

Edentata

The Newsletter of the IUCN/SSC Anteater, Sloth and Armadillo Specialist Group

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Male maned sloth (*Bradypus torquatus*), Praia do Forte, Bahia, Brazil.

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Letter from the Editors

Dear readers,

Welcome to this year's edition of our Journal and Newsletter! *Edentata* **23** features one article and four short communications. Four of them describe new records and information about the ecology of *Cabassous*. We are glad to see that this poorly known armadillo genus is being studied in several countries! You will also find an interesting short communication on the first sighting of a giant anteater female and her offspring in Honduras.

The **News** section includes some exciting announcements. First of all, we are thrilled to let you know that we have strengthened our Specialist Group's education strategy through several new approaches. Among others, our new team member Kenny Coogan has been developing animated videos and education materials on Xenarthra, which are available on our website and our new *YouTube* channel. Huge thanks to our partner institutions Nurtured by Nature and Foundation for International Aid to Animals (FIAA) for their generous support of this new initiative! We have also concluded the re-assessment of all Pilosa species and would like to thank all experts for their contributions.

Sadly, we share with you the passing of Gustavo Fonseca, a true conservation leader. Gustavo was the Chair of our Specialist Group from 1991 to 2008. He will be sorely missed.

As you will notice, this issue of *Edentata* is rather short. The number of submissions has steadily decreased over the past few years, which has led us to re-think the format of our journal and newsletter. You will find more information about the new strategy in the **News** section.

Last, but not least, we would like to inform you that Jim Loughry has decided to step down as associate editor of *Edentata*. Jim, thank you so much for your invaluable help, support, and patience over the past years! Andy Noss has joined the editorial board and will take over Jim's role. *Welcome on board, Andy!*



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New records for the western range of *Cabassous tatouay* (Cingulata: Chlamyphoridae) and the first record for the Pantanal wetland biome

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Abstract The greater naked-tailed armadillo (*Cabassous tatouay*) is the largest armadillo in the *Cabassous* genus. It can be distinguished from other species in the genus by its large body size and large ears with granular edges that extend above the top of the head. The presence of *C. tatouay* in some regions of Brazil and in some Brazilian biomes, such as the Pantanal wetland, was not previously confirmed. This paper presents 12 new records of *C. tatouay* obtained by camera traps (n=7), direct observations (n=1), and roadkills (n=4) in Mato Grosso do Sul (MS), Brazil. However, two camera trap records were only 14 minutes apart and could potentially represent the same individual. Photographic records are compared with *C. squamicaudis* to highlight important characteristics that differentiate the species. Finally, these records of *C. tatouay* extend its range to western Brazil and for the first time into the Pantanal wetland near the transition to the Cerrado savanna.

Keywords: roadkill, Cerrado savanna, greater naked-tailed armadillo, photograph record, transition environment, Xenarthra

Novos registros da distribuição ocidental de *Cabassous tatouay* (Cingulata: Chlamyphoridae) e o primeiro registro de ocorrência para o bioma Pantanal

Resumo O tatu-de-rabo-mole grande (*Cabassous tatouay*) é o maior tatu do gênero *Cabassous*. Ele pode ser distinguido de outras espécies do gênero pelo tamanho corporal e pelas grandes orelhas granulares que se estendem acima do topo da cabeça. A ocorrência de *C. tatouay* em algumas regiões do Brasil e em alguns biomas brasileiros, como o Pantanal, ainda é incerta. Este trabalho apresenta 12 registros de *C. tatouay* obtidos por armadilhas fotográficas (n=7), observações diretas (n=1) e atropelamentos (n=4) em Mato Grosso do Sul (MS), Brasil. No entanto, dois registros de armadilhas fotográficas tiveram apenas 14 minutos de diferença e poderiam representar o mesmo indivíduo. Foi comparado alguns registros fotográficos com *C. squamicaudis* para evidenciar algumas características importantes que diferenciam ambas espécies. Por fim, a ocorrência de *C. tatouay* foi confirmada nos limites ocidentais de sua distribuição e os primeiros registros no Pantanal são relatados próximo aos limites de transição com o Cerrado.

Palavras-chave: ambiente de transição, Cerrado, registro fotográfico, tatu-de-rabo-mole, atropelamentos, Xenarthra

INTRODUCTION

The greater naked-tailed armadillo, *Cabassous tatouay* (Desmarest, 1804), is a poorly known mammal of the order Cingulata. This genus includes four other species: *C. chacoensis* (Wetzel, 1980), *C. centralis* (Miller, 1899), *C. uncinatus* (Linnaeus, 1758), and *C. squamicaudis* (Lund, 1845). *Cabassous tatouay* is the largest species of the genus and on average measures 47.9 cm in head-body length and weighs 4.8 kg. In addition to its size, this species can be differentiated from its congeners by the presence of 35 to 57 small cephalic scutes regularly organized around a large central hexagonal scute over its head. Moreover, it has larger ears, on average 4.1 cm long, that extend above the top of its head and bear characteristic granular edges that extend above the top of its head (Feijó & Anacleto, 2021).

Other species of the genus *Cabassous* reach a maximum head-body length of 46.4 cm and weigh up to 3.8 kg (Desbiez *et al.*, 2018; Feijó & Anacleto, 2021). They have a different pattern of the cephalic scutes and smaller ears compared to *C. tatouay* (Feijó & Anacleto, 2021). In general, the main morphological characteristic of the *Cabassous* species is a tail lacking a full osteoderm cover. They are also characterized by having from 11 to 14 movable bands on the carapace and by the forefeet that exhibit robust claws on the third and fourth digits (Feijó & Anacleto, 2021).

The species of the genus *Cabassous* are still poorly known, especially *C. tatouay* (Ubaid *et al.*, 2010; Superina *et al.*, 2014). Field records of *C. tatouay* are rare and may be false due to external morphological similarities with other species of the genus (Oliveira *et al.*, 2015; Massocato & Desbiez, 2017; Desbiez *et al.*, 2018; Feijó & Anacleto, 2021). *Cabassous tatouay* is a cryptic, solitary species with a specialist insectivorous diet (Redford, 1985; Anacleto, 2007). The few records of the species in the literature suggest that it can be nocturnal and/or diurnal (Meritt, 1985; Encarnação, 1987; Ubaid *et al.*, 2010; Massocato & Desbiez, 2017). It is believed that *C. tatouay* can use both forested and open areas, but prefers forested habitats (Gonzalez & Abba, 2014; Feijó & Anacleto, 2021). Others report that it uses primary and secondary forest habitats, but is rare in areas that are largely degraded or with agricultural activities (Mikich & Bérnils, 2004; Anacleto, 2006; Aguiar & Fonseca, 2008; Oliveira *et al.*, 2015).

Cabassous tatouay occurs in northeastern, eastern, central western and southern Brazil, northeastern Uruguay, northeastern Argentina, and southeastern Paraguay (Gonzalez & Abba, 2014; Feijó & Anacleto, 2021). In Brazil, records of the species come from the states of Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São

Paulo, Paraíba, Pernambuco, Ceará, Piauí, Pará, and Mato Grosso do Sul (Ubaid *et al.*, 2010; Gonzalez & Abba, 2014; Feijó & Anacleto, 2021). Moreover, the species is reported from the Atlantic forest, Caatinga, Cerrado savanna, and Pampa biomes (Feijó & Langguth, 2013; Anacleto *et al.*, 2015; Oliveira *et al.*, 2015). The occurrence of *C. tatouay* in the Pantanal wetland was predicted by some authors (Anacleto *et al.*, 2006; Paglia *et al.*, 2012; Hayssen, 2014). However, a recent study indicated low suitability for *C. tatouay* in the Pantanal wetland and Amazonia (Rocha *et al.*, 2022).

The state of Mato Grosso do Sul (MS) includes three biomes: Atlantic forest, Cerrado savanna, and Pantanal wetland (Silva *et al.*, 2010). The most recent list of mammals in the state reported 166 species, including six armadillos: *Cabassous squamicaudis*, *Dasypus novemcinctus*, *Dasypus septemcinctus*, *Euphractus sexcinctus*, *Tolypeutes matacus*, and *Priodontes maximus* (Tomas *et al.*, 2017). Although *C. tatouay* was not included in this list, its presence in MS had already been confirmed (Massocato & Desbiez, 2017) and published in a Xenarthran data set (Santos *et al.*, 2019). Most of these records were from the Cerrado savanna of MS: two camera trap records from the municipality of Brasilândia (Massocato & Desbiez, 2017), two roadkills from the municipality of Inocência, and one specimen in Brasilândia (Santos *et al.*, 2019).

Although the current distribution of *C. tatouay* encompasses the Pantanal wetland (Feijó & Anacleto, 2021), its presence in this biome seemed doubtful, with no confirmed records (Rocha *et al.*, 2022). Only one unconfirmed camera trap record was reported on a farm in the municipality of Miranda (Santos *et al.*, 2019). *Cabassous squamicaudis* has been widely registered and confirmed in the Pantanal wetland and identification errors between both species are common due to morphological similarities between them (Desbiez *et al.*, 2018). This paper presents new records of *C. tatouay* in MS, confirming the species in the Cerrado savanna and Pantanal wetland biomes.

MATERIALS AND METHODS

We compiled records of free-living animals made by field researchers between 2013 and 2021 in the western region of MS state (FIG. 1). The study region covers 16,800 km² and is composed of both dry and seasonally flooded savannas. The savannas are a mosaic of pastures, natural grasslands, forest fragments, and savanna/scrubland (FIG. 1). Records of the species were obtained through three complementary methods: survey of animal carcasses on roads, camera traps, and direct observation.

Roadkill data were obtained from a long-term monitoring effort of wildlife-vehicle collisions on

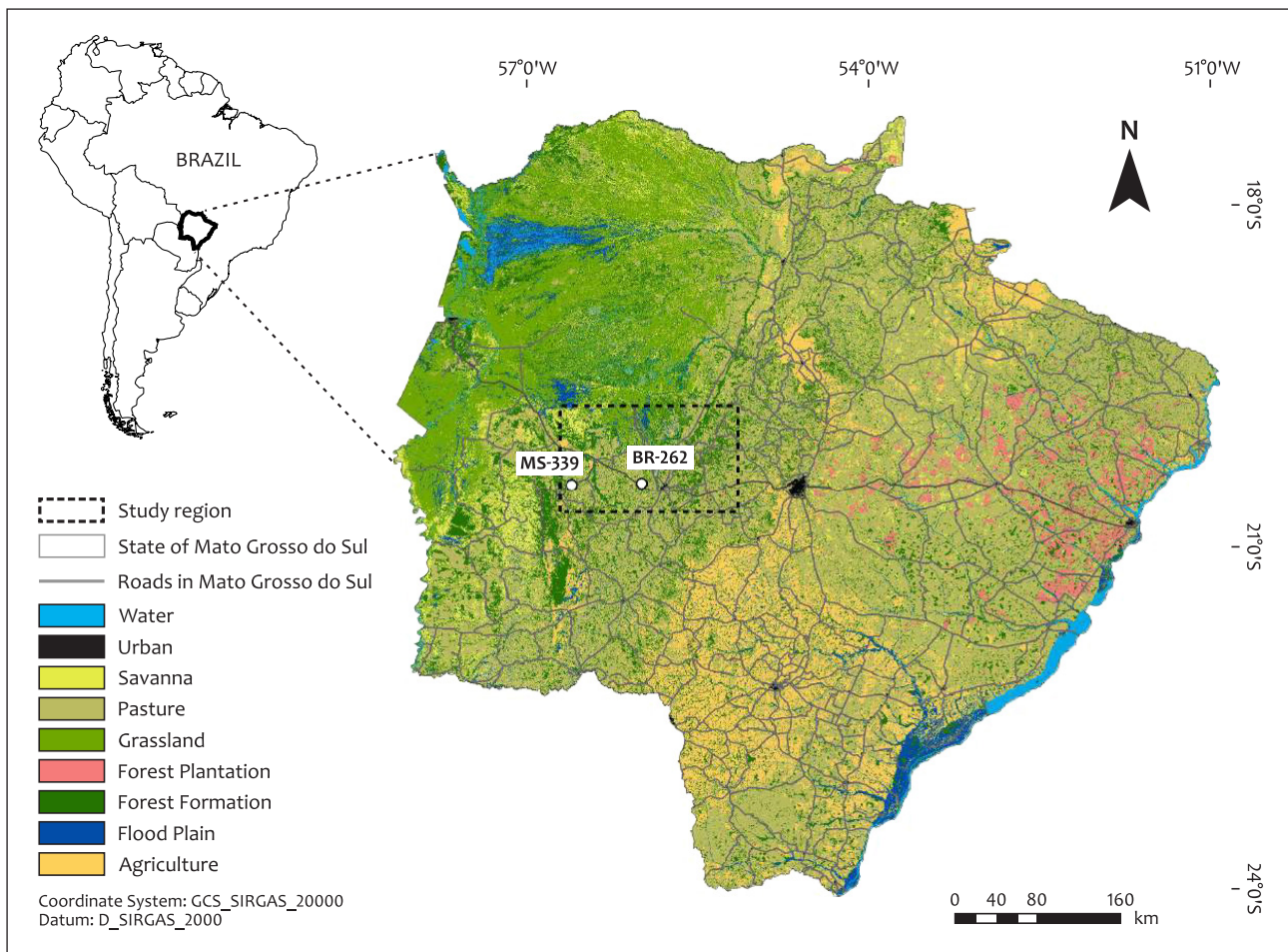


FIGURE 1. Main land cover classes (from <https://mapbiomas.org> in Collection 6) and road network, especially BR-262 and MS-339, in the study region in Mato Grosso do Sul, Brazil.

