-oso-melero-ciudad-este-n1028410	1 Oct 2016	25°29'35"S, 54°58'1"W
Ciudad del Este	Alto Paraná	https://www.abc.com.py/este/2021/01/04/rescatan-oso-hormiguero-de-un-populoso-barrio/	4 Jan 2021	25°29'35"S, 54°58'1"W
Yguazú	Alto Paraná	https://www.ultimohora.com/oso-melero-es-reinsertado-reserva-incendio-forestal-alto-parana-n2848182	8 Oct 2019	25°25'12"S, 55°16'37"W
Presidente Franco	Alto Paraná	https://www.ip.gov.py/ip/oso-melero-es-reinsertado-en-areas-protegidas-de-la-itaipu/	14 Nov 2020	25°36'11"S, 54°43'16"W
* Pastoreo (Dr. Juan Manuel Frutos)	Caaguazú	https://www.ultimohora.com/rescatan-osos-meleros-uno-fue-macheteado-san-antonio-n2976471	14 Dec 2021	25°21'58"S, 55°48'00"W
* Capiatá	Central	https://grandecapiata.blogspot.com/2012/11/bomberos-capturan-oso-hormiguero-en.html?m=1	13 Nov 2012	25°21'22"S, 57°26'28"W
* Capiatá	Central	https://www.taringa.net/+paraguaynoticias/rescatan-a-un-oso-hormiguero-en-capiata_1glfq6	16 Feb 2013	25°21'22"S, 57°26'28"W
* Guarambaré	Central	https://www.ultimohora.com/poblador-rescata-un-oso-melero-guarambare-n2912530	4 Nov 2020	25°29'46"S, 57°27'4"W
* San Antonio	Central	https://www.ultimohora.com/rescatan-osos-meleros-uno-fue-macheteado-san-antonio-n2976471	14 Dec 2021	25°22'44"S, 57°36'32"W
Concepción	Concepción	https://www.hoy.com.py/nacionales/rescatan-a-varios-animales-silvestres-en-las-calles-de-concepcion-no-es-normal	26 Jul 2022	23°25'23"S, 57°28'30"W
Concepción	Concepción	https://www.ypanefm.com.py/rescataron-un-oso-melero-en-concepcion-y-lo-liberaron-en-su-habitat--a821.html	5 Oct 2022	23°25'23"S, 57°28'30"W
Cambyretá	Itapúa	https://itapanoticias.tv/bomberos-rescataron-a-un-oso-melero-y-necesita-atencion-veterinaria/	11 Jun 2019	27°21'32"S, 55°46'26"W
Encarnación	Itapúa	https://www.moopio.com/rescatan-a-un-oso-hormiguero-en-encarnacion.html	30 Jun 2019	27°17'46"S, 56°3'43"W
Obligado	Itapúa	https://guyra.org.py/rescate-y-liberacion-de-oso-melero/	14 Sep 2016	27°2'31"S, 55°34'37"W
San Ignacio	Misiones	https://www.ultimohora.com/bomberos-san-ignacio-rescatan-un-oso-melero-n2971049	10 Nov 2021	26°53'13"S, 57°10'26"W
Santa Rosa	Misiones	https://www.abc.com.py/edicion-impresa/interior/rescatan-oso-melero-herido-en-compania-de-santa-rosa-1651802.html	22 Nov 2017	26°53'49"S, 57°8'31"W
Yacuty	Misiones	https://www.ultimohora.com/rescatan-un-oso-hormiguero-que-fue-atacado-perros-pitbull-n2914614	8 Jul 2023	27°0'43"S, 56°47'49"W
Carapeguá	Paraguarí	https://www.abc.com.py/nacionales/2021/09/25/rescatan-a-un-oso-melero-herido-en-carapegua/	25 Sep 2021	25°46'5"S, 57°15'47"W