MS highways BR-262 and MS-339 (Ascensão *et al.*, 2017, 2021; **FIG. 1**). The monitoring has been carried out since 2013 by Instituto de Conservação de Animais Silvestres (ICAS, <https://www.icasconservacion.org.br>). Carcasses of *Cabassous* spp. that could not be identified ($n=9$) were sampled for genetic species identification (Schetino, 2017).

Camera trap records were obtained on ranches in the study region during mammal surveys. Camera traps (Bushnell, Leneka, USA; Cuddeback, De Pere, USA; and Stealth, Irving, USA) were programmed to take photos or videos. They were placed along fences, riverbanks, roads, trails, and open areas with the objective of recording medium and large mammals. In addition, live animals were photographed by ranch employees or researchers and given to ICAS for identification. All records obtained from camera traps that were not in the same action sequence were considered.

In the study area two species of naked-tailed armadillos, *C. tatouay* and *C. squamicaudis*, occur; they can sometimes be mistaken for each other (Massocato & Desbiez, 2017; Desbiez *et al.*, 2018). The main characteristic that we used in camera trap records for differentiating species was the size of

the ears, which are proportionally larger in *C. tatouay* (**FIG. 2**). In addition, *C. tatouay* is more robust and has a larger body size with well-developed scales on the carapace (**FIG. 2E**). Finally, nocturnal records can be an indication of *C. tatouay* because in the study region *C. squamicaudis* is strictly diurnal (Hayssen, 2014; Desbiez *et al.*, 2018; Feijó & Anacleto, 2021).

Camera trap records and direct observation were also used to document the activity period of *C. tatouay* in the study region. The new records of *C. tatouay* were georeferenced and compared with the species distribution map proposed by Feijó & Anacleto (2021). All points were imported to a GIS platform (ArcMap; ESRI, 2021) to generate a map with the new occurrence points of *C. tatouay* (**FIG. 3**). A land cover map of MapBiomas available in Collection 6 (<https://mapbiomas.org>) was also used to describe the vegetation types of the study area (**FIG. 1**).

RESULTS AND DISCUSSION

We obtained 12 new records (**TABLE 1, FIG. 3**) for *C. tatouay* in four MS municipalities: Aquidauana

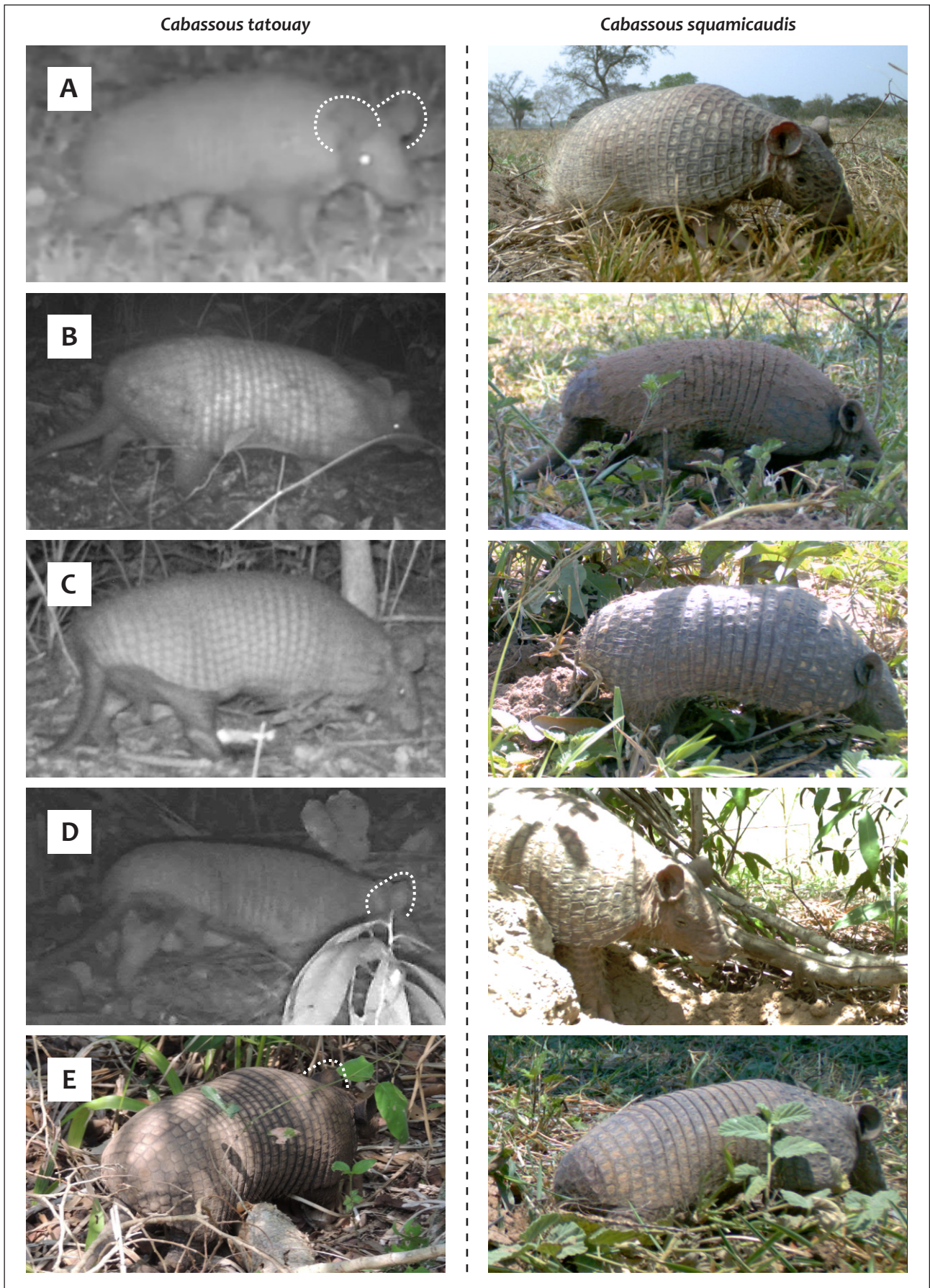


FIGURE 2. External morphological traits to differentiate *C. tatouay* (left) from *C. squamicaudis* (right) in photographs and direct observation; large ears of *C. tatouay* extending above the top of their heads are highlighted in pictures **A** and **D**, and the larger ears and body size in pictures **B** and **C** on the left side. Note the size of the body, the larger ears that extend above the top of the head, and the well-developed scales on the carapace in picture **E**.

(n=4), Bodoquena (n=3), Corguinho (n=1), and Miranda (n=4). Records were from camera trap surveys (n=7), roadkills (n=4), and direct observation (n=1) (TABLE 1).

During road surveys, two of the carcasses could be identified as *C. tatouay* through external morphological features. The carcasses were found in 2015 on MS-339 in the municipality of Bodoquena (TABLE 1, FIG. 3) and in 2020 on BR-262 in Miranda municipality, respectively (TABLE 1, FIG. 3). In addition, nine carcasses could not be identified to species level and were classified as *Cabassous* sp. Samples of these carcasses were collected and genetic analysis revealed that two of them were *C. tatouay* (Ascensão *et al.*, 2017; Schetino, 2017). Both had been collected in 2013 near Miranda (TABLE 1, FIG. 2).

The vegetation found on both sides of the road from the collected specimens was predominantly pasture with patches of forest. The presence of *C. tatouay* in this type of habitat was not expected, as the species tends to avoid degraded habitats or areas with intense agricultural activity (Mikich & Bérnils, 2004; Aguiar & Fonseca, 2008; Oliveira *et al.*, 2015). However, *C. tatouay* may use this type of habitat to move between forest fragments in search of shelter and resources. These records also demonstrate that highways and vehicle collisions can be a threat to species of the genus *Cabassous*.

Camera trap photographs were clear enough to distinguish the unique characteristics of *C. tatouay* (FIG. 2). One individual of *C. tatouay* was recorded in the municipality of Aquidauana on 18 August 2020, and two other records were made on 29 August 2020 on the same night (TABLE 1). The latter two records were only 14 minutes apart and could potentially represent the same individual. Two individuals were recorded in the municipalities of Corguinho and Miranda in 2014 and 2015, respectively (TABLE 1). Two other individuals were recorded in Bodoquena in 2018 and 2021, respectively (TABLE 1). All camera trap records occurred on cattle ranches near or in native forest habitats of the study region.

We recorded only one direct observation, in Aquidauana (FIG. 2E, TABLE 1) in 2020. In a study on *C. squamicaudis* in the Pantanal wetland, the animals spent on average 0.75% (10.8 minutes) of their time above ground and the species was therefore classified as subterranean (Desbiez *et al.*, 2018). Although we do not know if *C. tatouay* behaves similarly to *C. squamicaudis*, direct observations are very rare and its behavior may explain why there is so little information about the species.

Our camera trap and direct observation records were at night (n=6) and in the morning (n=2); no records were obtained during the afternoon. However, the low number of records presented in this

TABLE 1. New records of *Cabassous tatouay* in Mato Grosso do Sul, Brazil, obtained during field surveys between 2013 and 2021. Record numbers correspond to those indicated in FIG. 3.

Record	Record type	Biome	Municipality	Date	Time	Latitude (S)	Longitude (W)
1	Carcass/BR 262	Pantanal wetland	Miranda	18 May 2013	11:30	20°08'46"S	56°36'41"W
2	Carcass/BR 262	Cerrado savanna	Miranda	24 August 2013	10:14	20°18'33"S	56°14'53"W
3	Carcass/MS 339	Cerrado savanna	Bodoquena	14 February 2015	07:12	20°28'06"S	56°39'24"W
4	Carcass/BR 262	Cerrado savanna	Miranda	8 December 2020	13:18	20°21'04"S	56°08'07"W
5	Camera Trap	Cerrado savanna	Aquidauana	18 August 2020	00:08	19°53'21"S	56°19'46"W
6	Camera Trap	Pantanal wetland	Aquidauana	29 August 2020	04:36	19°49'21"S	56°21'37"W
7	Camera Trap	Pantanal wetland	Aquidauana	29 August 2020	04:50	19°49'21"S	56°21'37"W
8	Camera Trap	Cerrado savanna	Corguinho	23 May 2014	03:13	19°46'02"S	55°08'27"W
9	Camera Trap	Cerrado savanna	Miranda	19 November 2015	04:12	20°09'32"S	56°10'34"W
10	Camera Trap	Cerrado savanna	Bodoquena	24 September 2018	09:14	20°41'41"S	56°40'08"W
11	Camera Trap	Cerrado savanna	Bodoquena	23 September 2021	21:37	20°30'09"S	56°42'22"W
12	Direct observation	Pantanal wetland	Aquidauana	25 October 2020	09:35	19°47'45"S	56°20'54"W

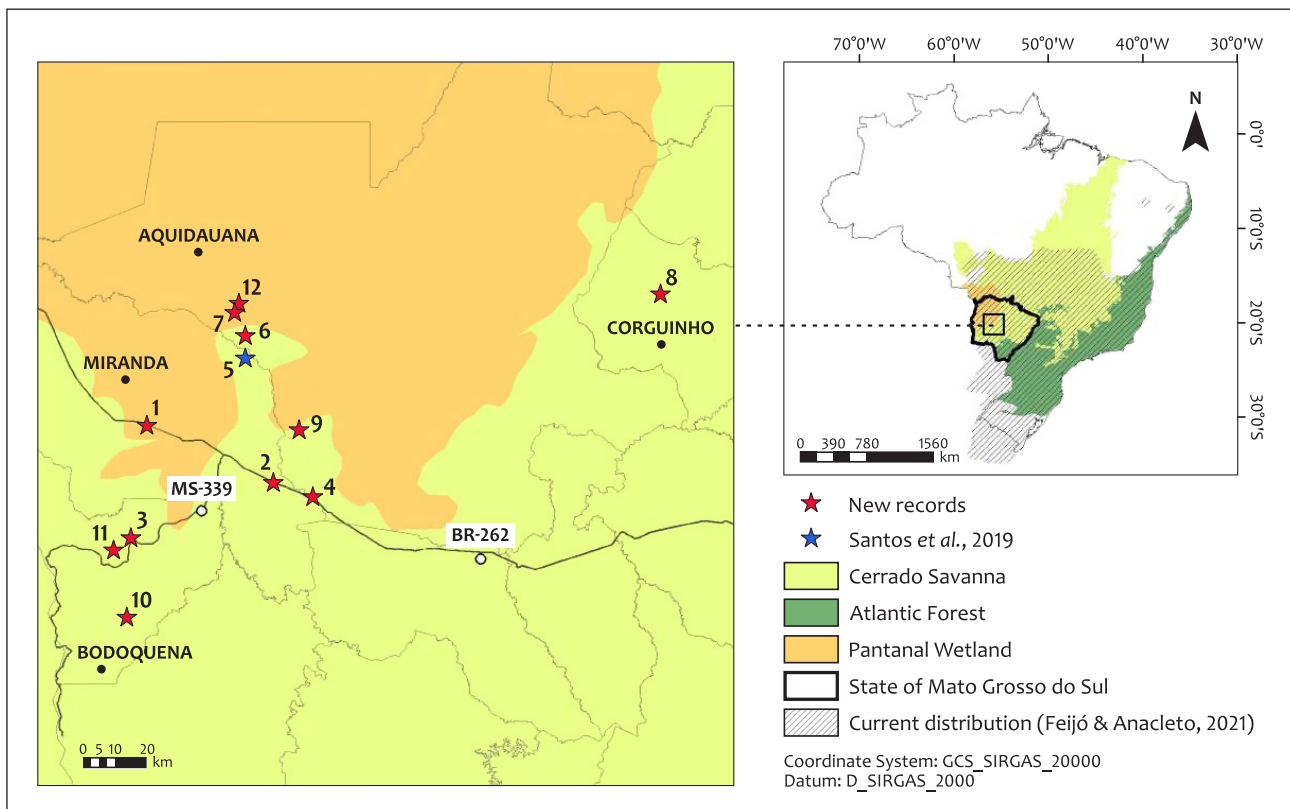


FIGURE 3. Study region with the location of new records of greater naked-tailed armadillo (*Cabassous tatouay*) in Mato Grosso do Sul, Brazil.

study does not allow us to confirm the activity pattern of *C. tatouay*. There are few studies on the activity pattern of *C. tatouay* (Meritt, 1985; Encarnaç o, 1987). Some authors consider the species to be nocturnal (Meritt, 1985; Encarnaç o, 1987; Ribeiro *et al.*, 2013; Monteiro *et al.*, 2019) while others consider it to be diurnal (Ubaid *et al.*, 2010). Other Cingulata species are known to change their activity depending on habitat structure (Norris *et al.*, 2010), prey availability (Bonato *et al.*, 2008), hunting pressure (Loughry & McDonough, 1998), and ambient temperature (Maccarini *et al.*, 2015; Attias *et al.*, 2018). Hence, to better understand its behavior, we suggest that future research should explicitly evaluate the relationship between the behavior of this species and environmental conditions, thereby increasing the knowledge on this cryptic and poorly known species.

In this study, a total of eight records were obtained in the Cerrado savanna and four in the Pantanal wetland. Our records have been categorized according to the boundaries of Brazilian biomes defined by IBGE (2004; FIG. 3). We consider the region to be a transition between the Pantanal wetland and Cerrado savanna locations: it presents differences in altitude between the Pantanal wetland and Cerrado savanna (115 to 156 m asl), but similarities in vegetation mosaics, both composed of several types of seasonal savanna, semi-deciduous

forests, gallery forests, grasslands, and open areas, and some parts are subject to seasonal flooding (Eiten, 1991; Harris *et al.*, 2005). The only previously published record of *C. tatouay* in the Pantanal wetland (Santos *et al.*, 2019, FIG. 3) is not within the boundaries of the biome according to IBGE maps. The transition zones may generate confusion in the classification of field records. Our data present the first records for this species in the Pantanal wetland biome, and we recommend the inclusion of *C. tatouay* in the species list of this biome. However, the presence of this species in central regions of the Pantanal wetland remains unconfirmed due to the lack of records and the low suitability of this biome for the species according to Rocha *et al.* (2022).

The new records presented here extend the confirmed range of *C. tatouay* in MS to the west. These results highlight the need for further surveys in this region to understand the distribution, habitat associations, and ecology of this cryptic mammal.

CONCLUSION

This work presents 12 new records of *C. tatouay* in Mato Grosso do Sul. We show that photographic records can be effective in identifying this species and that it can be active both during the day and night in this region. Our data also suggest that highways may be a threat to this species. Furthermore,

we confirmed for the first time the presence of *C. tatouay* in the Pantanal wetland, with records in the transitional environments between the Cerrado savanna and Pantanal. We highlight the importance of studies in the core zone of the Pantanal wetland to confirm the range of the species in this biome. Further research in this region and in other parts of its range may help to understand habitat use, distribution, and activity patterns of *C. tatouay*. We reinforce the importance of transition areas for biodiversity and the importance of developing conservation strategies in these regions, especially for areas that suffer from the conversion of native vegetation to pasture and agriculture.

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REFERENCES

- Aguiar, J.M. & G.A.B. Fonseca. 2008. Conservation status of the *Xenarthra*. Pp. 215–231 in: *The biology of the Xenarthra* (S.F. Vizcaíno & W.J. Loughry, eds.). University Press of Florida, Gainesville.
- Anacleto, T.C.S. 2006. Distribuição, dieta e efeitos das alterações antrópicas do Cerrado sobre os tatus. Tese de Doutorado, Universidade Federal de Goiás, Goiás, Brasil. 139 pp.
- Anacleto, T.C.S. 2007. Food habits of four armadillo species in the Cerrado area, Mato Grosso, Brazil. *Zoological Studies* 46: 529–537.
- Anacleto, T.C.S., J.A.F. Diniz Filho & M.V.C. Vital. 2006. Estimating potential geographic ranges of armadillos (*Xenarthra*, Dasypodidae) in Brazil under niche-based models. *Mammalia* 70: 202–213. <https://doi.org/10.1515/MAMM.2006.039>
- Anacleto, T.C.S., A.G. Chiarello, K.M.S. Ferrari, G.M. Mourão & S.M. Vaz. 2015. Avaliação do risco de extinção de *Cabassous tatouay* Desmarest, 1804 no Brasil. Avaliação do risco de extinção dos xenartros brasileiros – Série Estado de Conservação da Fauna Brasileira 2: 127–138.
- Ascensão, F., A.L. Desbiez, E.P. Medici & A. Bager. 2017. Spatial patterns of road mortality of medium-large mammals in Mato Grosso do Sul, Brazil. *Wildlife Research* 44: 135–146. <https://doi.org/10.1071/WR16108>
- Ascensão, F., D.R. Yogui, M.H. Alves, A.C. Alves, F. Abra & A.L. Desbiez. 2021. Preventing wildlife roadkill can offset mitigation investments in short-medium term. *Biological Conservation* 253: 108902. <https://doi.org/10.1016/j.biocon.2020.108902>
- Attias, N., L.G.R. Oliveira-Santos, W.F. Fagan & G. Mourão. 2018. Effects of air temperature on habitat selection and activity patterns of two tropical imperfect homeotherms. *Animal Behaviour* 140: 129–140. <https://doi.org/10.1016/j.anbehav.2018.04.011>
- Bonato, V., E.G. Martins, G. Machado, C.Q.D. Silva & S.F.D. Reis. 2008. Ecology of the armadillos *Cabassous unicinctus* and *Euphractus sexcinctus* (Cingulata: Dasypodidae) in Brazilian Cerrado. *Journal of Mammalogy* 89: 168–174. <https://doi.org/10.1644/06-MAMM-A-187.1>
- Desbiez, A.L.J., G.F. Massocato, D. Kluyber & R.C.F. Santos. 2018. Unraveling the cryptic life of the southern naked-tailed armadillo, *Cabassous unicinctus squamicaudis* (Lund, 1845), in a Neotropical wetland: home range, activity pattern, burrow use and reproductive behaviour. *Mammalian Biology* 91: 95–103. <https://doi.org/10.1016/j.mambio.2018.02.006>
- Eiten, G. 1991. Vegetação do Cerrado. Pp. 9–65 in: *Cerrado, caracterização, ocupação e perspectivas* (M.N. Pinto, ed.). Universidade de Brasília, Brasília, Brasil.
- Encarnação, C.D. 1987. Contribuição à ecologia dos tatus (*Xenarthra*, Dasypodidae) da Serra da Canastra, Minas Gerais. Tese de Mestrado, Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brasil. 210 pp.
- ESRI. 2021. ArcMap 10.8. Redlands, USA.
- Feijó, A. & T.C. Anacleto. 2021. Taxonomic revision of the genus *Cabassous* McMurtrie, 1831 (Cingulata: Chlamyphoridae), with revalidation of *Cabassous squamicaudis* (Lund, 1845). *Zootaxa* 4974: 47–78.
- Feijó, A. & A. Langguth. 2013. Mamíferos de médio e grande porte do Nordeste do Brasil: distribuição e taxonomia, com descrição de espécies novas. *Revista Nordestina de Biologia* 22: 3–225.
- Gonzalez, E. & A.M. Abba. 2014. *Cabassous tatouay*. The IUCN Red List of Threatened Species 2014:e.T3414A47437737. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T3414A47437737.en>. Accessed on 1 November 2022.
- Harris, M.B. *et al.* 2005. Desafios para proteger o Pantanal brasileiro: ameaças e iniciativas em conservação. *Megadiversidade* 1: 156–164.
- Hayssen, V. 2014. *Cabassous tatouay* (Cingulata: Dasypodidae). *Mammalian Species* 46: 28–32. <https://doi.org/10.1644/909>
- IBGE – Instituto Brasileiro de Geografia e Estatística. 2004. Mapa de biomas do Brasil. <https://portaldemapas.ibge.gov.br/portal.php#mapa208018>. Accessed on 7 March 2022.

- Loughry, W.J. & C.M. McDonough. 1998. Comparisons between nine-banded armadillo (*Dasypus novemcinctus*) populations in Brazil and the United States. *Revista de Biologia Tropical* 46: 1173–1183. <https://doi.org/10.15517/rbt.v46i4.20740>
- Maccarini, T.B., N. Attias, M. Medri, J. Marinho-Filho & G.M. Mourão. 2015. Temperature influences the activity patterns of armadillo species in a large neotropical wetland. *Mammal Research* 60: 403–409. <https://doi.org/10.1007/s13364-015-0232-2>
- Massocato, G.F. & A.L.J. Desbiez. 2017. Presença e importância do tatu-canastra, *Priodontes maximus* (Kerr, 1792), na maior área protegida do leste do Estado de Mato Grosso do Sul, Brasil. *Edentata* 18: 26–33. <https://doi.org/10.2305/IUCN.CH.2017.Edentata-18-1.4.en>
- Meritt, D.A. 1985. Naked-tailed armadillos, *Cabassous* sp. Pp. 333–341 in: *The evolution and ecology of armadillos, sloths and vermilinguas* (G.G. Montgomery, ed.). Smithsonian Institution Press, Washington and London.
- Mikich, S.B. & R.S. Bérnils. 2004. Livro vermelho da fauna ameaçada no Estado do Paraná. Instituto Ambiental do Paraná.
- Monteiro, M.C.M., K.V.K.A. Silva, A.S. Pires & P.K. Lira. 2019. First record of the naked-tailed armadillo (*Cabassous* sp.) at Tijuca National Park, Rio de Janeiro, Brazil. *Studies on Neotropical Fauna and Environment* 54: 97–101. <https://doi.org/10.1080/01650521.2019.1582137>
- Norris, D., F. Michalski & C.A. Peres. 2010. Habitat patch size modulates terrestrial mammal activity patterns in Amazonian forest fragments. *Journal of Mammalogy* 91: 551–560. <https://doi.org/10.1644/09-MAMM-A-199.1>
- Oliveira, S.V. *et al.* 2015. Occurrence of *Cabassous tatouay* (Cingulata, Dasypodidae) in Rio Grande do Sul and its potential distribution in southern Brazil. *Iheringia: Série Zoologia* 105: 235–241. <https://doi.org/10.1590/1678-476620151052235241>
- Paglia, A.P., G.A.B. Fonseca, A.B. Rylands, G. Hermann, L.M.S. Aguiar & A.G. Chiarello. 2012. Lista anotada dos mamíferos do Brasil. 2ª Edição / Annotated checklist of Brazilian mammals. *Occasional Papers in Conservation Biology* 6: 1–82.
- Redford, K.H. 1995. Food habits of armadillos (*Xenarthra: Dasypodidae*). Pp. 429–437 in: *The evolution and ecology of armadillos, sloths and vermilinguas* (G.G. Montgomery, ed.). Smithsonian Institution Press, Washington and London.
- Ribeiro, P., C. Sánchez-Lalinde, F. Vélez-García, A. Schiavetti & M.R. Alvarez. 2013. Novo registro de *Cabassous tatouay* Desmarest, 1804 para a Mata Atlântica da Bahia, Brasil. *Edentata* 14: 74–77. <https://doi.org/10.5537/020.014.0110>
- Rocha, E.C., J. Silva, D.P. Silva, F.G. Lemos & M.C. Castro. 2022. Distribution of the greater naked-tailed armadillo *Cabassous tatouay* (Desmarest, 1804) in South America, with new records and species distribution modeling. *Studies on Neotropical Fauna and Environment*. <https://doi.org/10.1080/01650521.2022.2085018>
- Santos, P.M. *et al.* 2019. Neotropical xenarthrans: a data set of occurrence of xenarthran species in the Neotropics. *Ecology* 100: e02663. <https://doi.org/10.1002/ecy.2663>
- Schetino, M.A.A. 2017. Análises moleculares em *Xenarthra*: contribuições para a sistemática filogenética de Tolypeutinae, taxonomia de *Cabassous* e filogeografia de *Bradypus torquatus*. Tese de Doutorado, Universidade Federal de Minas Gerais, Minas Gerais, Brasil. 100 pp.
- Silva, A.M., J.S. Vila, D.L. Ferrari & R.A.C. Lamperelli. 2010. Vegetação natural e área antrópica em Mato Grosso do Sul até o ano de 2002. Pp. 391–400 in: *Anais 3º Simpósio de Geotecnologias no Pantanal, Cáceres*.
- Superina, M., N. Pagnutti & A.M. Abba. 2014. What do we know about armadillos? An analysis of four centuries of knowledge about a group of South American mammals, with emphasis on their conservation. *Mammal Review* 44: 69–80. <https://doi.org/10.1111/mam.12010>
- Tomas, W.M. *et al.* 2017. Checklist of mammals from Mato Grosso do Sul, Brazil. *Iheringia: Série Zoologia* 107: 1–17. <https://doi.org/10.1590/1678-4766e2017155>
- Ubaid, F.K., L.S. Mendonça & F. Maffei. 2010. Contribuição ao conhecimento da distribuição geográfica do *Cabassous tatouay* no Brasil: revisão, status e comentários sobre a espécie. *Edentata* 11: 22–28. <https://doi.org/10.1896/020.011.0105>