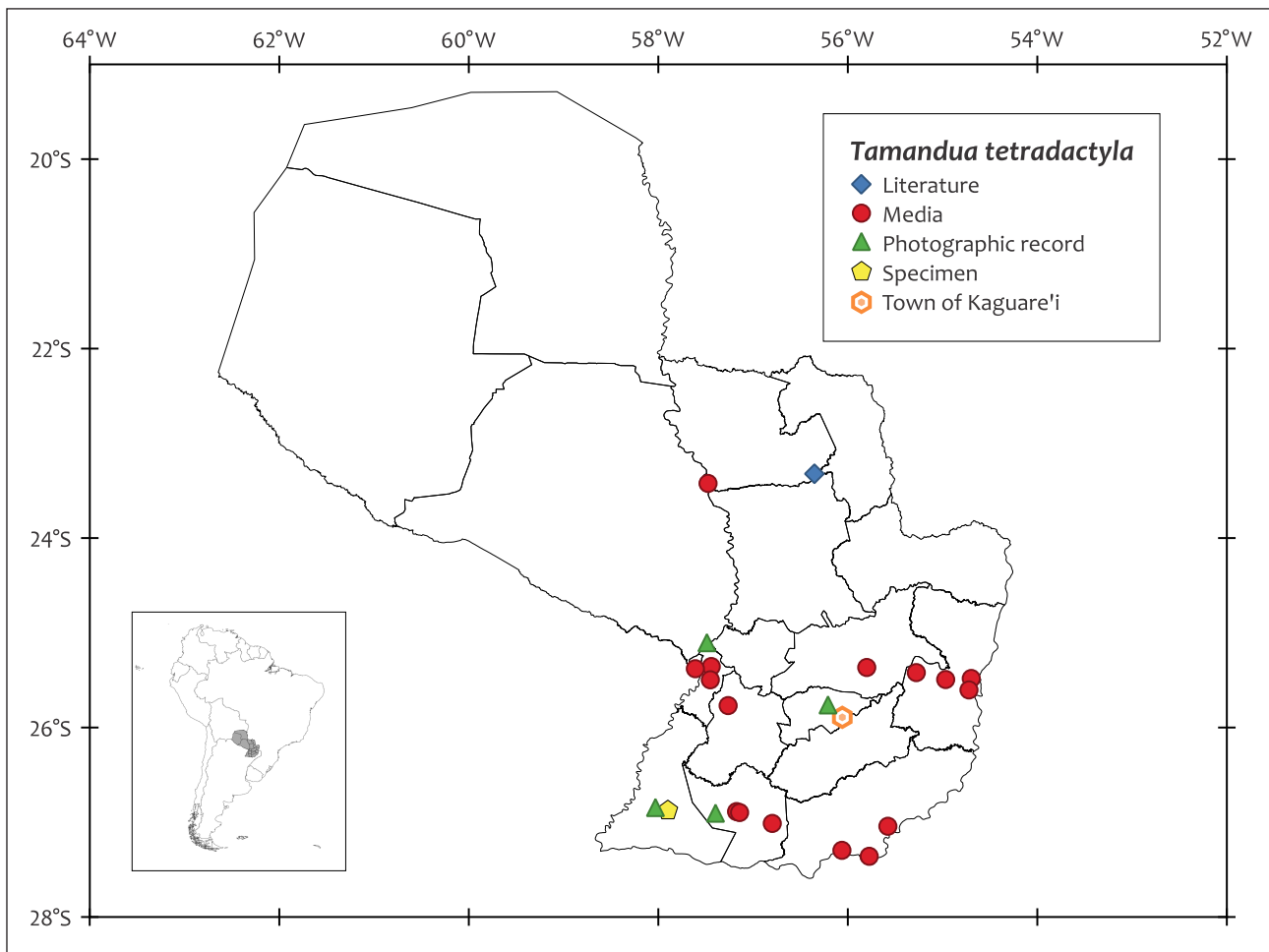


FIGURE 3. New records of *Tamandua tetradactyla* reported from Paraguay (additional to those in Smith & Ríos, 2018).

prepared as a skin, skull, and post-cranial skeleton. 2) Camera-trap photographs of the species from Estancia Santa Ana (26°50'38"S, 58°1'48"W) approximately 26 km east of Pilar on 23 November 2022 and 4 March 2023.