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COMUNICACIÓN BREVE

Registros del armadillo coletrapo norteño, *Cabassous centralis* (Cingulata: Chlamyphoridae), para el departamento de Norte de Santander, Colombia

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Resumen El coletrapo norteño (*Cabassous centralis*) es un armadillo que presenta una baja detectabilidad en campo debido a sus hábitos crípticos, desconociéndose muchos aspectos de su historia natural y distribución. Debido a esto y a la ausencia de exploraciones puntuales, aún permanecen territorios en Colombia sin reportes de la especie. En esta nota se añaden tres registros novedosos de *C. centralis* para el departamento de Norte de Santander, discutiéndose, a su vez, la identidad taxonómica de un registro previo asignado a esta especie para la región y omitido por la literatura. Con estas evidencias se llena el vacío de información de *C. centralis* en este sector de Colombia. Se espera un mayor estudio de la especie para el departamento, así como la obtención de más registros biológicos y fotográficos, con el fin de esclarecer asuntos concernientes a los límites geográficos de su distribución y amenazas locales.

Palabras clave: *Cabassous unicinctus*, cisandino, Cordillera Oriental, Datos Insuficientes, distribución, transandino

Records of the northern naked-tailed armadillo, *Cabassous centralis* (Cingulata: Chlamyphoridae), for the Department of Norte de Santander, Colombia

Abstract The northern naked-tailed armadillo (*Cabassous centralis*) is a species with a low detectability in the field due to its cryptic habits. Many aspects of its natural history and distribution are therefore unknown. Due to this and the absence of specific explorations, there are still territories in Colombia without reports of the species. In this note, three novel records of *C. centralis* for the Department of Norte de Santander are added. In addition, the taxonomic identity of a previous record assigned to this species for the region and omitted by the literature is discussed. With this evidence, the information gap of *C. centralis* in this sector of Colombia is filled. Further studies of the species in the department, as well as obtaining additional biological and photographic records, are needed to clarify issues concerning the geographical limits of their distribution and local threats.

Keywords: *Cabassous unicinctus*, cis-Andean, Data Deficient, distribution, Eastern Cordillera, trans-Andean

Los armadillos de cola desnuda o «coletrapos» del género *Cabassous* McMurtrie, 1831 comprenden en la actualidad cinco especies (*C. centralis*, *C. chacoensis*, *C. squamicaudis*, *C. tatouay* y *C. unicinctus*), distribuidas desde el sur de México hasta el norte de Argentina. Son denominados así porque sus colas carecen total o parcialmente de placas óseas (Feijó & Anacleto, 2021). De las cinco especies reconocidas,

solo dos tienen presencia en Colombia: el armadillo coletrapo norteño, *C. centralis* (Miller, 1899), de distribución transandina (regiones Andina, Caribe y Pacífica), presente entre los 0 y los 3018 msnm, y el armadillo coletrapo sureño, *C. unicinctus* (Linnaeus, 1758), de distribución cisandina (regiones Amazónica, Andina y de la Orinoquía), entre los 0 y los 1200 msnm (Aya-Cuero *et al.*, 2019).

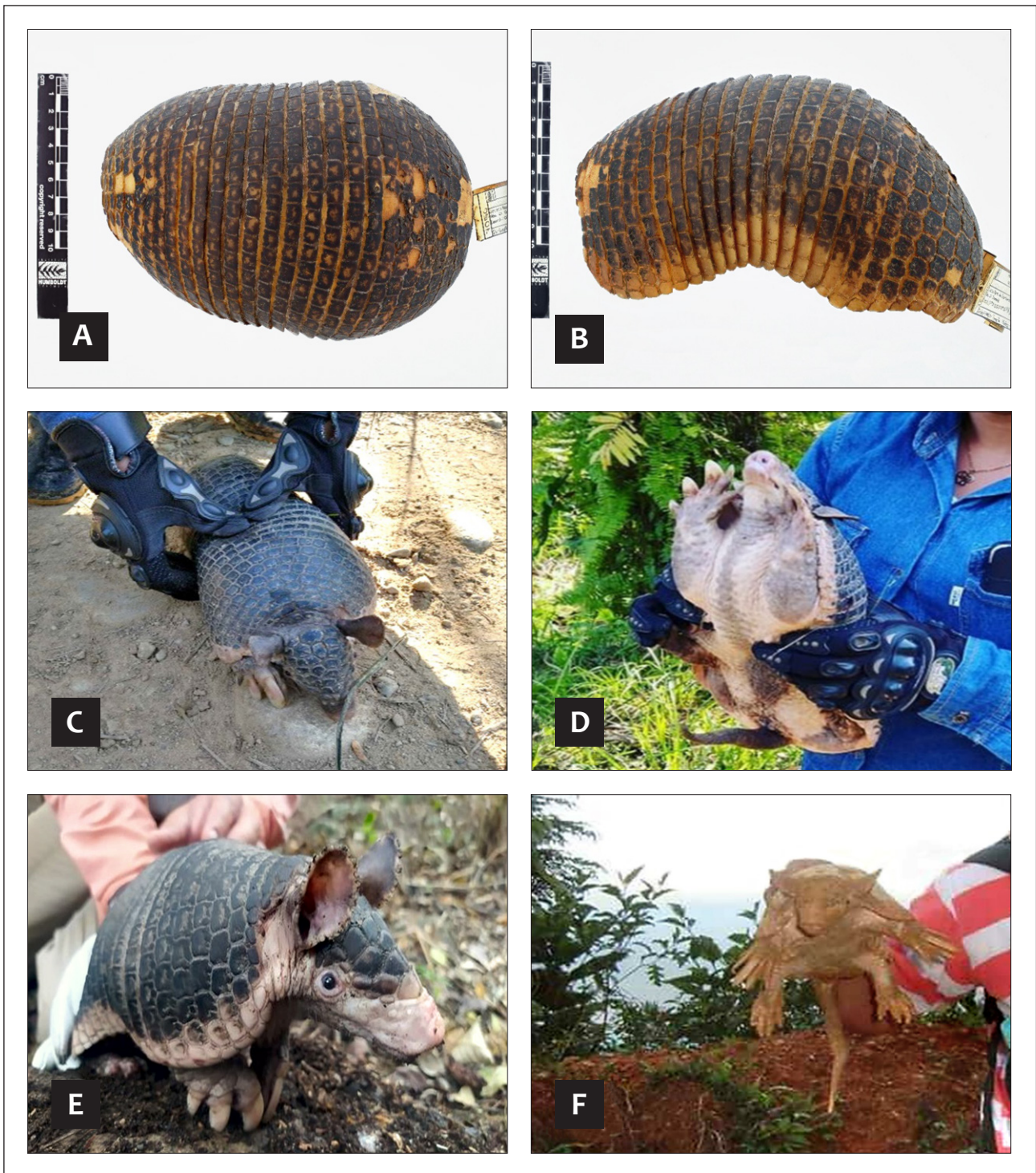


FIGURA 1. Registros fotográficos de *Cabassous* para Norte de Santander, Colombia. **A-B.** Vista dorsal y lateral del caparazón de *Cabassous* sp. (IAvH-M-7056), recolectado en la vereda El Diamante, Toledo. **C-D.** *Cabassous centralis* capturado en la vereda Campo Tres, Tibú. **E-F.** Ejemplares de *C. centralis* registrados en la vereda California, Los Patios y la vereda Santa Fe, El Tarra, respectivamente.

Estas dos especies son consideradas raras en sus áreas de distribución, tanto por sus actividades fosoriales como por sus hábitos solitarios y nocturnos, siendo sus encuentros esporádicos (Alberico, 2006; Hayssen, 2014). Por lo tanto, muchos aspectos de la ecología, historia natural y distribución de estos armadillos son aún desconocidos (Abba & Superina, 2010; Hayssen, 2014; Chacón-Pacheco

et al., 2021). *Cabassous centralis*, por ejemplo, se clasifica como una especie con Datos Insuficientes (DD), según la Unión Internacional para la Conservación de la Naturaleza (UICN) (Tirira *et al.*, 2014).

Artículos recientes evidenciaron una ausencia de reportes de estos mamíferos para el departamento de Norte de Santander, Colombia, en la frontera con Venezuela (Ramírez-Chaves *et al.*, 2017;

Aya-Cuero *et al.*, 2019; Chacón-Pacheco *et al.*, 2021; Gómez-Sánchez *et al.*, 2021). En esta nota se discute un registro previo, omitido por la literatura, de *C. centralis* para Norte de Santander, añadiéndose, a su vez, tres nuevos registros de la especie en la región, basados estos últimos en encuentros fortuitos con personas y entidades en campo e indagados por el autor.

El registro previo corresponde a un caparazón, recolectado por Yaneth Muñoz el 26 de septiembre de 1999 en la vereda El Diamante, municipio de Toledo, cerca del Parque Nacional Natural Tamá (7°7'21,97"N, 72°13'58,98"O; 1100 msnm), depositado en la colección de mamíferos del Instituto Alexander von Humboldt (IAvH-M-7056), en Villa de Leyva (FIG. 1A, FIG. 1B). El segundo registro de *C. centralis* atañe a un ejemplar capturado el 6 de febrero de 2020, entre las 08:00 y las 09:00 h, en un cultivo de palma africana por empleados de la empresa Palnorte S.A., como parte de las jornadas efectuadas por el *Proyecto mi Catatumbo* en la vereda Campo Tres, municipio de Tibú (8°30'49,00"N, 72°42'19,98"O; 52 msnm) (FIG. 1C, FIG. 1D). Este sitio está enmarcado en una matriz de bosque húmedo tropical. Luego de ser manipulado, el animal fue liberado en el mismo lugar.

El tercer registro proviene de la recta Corozal en la vereda California, municipio de Los Patios

(7°43'5,59"N, 72°34'28,51"O; 748 msnm) (FIG. 1E). El ejemplar, en este caso, fue capturado el 1° de marzo de 2021 en horario diurno por funcionarios del *Proyecto vial Pamplona-Cúcuta*, durante las actividades de rescate de fauna silvestre en las áreas licenciadas. Luego de ser fotografiado, el animal se reubicó en otro sitio con similares condiciones de donde fue extraído, correspondiente al ecosistema de bosque seco tropical.

El cuarto registro de *C. centralis* es de un individuo capturado el 17 de octubre de 2021, entre las 16:00 y las 17:00 h, mientras atravesaba un sendero en un sector de potreros, cultivos y parches de bosque húmedo tropical en la vereda Santa Fe, municipio del Tarra, Región del Catatumbo (8°40'2,51"N, 73°4'14,30"O; 594 msnm) (FIG. 1F). El animal fue liberado en el mismo sitio.

El espécimen IAvH-M-7056, si bien aparece identificado como *C. centralis*, por su ubicación cisandina (Región del Sarare: Entre los ríos Margua y Cubugón) podría corresponder a *C. unicinctus*, tal como lo mencionan Gómez-Sánchez *et al.* (2021). A su vez está a 43 km, en línea recta, de un registro histórico de *C. unicinctus* en el estado Apure, Venezuela (Feijó & Anacleto, 2021) (FIG. 2). Sin embargo, *C. centralis* se ha reportado hasta los 3018 msnm (Díaz-N. & Sánchez-Giraldo, 2008), de manera que podría llegar a ese sector cisandino, atravesando

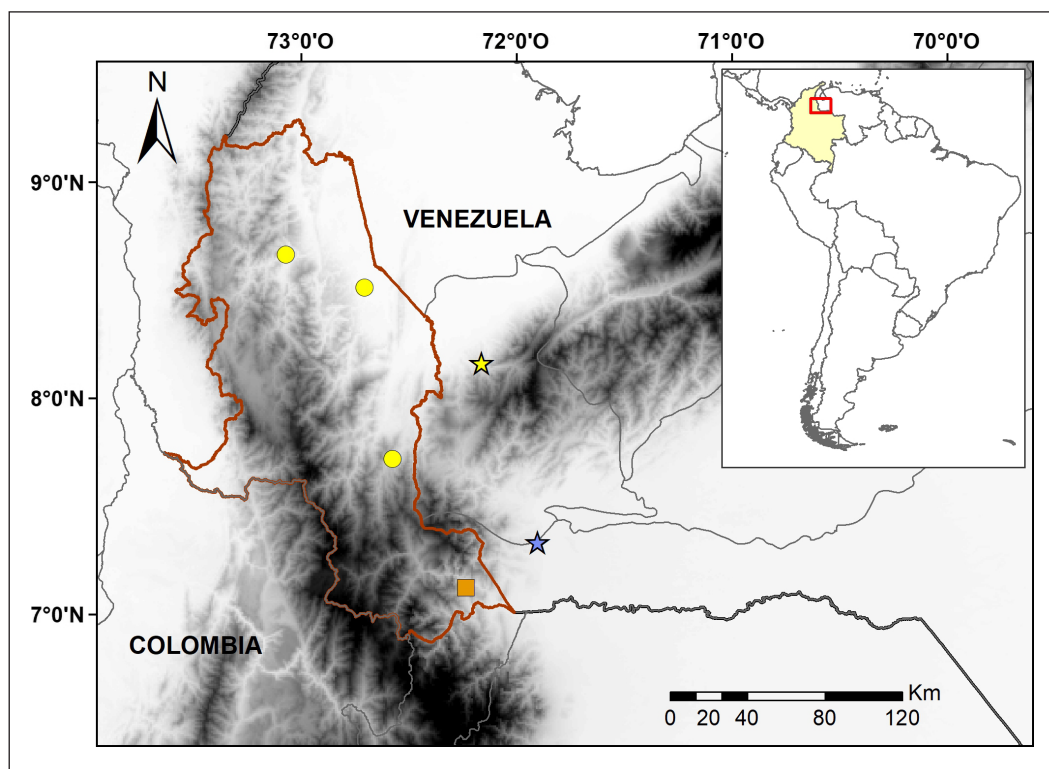


FIGURA 2. Localidades de registro de *Cabassous* para el departamento de Norte de Santander, Colombia, con reportes adyacentes en Venezuela. **CUADRADO NARANJA:** *Cabassous* sp. (IAvH-M-7056). **CÍRCULOS AMARILLOS:** Localidades de *Cabassous centralis* referidas en esta nota. **ESTRELLAS AMARILLA Y AZUL:** Registros históricos de *C. centralis* (EBRG 781) y *C. unicinctus* (MBUCV I-2961) respectivamente, basados en especímenes biológicos revisados por Feijó & Anacleto (2021) para Venezuela.

altitudes menores presentes al sureste del departamento. Por ello, se ha considerado a los Andes como una barrera parcial para este armadillo (Wetzel, 1985; Aya-Cuero *et al.*, 2019; Chacón-Pacheco *et al.*, 2021).

Ambas especies son similares externamente, siendo las medidas corporales (longitud total, de la cola, pata trasera y oreja) y craneales (anchura cigomática e inter-orbital) las que aportan una mejor distinción entre ellas (Wetzel *et al.*, 2008; Feijó & Anacleto, 2021). Por tanto, el espécimen debería quedar como *Cabassous* sp. hasta no realizarle análisis moleculares, siendo quizás esta incertidumbre el motivo de su omisión en las publicaciones más recientes.

Respecto a los otros tres registros de *C. centralis*, estos mantienen su identificación en base a que fueron reportados al oeste de los Andes, a más de 200 km en línea recta de la distribución estipulada para *C. unicinctus*, y sin presencia de registros confirmados de esta última especie en la zona (Ramírez-Chaves *et al.*, 2017; Aya-Cuero *et al.*, 2019) (FIG. 2).

En lo concerniente al hábitat, se destaca el encuentro de estos individuos en sitios alterados. *Cabassous centralis* se ha reportado en zonas agrícolas, bosques secundarios o áreas semiurbanas, aunque asociado a coberturas en buen estado de conservación (Hayssen *et al.*, 2013; Tirira *et al.*, 2014). No obstante, la mayoría de los registros provienen de hábitats inalterados, por lo que, teniendo una aparente baja abundancia, podría estar enfrentando graves problemas como la deforestación (Chacón-Pacheco *et al.*, 2021). Debido a esto, se le ha clasificado como una especie Casi Amenazada (NT) en el Libro Rojo de mamíferos de Colombia (Alberico, 2006).

Con los registros aquí presentados, se llena el vacío de distribución de *C. centralis* para el norte de la Cordillera Oriental colombiana, generándose bases para futuros estudios de la especie en el departamento de Norte de Santander. Se resalta, además, la importancia de la participación ciudadana en la obtención de registros de especies elusivas, sobre todo en regiones con problemas de orden público. Por otro lado, se recomienda la adquisición de muestras morfológicas y genéticas de estos armadillos, particularmente al sureste del departamento (Región del Sarare), con el fin de investigar la posible simpatria de las poblaciones de *C. centralis* y *C. unicinctus* en la transición entre la Cordillera Oriental y los Llanos de la Orinoquía.

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REFERENCIAS

- Abba, A.M. & M. Superina. 2010. The 2009/2010 armadillo Red List assessment. *Edentata* 11: 135–184. <https://doi.org/10.5537/020.011.0203>
- Alberico, M.A. 2006. Armadillo coiletrapo centroamericano *Cabassous centralis*. Pp. 324–327 in: Libro Rojo de los mamíferos de Colombia (J.V. Rodríguez-Machecha., M.A. Alberico., F. Trujillo & J.P. Jorgenson, eds.). Conservación Internacional & Ministerio de Medio Ambiente, Vivienda y Desarrollo Territorial, Bogotá, Colombia.
- Aya-Cuero, C. *et al.* 2019. Distribution of armadillos in Colombia, with an analysis of ecoregions and protected areas inhabited. *Mammal Research* 64: 569–580. <https://doi.org/10.1007/s13364-019-00435-4>
- Chacón-Pacheco, J., C.R. Madera & M. Superina. 2021. State of knowledge and updated distribution of the northern naked-tailed armadillo *Cabassous centralis* Miller, 1899 (Cingulata, Chlamyphoridae). *Mammalia* 85: 503–514. <https://doi.org/10.1515/mammalia-2021-0054>
- Díaz-N., J.F. & C. Sánchez-Giraldo. 2008. Notable altitudinal range extension of the northern naked-tailed armadillo *Cabassous centralis* (Cingulata: Dasypodidae) in Colombia. *Brenesia* 69: 75–76.
- Feijó, A. & T.C. Anacleto. 2021. Taxonomic revision of the genus *Cabassous* McMurtrie, 1831 (Cingulata: Chlamyphoridae), with revalidation of *Cabassous squamicaudis* (Lund, 1845). *Zootaxa* 4974: 47–78. <https://doi.org/10.11646/zootaxa.4974.1.2>
- Gómez-Sánchez, D., S. García-Restrepo & C. Bravo-Vega. 2021. Ampliación de la distribución del armadillo cola de trapo transandino *Cabassous centralis* (Cingulata: Chlamyphoridae), para el Alto Magdalena en Colombia. *Mammalogy Notes* 7: 220. <https://doi.org/10.47603/mano.v7n1.220>
- Hayssen, V., J. Ortega., A. Morales-Leyva & N. Martínez-Mendez. 2013. *Cabassous centralis* (Cingulata: Dasypodidae). *Mammalian Species* 898: 12–17. <https://doi.org/10.1644/898.1>
- Hayssen, V. 2014. *Cabassous unicinctus* (Cingulata: Dasypodidae). *Mammalian Species* 46(907): 16–23. <https://doi.org/10.1644/907>
- Ramírez-Chaves, H.E., J.P. López Ordóñez, N.A. Peralta & C.A. Aya-Cuero. 2017. A noteworthy elevational record of the southern naked-tailed armadillo *Cabassous unicinctus* in Colombia, with comments on the species distribution in the country. *Edentata* 18: 1–5. <https://doi.org/10.2305/IUCN.CH.2017.Edentata-18-1.9.en>

Tirira, D. G., J. F. Díaz-N., M. Superina & A. M. Abba. 2014. *Cabassous centralis*. The IUCN Red List of Threatened Species 2014: e.T3412A47437304. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T3412A47437304.en>. Acceso el 29 de mayo de 2022.

Wetzel, R. M. 1985. Taxonomy and distribution of armadillos, Dasypodidae. Pp 23–46 in: The evolution and ecology of armadillos, sloths, and vermilinguas. (G. G. Montgomery, ed.). Smithsonian Institution Press, Washington and London.

Wetzel, R. M., A. L. Gardner, K. H. Redford & J. F. Eisenberg. 2008. Order Cingulata Illiger, 1811. Pp. 128–157 in: Mammals of South America, volume 1: Marsupials, xenarthrans, shrews and bats (A. L. Gardner, ed.). University of Chicago Press, Chicago.

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Depredación por *Puma concolor* y nueva localidad para *Cabassous tatouay* en Corrientes, Argentina

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Resumen *Cabassous tatouay* es una especie de armadillo altamente fosorial, cuya historia natural y distribución son pobremente conocidas. En Argentina cuenta con citas solo para las provincias de Misiones y Corrientes. En esta nota reportamos el hallazgo de una coraza de un individuo potencialmente depredado por un puma (*Puma concolor*) en el noreste de la provincia de Corrientes. Esto adiciona una nueva localidad en Corrientes, siendo además el primer registro de depredación de puma sobre *C. tatouay* en Argentina.

Palabras clave: cabasú grande, Campos y Malezales, distribución, registro documentado

Predation by *Puma concolor* and new locality for *Cabassous tatouay* in Corrientes, Argentina

Abstract *Cabassous tatouay* is a highly fossorial species of armadillo whose natural history and distribution are poorly known. In Argentina, it has records only for the provinces of Misiones and Corrientes. In this note, we report the discovery of a carapace of an individual potentially captured by a puma (*Puma concolor*) in northeastern Corrientes province. This note adds a new locality in Corrientes, and is the first record of puma predation on *C. tatouay* in Argentina.

Keywords: distribution, documented record, greater naked-tailed armadillo, Southern Cone Mesopotamian savanna

El tatú-aí o cabasú grande (*Cabassous tatouay*) (Cingulata: Chlamyphoridae) es la mayor especie de su género, con una longitud de cabeza-cuerpo de hasta 490 mm y 6,4 kg de masa corporal (Redford & Eisenberg, 1992), aunque se citan ejemplares de dimensiones superiores (Hayssen, 2014; Nigro *et al.*, 2021). Es una de las especies de armadillo menos conocidas por la ciencia, con muy pocos estudios y poco representadas en colecciones científicas (Ubaid *et al.*, 2010; Abba *et al.*, 2012; Superina *et al.*, 2014). Se lo encuentra desde el centro y este de Brasil, sudeste de Paraguay y noreste de Argentina hasta el noreste de Uruguay (Abba & Superina, 2010; González & Abba, 2014). A lo largo de su

distribución geográfica habita selvas, bosques, pajonales y pastizales, incluyendo bosques secundarios y agroecosistemas (Redford & Eisenberg, 1992; Chebez & Nigro, 2008; Hayssen, 2014). En Argentina, donde se lo considera como una especie Casi Amenazada (Varela *et al.*, 2019), se encuentra únicamente en la provincia de Misiones y noreste de la provincia de Corrientes (Chebez & Nigro, 2008; Varela *et al.*, 2019), siendo erróneas sus menciones para la provincia de Buenos Aires (Abba *et al.*, 2012).

Debido en parte a los hábitos marcadamente fosoriales de *C. tatouay*, su biología y ecología son pobremente conocidas (Redford, 1994; McDonough & Loughry, 2008). Se sabe que es una

especie principalmente nocturna y solitaria, que cava madrigueras con entradas únicas y que rara vez permanece o regresa a ellas después de usarlas (Carter & Encarnaçao, 1983). Es considerado un insectívoro especializado en termitas y hormigas (Redford, 1985). No se conocen adecuadamente sus preferencias de hábitat, ya que según Wetzel *et al.* (2008) parece preferir sabanas y áreas abiertas, mientras que Feijó & Anacleto (2021) sugieren que frecuenta principalmente bosques. También el grado de uso de bosques secundarios y áreas de cultivos es poco conocido, e incluso contradictorio (p.ej. Fabri *et al.*, 2003; Fonseca & Aguiar, 2004; Iezzi *et al.*, 2020). De sus interacciones con otros vertebrados, solo existen reportes del hallazgo de restos de *C. tatouay* en heces de pumas (*Puma concolor*) en el sudeste de Brasil (Martins *et al.*, 2008; Gheler-Costa *et al.*, 2018; Magioli & Ferraz, 2021). Esta escasez de datos sobre su historia natural, sumada al reducido número de localidades con registros confirmados, resalta la necesidad de generar información sobre esta especie lo antes posible (Abba *et al.*, 2012). Por esta razón, consideramos de interés dar a conocer

una nueva localidad en la provincia de Corrientes, basada en el hallazgo de una coraza de un individuo de *C. tatouay* con evidencias de haber sido depredado por *P. concolor*.