Caaguazú department. A roadkill individual was photographed by Sergio D. Ríos on 24 April 2019 on Km 139 Ruta 2 (now called Ruta PY02) near Coronel Oviedo (26°54'14"S, 57°23'46"W). On 9 December 2021 an individual of this species was captured in the village of Dr. Juan Manuel Frutos (more commonly referred to as Pastoreo) (25°21'58"S, 55°48'00"W) after it wandered into a populated area, and was later released in a forested area nearby. This latter record was reported in the local press (**TABLE 1**).

Central department. One individual photographed by Juan José Resquín at Piquete Cué, Limpio (25°6'14"S, 57°29'13"W), near the Paraguay River on 4 October 2004 is apparently the first confirmed modern record from Central department. Two individuals have been rescued at the town of Capitá (25°21'22"S, 57°26'28"W), one on 13 November 2012 and another on 16 February 2013. More recently, an individual was rescued in Guarambaré (25°29'46"S, 57°27'4"W) after being chased up a tree

by dogs on 4 November 2020. Another individual of the species was apparently attacked with a machete by unknown assailants in San Antonio (25°22'44"S, 57°36'32"W) on 12 December 2021. The animal was rescued by local firemen, but its fate is unknown. All these records, except the first one, were reported in the local press (**TABLE 1**).

Guairá department. A video of an adult individual was taken by Héctor Narváez at Wolfgang Greissel, on the road to Salto Suizo, Guairá department (25°45'40"S, 56°12'32"W) on 11 May 2022, the first documented report of the species in that department. Additionally, we note that there is a town in Guairá department called Kaguare'i (25°53'31"S, 56°3'29"W), which translates from the Guaraní language to "little Tamandua", which may or may not be indicative of historical populations in this department.

Added to the records of the species in Misiones department by Salinas *et al.* (2022) and **TABLE 1**, and Cordillera by Petters *et al.* (2020), the species is now documented to occur in all Paraguayan political departments. Telfer (1938) also shows photographs of this species taken at Zanja Moroti, Concepción department (23°19'16"S, 56°21'7"W).

Nine-banded Armadillo *Dasypos novemcinctus* (Cingulata: Dasypodidae) (FIG. 4)

This common and widespread species has been previously reported from all Paraguayan departments except Cordillera, Guairá, and Ñeembucú (Smith & Ríos 2018).

Ñeembucú department. There have since been numerous records of the species from several localities across Ñeembucú which are detailed below: 1) Roadkill specimen (CZPLT-M 543) consisting of a half carapace and skeleton collected on Ruta IV approximately 15.5 km east of Pilar (at 26°51'50"S, 58°8'10"W) by Yvonne Kemp on 23 September 2019. 2) Camera-trap photographs and videos of the species from Estancia Santa Ana (26°50'38"S, 58°1'48"W) approximately 26 km east of Pilar on 14 February 2019 and during July, November, and December 2022. 3) Skeletal remains at Estancia Delfino (26°53'10"S, 58°22'8"W) photographed by Sergio D. Ríos on 21 December 2020.

The species has now been confirmed to occur in all Paraguayan departments except Cordillera and Guairá (from where we are aware of undocumented records).

The Basel Natural History Museum specimens

Five Paraguayan specimens of *Xenarthra* are stored at the Basel Natural History Museum (FIG. 5). One of these, a giant armadillo *Priodontes maximus* (NMB-MAMM 3084), collected on 1 January 1920 by Emil Hassler (who was active in Paraguay between 1887 and his death on 4 November 1937), lacks any locality data except "Paraguay" and will not be discussed further. The collection of the remaining four specimens is attributed to Dr. Carl Ternetz, and all are stated to come from the same locality "Paraguay Curupaity Misiones" with date 27 June 1904. We can confirm that the date provided refers to the date of arrival of the specimens at the museum and is not the collection date (David Marques, *in litt.*). The locality was assumed by Wetzel & Mondolfi (1979) and Wetzel (1980) to refer to Curupaity, Ñeembucú department (on the Paraguay River at approximately 27°6'43"S, 58°34'30"W) but in fact it likely refers to Curupaity, Misiones department (close to the town of Santa Rosa at approximately 26°50'56"S, 56°47'35"W). The specimens in question are the following: NMB-MAMM 1449 *D. novemcinctus*, NMB-MAMM 1450 *D. hybridus* (identification confirmed by Wetzel & Mondolfi,

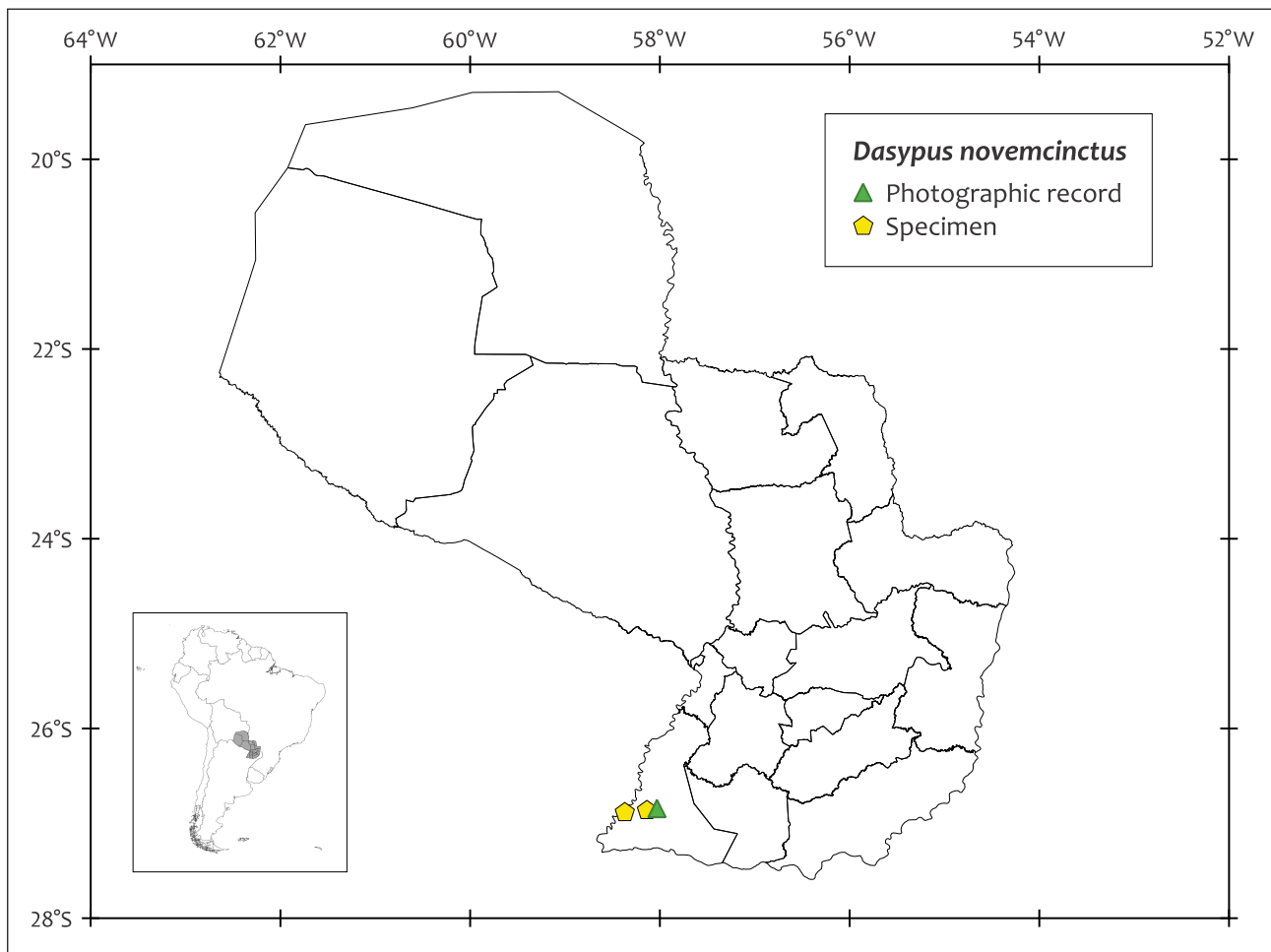


FIGURE 4. New records of *Dasypos novemcinctus* reported from Paraguay (additional to those in Smith & Ríos, 2018).