El registro se realizó el 14 de febrero de 2022 en el Establecimiento Las Marías (28°08'06"S, 55°51'16"O, 125 msnm), departamento Santo Tomé, noreste de Corrientes (FIG. 1). Esta localidad se encuentra en el Distrito de los Campos de la Provincia Fitogeográfica Paranaense (Cabrera, 1976) o Ecorregión de Campos y Malezales (Burkart *et al.*, 1999). El área se caracteriza por su relieve ondulado, con lomadas que alcanzan en promedio 130 msnm. El clima es subtropical sin estación seca, con mayor concentración de precipitaciones en verano (Servicio Meteorológico Nacional, 2022). La superficie de los predios pertenecientes a esta empresa es de 30.000 ha, en las que se encuentran plantaciones de yerba mate (*Ilex paraguariensis*), té (*Camellia sinensis*) y forestaciones de pinos (*Pinus* spp.) y eucaliptos (*Eucalyptus* spp.). Estas forestaciones en muchos casos poseen un sotobosque formado por arbustos y arbolitos de especies nativas (Barret & Tressens,

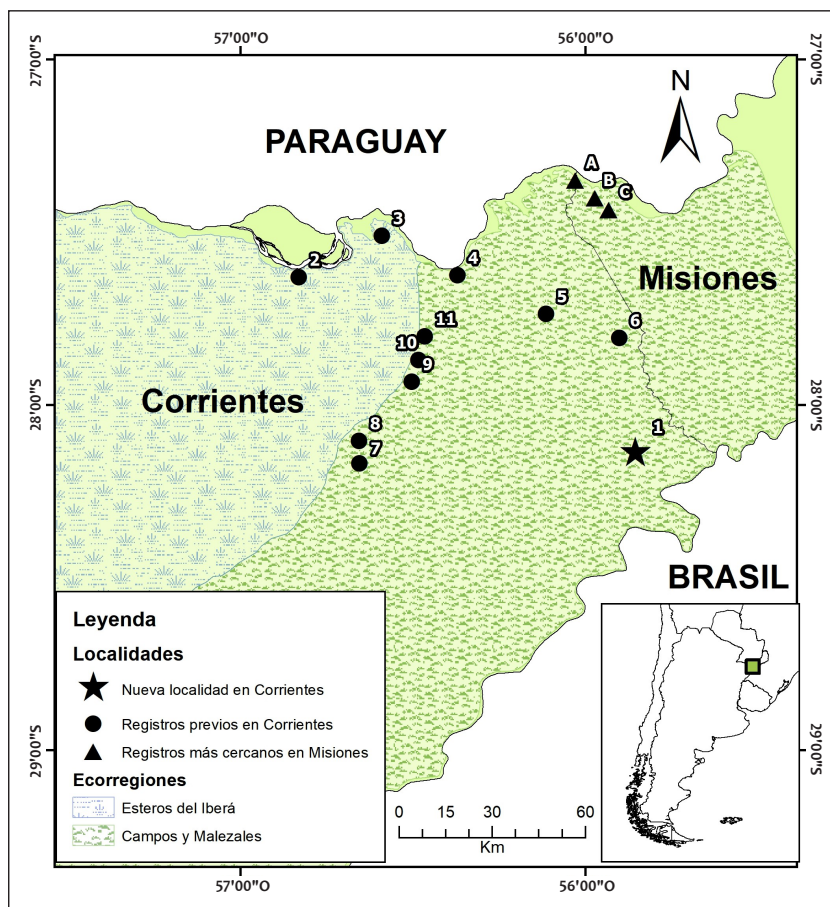


FIGURA 1. Localidades con registros de *Cabassous tatouay* en la provincia de Corrientes y el sur de Misiones. 1. Establecimiento Las Marías, Corrientes, Argentina (este trabajo); 2. 15 km al oeste de Ituzaingó (Massoia & Chebez, 1985); 3. Reserva Natural Rincón Santa María (Pasian *et al.*, 2015); 4. Estancia Puerto Valle (Chebez & Nigro, 2008); 5. Estancia San Miguelito; 6. San Carlos 3; 7. Estancia San Antonio (Bauni *et al.*, 2013); 8. Paraje Galarza; 9. Estancia Fortín Santa Catalina; 10. Colonia Tabereta; 11. Estancia La Malena (Fabri *et al.*, 2003). A. Desembocadura del A° Itaembé; B. Colonia Aeroparque; C. Posadas (Massoia *et al.*, 2006).

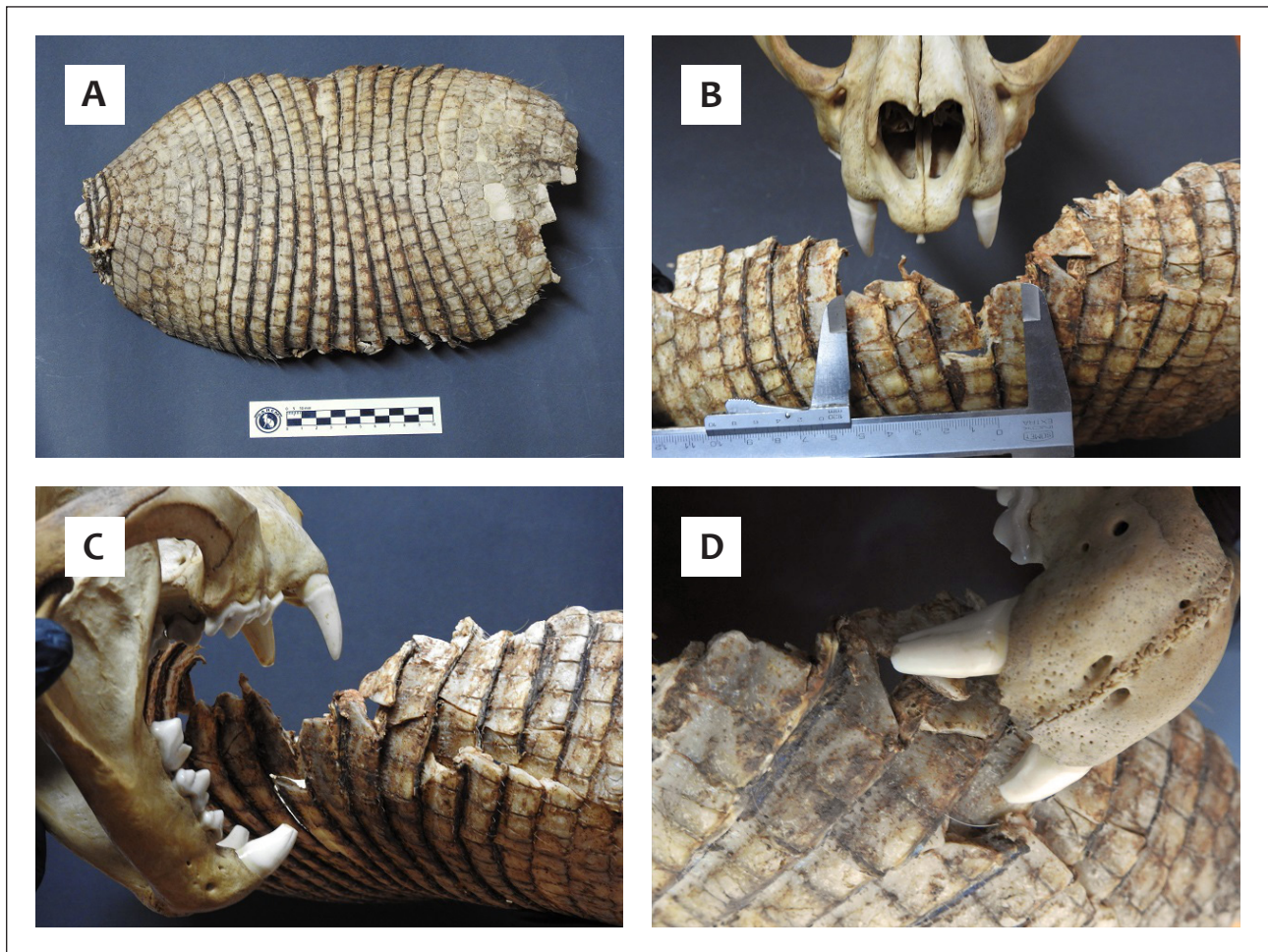


FIGURA 2. A. Coraza de *Cabassous tatouay* hallada en el Establecimiento Las Marias. B. Comparación del ancho de una de las mordeduras con el ancho de la mandíbula superior de *Puma concolor*. C. Disposición probable de las mandíbulas de *P. concolor* y de la coraza de *C. tatouay* durante la mordida. D. Ajuste de los caninos de la mandíbula inferior (separación: 31 mm) en dos orificios presentes en el área lateral de la coraza.

1996). Existen además isletas de selva paranaense y bosques en galería que siguen el curso de los numerosos arroyos, en buen estado de conservación. Por último, también hay sectores de pastizales naturales destinados a la ganadería.

La coraza (**FIG. 2**) fue hallada en un camino interno de un sector productivo con pastizales ganaderos, plantaciones de yerba mate y forestaciones de *Pinus taeda* y *P. elliottii*. No se hallaron otros restos como el cráneo o las extremidades, los que probablemente hayan sido consumidos o llevados del lugar por carroñeros. Por el estado en que se hallaba, sin restos de tejidos musculares y seca, estimamos que el animal debió haber sido capturado y consumido por lo menos una semana antes. La coraza fue identificada como perteneciente a *C. tatouay* en base al número de bandas móviles (13) y la forma de sus osteodermos (Ximenez & Achaval, 1966; Hayssen, 2014; Feijó & Anacleto, 2021). Tres de los osteodermos del escudete cefálico permanecieron adheridos a las tres bandas cervicales que conectan a este con la coraza. Parte de la oreja izquierda

también se conservó, lo que permitió observar su característica textura granulada (Hayssen, 2014).

La coraza presentaba daños en ambos bordes laterales, donde faltaban fragmentos de las bandas móviles. Uno de los fragmentos faltantes del lado derecho presentaba la forma de una mordedura semicircular de 52 mm de ancho por 45 de profundidad (**FIG. 2B**). Junto a estas roturas de los bordes se observaron perforaciones coincidentes con los caninos de un gran carnívoro. También faltaba parte del extremo posterior del escudo pélvico (**FIG. 2**). A pesar de esto se midió la longitud de la coraza, que, mediante proyección del fragmento semicircular faltante, mediría aproximadamente 340 mm. No se midió el ancho de la misma a causa de su deformación durante su exposición al sol en el campo.

La mordedura encaja con el ancho de las mandíbulas de *P. concolor* (**FIG. 2B**, **FIG. 2C**). También las perforaciones son coincidentes con los caninos inferiores de este felino (**FIG. 2D**), el único carnívoro en el área capaz de producir daños de ese tipo.

Aunque se ha sugerido que *P. concolor* no tendría la capacidad de perforar corazas (Magalhães *et al.*, 2021), el ancho del hocico y la robustez de sus caninos presentan similitudes con los de algunos panterinos (Werdelin, 1983; Meachen-Samuels & van Valkenburgh, 2009). Además, debe tenerse en cuenta que las mordeduras observadas se produjeron en las paredes laterales de la coraza, y no en el dorso convexo. En aquellos sectores la coraza es casi plana y ofrece un punto donde los carnívoros podrían sujetar a los armadillos con sus mandíbulas para trasladarlos a cierta distancia del lugar de la captura. Durante esta manipulación de la presa es cuando se producirían las roturas y perforaciones observadas.

Este constituye el primer registro de depredación conocido de *C. tatouay* por *P. concolor* en Argentina. En un estudio de ecología trófica de *P. concolor* realizado en la misma área, en el que se analizaron 99 heces (Zaracho *et al.*, datos no publicados), no se hallaron osteodermos, pelos o uñas de esta especie. En estudios similares en Brasil, los restos de *C. tatouay* presentaron un porcentaje de ocurrencia muy reducido en las heces analizadas (Martins *et al.*, 2008; Gheler-Costa *et al.*, 2018; Magioli & Ferraz, 2021). Es probable que la densidad poblacional de estos armadillos en el noreste de Corrientes sea muy baja, como ha sido señalada para otras regiones (p.ej. McDonough & Loughry, 2008; Ubaid *et al.*, 2010), por lo que constituirían solamente una presa ocasional para estos grandes felinos.

Cabassous tatouay contaba con citas para 10 localidades en la provincia, en los departamentos Ituzaingó y Santo Tomé (Massoia & Chebez, 1985; Fabri *et al.*, 2003; Bauni *et al.*, 2013; Pasian *et al.*, 2015). Todas las localidades pertenecen a la Ecorregión de Campos y Malezales, aunque varias de ellas se encuentran en el ecotono con la Ecorregión de los Esteros del Iberá (FIG. 1). La cita de Massoia & Chebez (1985) se basa en un ejemplar colectado que había sido capturado por un cazador 15 km al oeste de la ciudad de Ituzaingó. Las nueve localidades restantes se conocen a través de encuestas y comunicaciones verbales a los autores. Aunque recientemente Iezzi *et al.* (2020) informan un registro obtenido mediante fototrampeo, no mencionan la localidad de donde procede. Si bien el hallazgo reportado en esta nota no constituye una extensión del rango geográfico, un aspecto importante de este radica en que es un nuevo registro documentado de *C. tatouay* para la provincia de Corrientes.

Es importante continuar las investigaciones de campo que permitan establecer con certeza su distribución y uso de hábitat, y que aporten datos sobre su historia natural y ecología. Sin esta información básica es imposible desarrollar estrategias efectivas de conservación de esta especie.

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REFERENCIAS

- Abba, A.M. & M. Superina. 2010. The 2009/2010 armadillo Red List assessment. *Edentata* 11: 135–184. <https://doi.org/10.5537/020.011.0203>
- Abba, A.M., M.F. Tognelli, V.P. Seitz, J.B. Bender & S.F. Vizcaíno. 2012. Distribution of extant xenarthrans (Mammalia: Xenarthra) in Argentina using species distribution models. *Mammalia* 76: 123–136. <https://doi.org/10.1515/mammalia-2011-0089>
- Barret, W.H. & S.G. Tressens. 1996. Estudio de la vegetación nativa en plantaciones de *Eucalyptus grandis* (Myrtaceae) en el norte de la provincia de Corrientes, República Argentina. *Bonplandia* 9:1–18.
- Bauni, V., V. Capmourteres, M.A. Homberg & G.A. Zuleta. 2013. Distribution and status of the extant xenarthrans (Mammalia: Xenarthra) in the Southern Cone Mesopotamian savanna, Argentina. *Edentata* 14: 35–50. <https://doi.org/10.5537/020.014.0105>
- Burkart, R., N.O. Bárbaro, R.O. Sánchez & D.A. Gómez. 1999. Eco-regiones de la Argentina. Administración de Parques Nacionales, Buenos Aires. 42 pp.
- Cabrera, A.L. 1976. Regiones fitogeográficas argentinas. Enciclopedia argentina de agricultura y jardinería II. 1. 2ª ed. ACME, Buenos Aires. 85 pp.
- Carter, T.S. & C.D. Encarnação. 1983. Characteristics and use of burrows by four species of armadillo in Brazil. *Journal of Mammalogy* 64: 103–108. <https://doi.org/10.2307/1380755>
- Chebez, J.C. & N.A. Nigro. 2008. Tatú aí. Pp. 49–51 in: *Los que se van. Fauna argentina amenazada. Tomo 3* (J.C. Chebez, ed.). Albatros, Buenos Aires.
- Fabri S., S. Heinonen Fortabat, A. Soria & U.F.J. Pardiñas. 2003. Los mamíferos de la Reserva Provincial Iberá, provincia de Corrientes, Argentina. Pp. 305–342 in: *Fauna del Iberá* (B.B. Álvarez, ed.). EUDENE, Corrientes.
- Feijó, A. & T.C. Anacleto. 2021. Taxonomic revision of the genus *Cabassous* McMurtrei, 1831 (Cingulata Chlamyphoridae), with revalidation of *Cabassous squamicaudis* (Lund, 1845). *Zootaxa* 4974: 47–78. <https://doi.org/10.11646/zootaxa.4974.1.2>
- Fonseca, G.A.B. & J.M. Aguiar. 2004. The 2004 Edentate species assessment workshop. *Edentata* 6: 1–26.

- Gheler-Costa, C., G.P. Botero, L. Reia, L. de Cassia Gilli, F.H. Comin & L.M. Verdade. 2018. Ecología trófica de onça parda (*Puma concolor*) em paisagem agrícola. *Revista em Agronegócio e Meio Ambiente* 11: 203–225. <https://doi.org/10.17765/2176-9168.2018v11n1p203-225>
- González, E. & A.M. Abba. 2014. *Cabassous tatouay*. The IUCN Red List of Threatened Species 2014: e.T3414A47437737. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T3414A47437737.en>. Acceso el 4 de abril de 2022.
- Hayssen, V. 2014. *Cabassous tatouay* (Cingulata: Dasypodidae). *Mammalian Species* 46: 28–32. <https://doi.org/10.1644/909>
- Iezzi, M.E., C. De Angelo & M.S. Di Bitetti. 2020. Tree plantations replacing natural grasslands in high biodiversity areas: how do they affect the mammal assemblage? *Forest Ecology and Management* 473: 118303. <https://doi.org/10.1016/j.foreco.2020.118303>
- Magalhães, R.A., L.M. Mendes de Sena & F.H. Guimarães Rodrigues. 2021. First records of Brazilian three-banded armadillo (*Tolypeutes tricinctus*, Mammalia, Cingulata, Chlamyphoridae) predation by jaguar (*Panthera onca*, Mammalia, Carnivora, Felidae). *Papéis Avulsos de Zoologia* 61: e20216158. <http://doi.org/10.11606/1807-0205/2021.61.58>
- Magioli, M. & K.M.P.M.B. Ferraz. 2021. Deforestation leads to prey shrinkage for an apex predator in a biodiversity hotspot. *Mammal Research* 66: 245–255. <https://doi.org/10.1007/s13364-021-00556-9>
- Martins, R., J. Quadros & M. Mazzolli. 2008. Hábito alimentar e interferência antrópica na atividade de marcação territorial do *Puma concolor* e *Leopardus pardalis* (Carnivora: Felidae) e outros carnívoros na Estação Ecológica de Juréia-Itatins, São Paulo, Brasil. *Revista Brasileira de Zoologia* 25: 427–435. <https://doi.org/10.1590/S0101-81752008000300007>
- Massoia, E. & J.C. Chebez. 1985. Hallazgo del «cabasú», *Cabassous tatouay* (Cingulata, Dasypodidae) en Corrientes y nuevos datos sobre su distribución en Misiones. *IDIA* 441–444: 56–58.
- Massoia, E., J.C. Chebez & A. Bosso. 2006. Los mamíferos silvestres de la provincia de Misiones, Argentina. Edición de los autores, Buenos Aires. 512 pp.
- McDonough, C.M. & W.J. Loughry. 2008. Behavioral ecology of armadillos. Pp. 281–293 in: *The biology of the Xenarthra* (S.F. Vizcaíno & W.J. Loughry, eds.). University Press of Florida, Gainesville.
- Meachen-Samuels, J. & B. van Valkenburgh. 2009. Cranio-dental indicators of prey size preference in the Felidae. *Biological Journal of the Linnean Society* 96: 784–799. <https://doi.org/10.1111/j.1095-8312.2008.01169.x>
- Nigro, N.A., B. Gasparri & E. Pepe Steger. 2021. Xenarthros argentinos: guía para su identificación. Fundación de Historia Natural Félix de Azara, Universidad Maimónides, Buenos Aires. 134 pp.
- Pasian, C., Y.E. Di Blanco, J.L. Fontana & N. Fariña. 2015. Composición de mamíferos medianos y grandes de la Reserva Natural Provincial Rincón de Santa María (Corrientes, Argentina): comparación con su zona de amortiguamiento y estado de conservación. *Mastozoología Neotropical* 22: 187–194.
- Redford, K.H. 1985. Food habits of armadillos (*Xenarthra*: Dasypodidae). Pp. 429–537 in: *The evolution and ecology of armadillos, sloths and vermilinguas* (G.G. Montgomery, ed.). Smithsonian Institution Press, Washington and London.
- Redford, K.H. 1994. The edentates of the Cerrado. *Edentata* 1: 4–9.
- Redford, K.H. & J.F. Eisenberg. 1992. *Mammals of the Neotropics, Vol. 2: The Southern Cone: Chile, Argentina, Uruguay, Paraguay*. The University of Chicago Press, Chicago. 430 pp.
- Servicio Meteorológico Nacional. 2022. Estadísticas climáticas. <<https://www.smn.gov.ar/estadisticas>>. Acceso el 15 de marzo de 2022.
- Superina, M., N. Pagnutti & A.M. Abba. 2014. What do we know about armadillos? An analysis of four centuries of knowledge about a group of South American mammals, with emphasis on their conservation. *Mammal Review* 44: 69–80. <https://doi.org/10.1111/mam.12010>
- Ubaid, F.K., L.S. Mendonça & F. Maffei. 2010. Contribuição ao conhecimento da distribuição geográfica do tatu-de-rabo-mole-grande *Cabassous tatouay* no Brasil: revisão, status e comentários sobre a espécie. *Edentata* 11: 22–28. <https://doi.org/10.1896/020.011.0105>
- Varela, D., S. Cirignoli, M. Superina & A.M. Abba. 2019. *Cabassous tatouay*. Categorización 2019 de los mamíferos de Argentina según su riesgo de extinción. Lista Roja de los mamíferos de Argentina. Versión digital: <http://cma.sarem.org.ar>
- Werdelin, L. 1983. Morphological patterns in the skulls of cats. *Biological Journal of the Linnean Society* 19: 375–392. <https://doi.org/10.1111/j.1095-8312.1983.tb00793.x>
- Wetzel, R.M., A.L. Gardner & K.H. Redford. 2008. Order Cingulata. Pp. 128–156 in: *Mammals of South America: marsupials, xenarthrans, shrews and bats* (A.L. Gardner, ed.). University of Chicago Press, Chicago.
- Ximenez, A. & F. Achaval. 1966. Sobre la presencia en el Uruguay del tatú de rabo molle, *Cabassous tatouay* (Desmarest) (Edentata-Dasypodidae). *Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo* 9: 1–5.

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COMUNICACIÓN BREVE

Distribución actualizada de *Cabassous centralis* (Cingulata: Chlamyphoridae) en Honduras

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Resumen Durante la última revisión de los xenartros de Honduras se consideró a *Cabassous centralis* como una especie rara, con 23 registros confirmados. Aquí presentamos cinco nuevos registros para el país, confirmando la especie en tres áreas protegidas declaradas (Reserva del Hombre y la Biosfera del Río Plátano, Reserva Biológica Montecillos y Reserva Biológica Misoco) en los departamentos Olancho, Intibucá y Francisco Morazán respectivamente; y en un área protegida propuesta (Parque Nacional Sierra Río Tinto) en el departamento de Colón. Con base a estos nuevos registros y los históricos, sospechamos que la especie podría estar ampliamente distribuida en Honduras. Sin embargo, la falta de un monitoreo sistemático no ha permitido que sus registros sean más frecuentes. Consideramos que la deforestación es la mayor amenaza para la especie en el país.

Palabras clave: áreas protegidas, armadillo de cola desnuda norteamericano, historia natural, tumbo

Updated distribution of *Cabassous centralis* (Cingulata: Chlamyphoridae) in Honduras

Abstract In the last review of the xenarthrans of Honduras, *Cabassous centralis* was considered a rare species, with 23 confirmed records. Here we present five new records for the country, confirming the species in three declared protected areas (Río Plátano Biosphere Reserve, Montecillos Biological Reserve, and Misoco Biological Reserve) in Olancho, Intibucá, and Francisco Morazán departments, respectively; and in a proposed protected area (National Park Sierra Río Tinto) in the department of Colón. Based on the new and historical records, we suspect that the species could be widely distributed in Honduras. However, the lack of systematic monitoring has not allowed its records to be more frequent. Deforestation is thought to be the greatest threat to the species in the country.

Keywords: natural history, northern naked-tailed armadillo, protected areas, tumbo

El tumbo, timba, pitero, cusuco lechoso o *takan takan* (miskitu; lengua indígena del noreste de Honduras), como se conoce a *Cabassous centralis* en Honduras, es considerado uno de los xenartros más emblemáticos debido a su vinculación con el folclor hondureño (Turcios-Casco *et al.*, 2020). Este armadillo es una de las pocas especies de mamíferos de los cuales hay registros antes de 1900 para Honduras y desafortunadamente ha sido uno de los

mamíferos menos estudiados. Turcios-Casco *et al.* (2020) compilaron los registros de *C. centralis* para el país y se resumían en 23.