	1443 x	<i>Vesperugo noctula</i> Schreb.	♂	Basel. (Museum)
	1444 x	"	♂	"
	1445 x	"	♂	"
	1446 x	"	♀	"
Juni	27.	Gesch. v. H. Carl Ternetz (Brasilien).		
	1447 x	<i>Felis jaguarundi</i> Fisch.	Balp. (Eiri)	Paraguay Misiones, Curupaty.
	1448 x	<i>Canis azarae</i> Wied.	" (Aparuchay)	" "
	1449 x	<i>Tatusia novem-cincta</i> L.	ad. (Tata hi)	"
	1450 x	" <i>hybrida</i> (sem. <i>sexcinctus</i> L.)	ad. Tatai mulekia	"
	1451 x	<i>Dasyus</i> us <i>us</i>	" (Tatai)	"
	1452 x	<i>Lypsius uncinatus</i> L.	(Tatouay)	"
Juni.		Gekauft bei Dr. Spitz Freiburg i. B.		
	1453 x	<i>Sciurus steeri</i> Gthr.		Philippinen (Plo. Princesa)
	1454 x	"		" "
	1455 x	<i>Phloeomys cumingi</i> Whak.		" (Eshe in Dringalan)
	1456 x	<i>Tragulus nigricans</i> O. Thom.		" (Balabac)
		Gesch. v. H. Carl Ternetz (Brasilien).		

FIGURE 5. Excerpt of log book of the Basel Natural History Museum, Switzerland showing the xenarthran specimens collected by Carl Ternetz. Photo by David Marques.

1979), NMB-MAMM 1451 *Euphractus sexcinctus*, and NMB-MAMM 1452 *C. tatouay* (identification confirmed by Wetzel, 1980).

Very little information is available about the time Carl Ternetz (13 August 1870–3 October 1928) spent in Paraguay, and no detailed information on his life and movements has ever been published. He is known to have resided in Bernal Cué (= Nueva Asunción), Cordillera department and to have collected along the Paraguay River from at least Fuerte Olimpo, Alto Paraguay department, south to Asunción. He also collected reptiles in Guairá department (Schenkel, 1901; Eigenmann & Kennedy, 1903). However, there is no record of him ever visiting or collecting in Ñeembucú or Misiones departments.

Although we concur with the identifications of Wetzel & Mondolfi (1979) and Wetzel (1980) (specimens examined), we consider that the reports of *D. hybridus* and *C. tatouay* from Ñeembucú are probably erroneous. There are no other reports of *C. tatouay* from Ñeembucú department, and this would extend the distribution of the species almost 100

km west of the closest record in Paraguay. Similarly, the specimen of *D. hybridus* is unique in terms of the Ñeembucú fauna and may have originated elsewhere. Furthermore, considering the lack of clarity surrounding these specimens, we also consider it questionable that all of these xenarthran specimens originated from the same locality, as Ternetz apparently collected no other xenarthrans during his extensive travels.

DISCUSSION AND CONCLUSIONS

Three species of Xenarthra are confirmed to be extant in Ñeembucú department. The records reported here confirm the presence of both Paraguayan representatives of the family Myrmecophagidae in the southwesternmost department of the country. The only other xenarthran species that can be confirmed to occur to date in the department is *D. novemcinctus*, which is documented herein. We consider the presence of *C. tatouay* and *D. hybridus* in Ñeembucú department on the basis of the specimens in the Basel Natural History Museum, as reported by Smith & Ríos (2018), to be doubtful.

The additional records of Myrmecophagidae documented herein provide a clearer picture of a wider distribution of anteaters in the Oriental region of Paraguay. However, the fact that such records are often considered “newsworthy” enough to publish in the local press reflects both the rarity of these animals, and the fascination that they inspire when encountered (**TABLE 1**). Typically, such news stories deal with animals that are “rescued” after wandering into populated areas, and such animals have frequently been accosted by dogs or occasionally people. We note that the *Tamandua* (oso-melero) is commonly reported as “oso hormiguero”, a name which properly refers to *Myrmecophaga*. We suggest that such interest amongst the general public could be capitalized upon for conservation purposes if properly channeled.

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