En este trabajo reportamos cinco nuevas localidades para el país (FIG. 1; TABLA 1) por medio de cinco fotografías de trampas-cámara. Estos registros incluyen los departamentos de Colón (sitio El Guapinol, FIG. 2A; Parque Nacional Sierra Río Tinto – PNSRT, FIG. 2B), Olancho (Reserva del Hombre

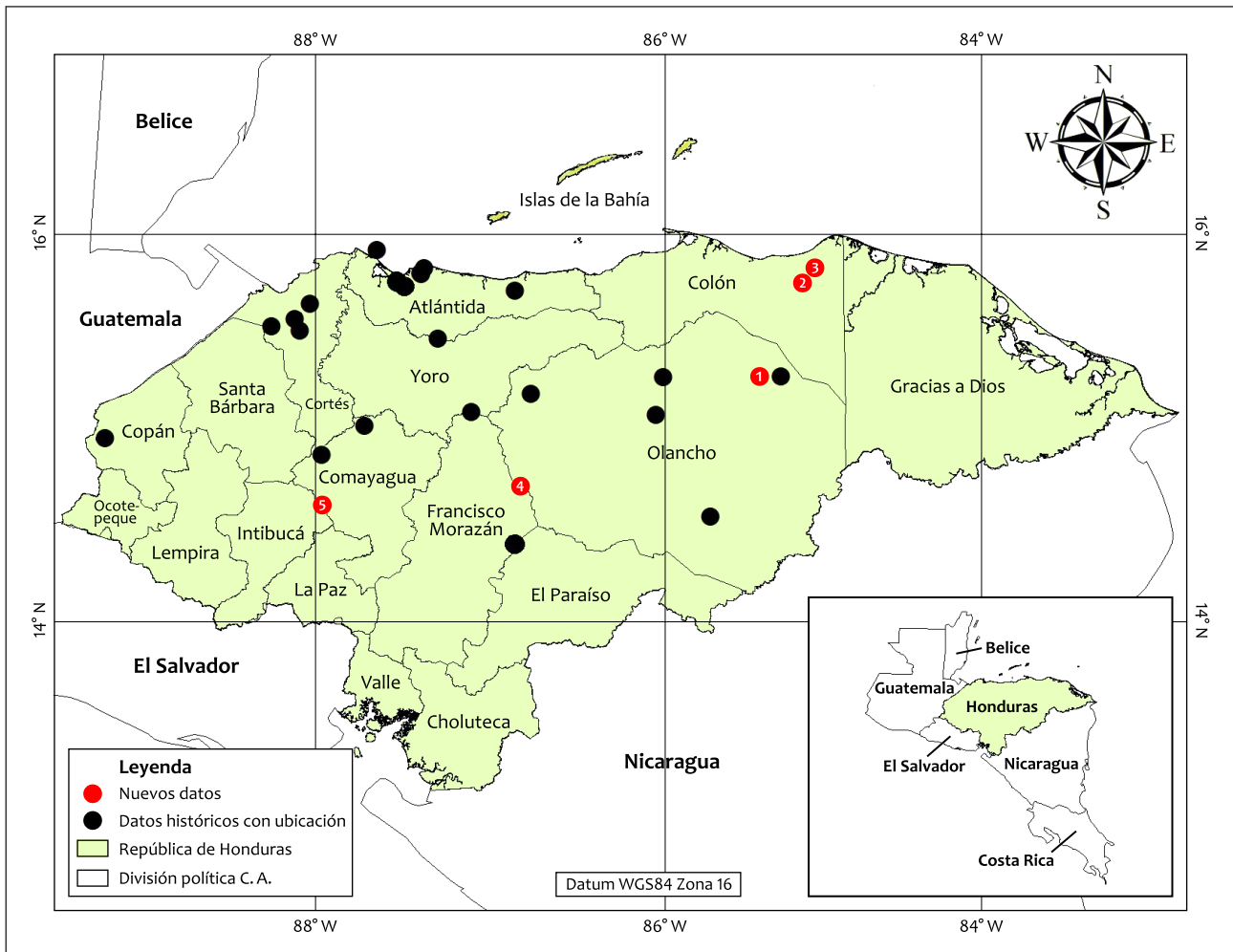


FIGURA 1. Registros de *Cabassous centralis* para Honduras. **PUNTOS NEGROS** según Turcios-Casco *et al.* (2020) y Midence-López (2021). Los **PUNTOS ROJOS** representan los nuevos registros de este trabajo (secuencia de números según la **TABLA 1**).

y la Biosfera del Río Plátano–RHBRP; **FIG. 2C**), Intibucá (Reserva Biológica Montecillos–RBMo; **FIG. 2D**) y Francisco Morazán (Reserva Biológica Misoco–RBMi; **FIG. 2E**). Los resultados de este trabajo son parte de la iniciativa de monitorear los objetos de conservación de diversas áreas protegidas en el país por medio del apoyo de la Universidad Estatal de Washington (WSU), Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF), Fundación Panthera, Asociación de Investigación para el Desarrollo Ecológico y Socioeconómico (ASIDE), Asociación para la Sostenibilidad e Investigación Científica en Honduras (ASICH), y las comunidades aledañas y de influencia de las áreas protegidas.

Las trampas-cámara usadas para estos registros fueron marca Browning (BTC-6HDX Dark Ops 940), las cuales se colocaron en senderos con evidencias de animales (p.ej. huellas, heces) o senderos utilizados por personas. La programación de las cámaras fue para 90 días, con una distancia mínima de 500 m de separación entre las trampas-cámara y se ubicaron en una posición perpendicular en los senderos para maximizar la probabilidad de capturar

en la imagen todo el flanco de los animales. Las cámaras se configuraron para tomar una ráfaga de tres fotos por evento con un intervalo de un minuto.

El registro en la RBMi se llevó a los 1.928 msnm, el cual representa el registro más alto para el país. No obstante, está dentro del rango presentado por Hayssen *et al.* (2013) para la especie. Este registro de *C. centralis* corresponde a la zona núcleo de la RBMi; tres corresponden a la zona de amortiguamiento de las otras tres áreas protegidas; y el registro en El Guapinol corresponde a un área no protegida. Según Turcios-Casco *et al.* (2020), el tumbo o cusuco lechoso es el tercer xenarcto menos registrado en el país y ya estaba reportado para los departamentos de Olancho y Francisco Morazán (considerado por Turcios-Casco *et al.* [2020] como no confirmado, ya que fue por medio de entrevistas), pero es la primera vez que se registra para los departamentos de Intibucá y Colón. Aparentemente es una especie ampliamente distribuida en el país y probablemente los escasos registros se deban a los pocos esfuerzos de su búsqueda y monitoreo biológico, no solo dentro de áreas protegidas sino afuera de las mismas. Después de Turcios-Casco *et al.* (2020) solo

se obtuvo un registro de *C. centralis* en Honduras por Midence-López (2021) en el Parque Nacional Cerro Azul Meámbar (departamento de Cortés). Sin embargo, en su resumen de la distribución de *C. centralis*, Midence-López (2021) no consideró todos los registros mencionados por Turcios-Casco *et al.* (2020) en Honduras, concluyendo que solo hay 13 registros distribuidos en cinco departamentos. Considerando a Turcios-Casco *et al.* (2020), Midence-López (2021) y el presente trabajo, existen 29 registros en nueve de los 18 departamentos de Honduras.

En áreas más extensas de bosques, como las de la RHBRP (Medina-Fitoria *et al.*, 2020), hay más probabilidad de presencia de la especie, incluyendo en áreas alteradas (como la zona de amortiguamiento) o áreas más conservadas (zona núcleo). Sin embargo, aún hay muchas áreas en Honduras en las cuales se desconoce la diversidad y ecología de mamíferos e inclusive su relación con las actividades antropogénicas (p.ej. cultivos, ganadería, urbanización). En el caso de Honduras, *C. centralis* tiende a estar menos amenazada por la cacería para consumo que *Dasyurus novemcinctus* debido a que se cree que es una especie no comestible por ser considerada venenosa, tal como ocurre en México (Hayssen *et al.*, 2013), y se tiene la creencia de que secreta un tipo de «leche» (Turcios-Casco *et al.*, 2020). Sin embargo, en regiones del oriente del país a veces los tumbos son cazados solo por la creencia cultural de que son venenosos, e incluso solo por diversión. Consideramos que la reducción de su hábitat por medio de la deforestación (p.ej. debido a la extracción ilegal de madera, incendios, ganadería extensiva) está dentro de las mayores amenazas para la especie en Honduras.

Actualmente, *C. centralis* es una especie categorizada como Datos Insuficientes (DD) tanto a nivel regional como a nivel nacional (Tirira *et al.*, 2014; WCS, 2021). Estos esfuerzos nos están dando datos para lograr categorizar a esta especie debidamente a nivel nacional. *Cabassous centralis* podría ser más

común de lo que se creía y estar más ampliamente distribuida en el país. Sin embargo, es la primera vez que se confirma a esta especie en las cuatro áreas protegidas monitoreadas. Es importante mencionar que uno de sus objetos de conservación son los felinos y sus presas; por ende, *C. centralis* está implícito dentro de los mismos.

En conclusión, proponemos la consideración de colocar trampas-cámara en donde se encuentren rastros de cusucos, ya que generalmente se ubican con el propósito de registrar a los objetos de conservación, en estos casos, los felinos. Es por ello que la mayoría de los registros han sido consecuencia de los monitoreos de otras especies, y no específicamente para los cusucos. Finalmente, incentivamos a realizar un estudio poblacional como base para la determinación del estado de conservación de la especie en el país, y de esta forma identificar si es una especie común o rara.

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TABLA 1. Descripción de los nuevos registros de *Cabassous centralis* para Honduras.

Nº	Año	Departamento	Sitio	Categoría de área protegida	Latitud (N)	Longitud (W)	Altitud (msnm)
1	2021	Olancho	Subirana	Biosfera del Hombre y de Río Plátano	15°13'29.6"	85°27'57.2"	589
2	2021	Colón	Quebrada Honda	Parque Nacional Sierra Río Tinto	15°43'50.2"	85°13'48.7"	263
3	2022	Colón	El Guapinol	–	15°48'45.4"	85°9'29.2"	228
4	2022	Francisco Morazán	Los Olingos de Guaimaca	Reserva Biológica Misoco	14°38'09.2"	86°48'39.2"	1928
5	2022	Intibucá	Filo el Palmar	Reserva Biológica Montecillos	14°31'53.4"	87°54'50.0"	1842



FIGURA 2. Nuevos registros de *Cabassous centralis* para Honduras. **A.** Departamento de Colón en el sitio El Guapinol. **B.** Departamento de Colón en el Parque Nacional Sierra Río Tinto. **C.** Departamento de Olancho en la Reserva del Hombre y la Biosfera del Río Plátano. **D.** Reserva Biológica Montecillos en el Departamento de Intibucá. **E.** Reserva Biológica Misoco en el Departamento de Francisco Morazán.

REFERENCIAS

- Hayssen, V., J. Ortega, A. Morales-Leyva & N. Martínez-Méndez. 2013. *Cabassous centralis* (Cingulata: Dasypodidae). *Mammalian Species* 45(898): 12–17. <https://doi.org/10.1644/898.1>
- Medina-Fitoria, A., H.D. Ávila-Palma, M. Martínez, D.I. Ordoñez-Mazier & M.A. Turcios-Casco. 2020. Los murciélagos (Chiroptera) del Caribe de Honduras y Nicaragua: una comparación sobre su diversidad en cinco diferentes coberturas vegetales. *Neotropical Biodiversity* 6: 147–161. <https://doi.org/10.1080/23766808.2020.1804748>
- Midence-López, S. 2021. Registro de la ocurrencia de *Cabassous centralis* (Miller, 1899) en el Parque Nacional Azul Meámbar, Honduras. *Scientia Hondurensis* 4(2): 20–25.
- Tirira, D.G., J.F. Díaz-N., M. Superina & A.M. Abba. 2014. *Cabassous centralis*. The IUCN Red List of Threatened Species 2014: e.T3412A47437304. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T3412A47437304.en>
- Turcios-Casco, M.A. *et al.* 2020. The xenarthrans of Honduras: new records, main threats, and comments on their conservation status. *Edentata* 21: 13–18. <https://doi.org/10.2305/IUCN.CH.2020.Edentata-20-1.3.en>
- WCS – Wildlife Conservation Society. 2021. Lista Roja de especies amenazadas de Honduras [Informe Técnico]. WCS, MiAmbiente, UNAH-VS, ICF, IUCN, Tegucigalpa, M.D.C., Honduras.

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SHORT COMMUNICATION

An offspring from the northernmost population of *Myrmecophaga tridactyla* (Xenarthra: Myrmecophagidae)

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Abstract During a November 2021 to January 2022 camera trap survey in the core zone of Río Plátano Biosphere Reserve, Honduras, we detected the first instance of verified reproduction of a giant anteater (*Myrmecophaga tridactyla*) for northern Central America. As part of a permanent monitoring program using camera stations, an adult female giant anteater with an offspring was recorded at the Wuarska site in Colón department (northern Honduras). Our detection represents the northernmost record of reproduction in giant anteaters and provides evidence of the importance of the Wuarska site, which is the northernmost extension of its regional distribution, for the conservation of this species in Honduras. We hypothesize that there is a high loss of connectivity among populations of giant anteaters in Honduras due to illegal deforestation. In addition, illegal poaching with dogs is among the main threats for the species in Honduras.

Keywords: camera traps, giant anteater, Honduras, reproduction, Río Plátano Biosphere Reserve

Una cría de la población más septentrional de *Myrmecophaga tridactyla* (Xenarthra: Myrmecophagidae)

Resumen Durante un estudio con trampas cámara de noviembre de 2021 a enero de 2022 en la zona núcleo de la Reserva del Hombre y la Biosfera de Río Plátano, Honduras, detectamos el primer caso de reproducción verificada de un hormiguero gigante (*Myrmecophaga tridactyla*) para el norte de Centroamérica. Como parte de un programa de monitoreo permanente con estaciones de trampas cámara, se registró a una hembra adulta de *M. tridactyla* con su cría en el sitio de Wuarska, departamento de Colón (norte de Honduras). Esta detección representa el registro más septentrional de reproducción en hormigueros gigantes y proporciona evidencia de la importancia del sitio de Wuarska, que es la extensión más noroeste de su distribución regional, para la conservación de esta especie en Honduras y en la región. Nuestra hipótesis es que existe una gran pérdida de conectividad entre las poblaciones de hormigueros gigantes en Honduras debido a la deforestación ilegal. Además, la caza furtiva ilegal con perros se encuentra entre las principales amenazas para la especie en Honduras.

Palabras clave: Honduras, hormiguero gigante, reproducción, Reserva del Hombre y la Biosfera de Río Plátano, trampas cámara

The giant anteater (*Myrmecophaga tridactyla*; Xenarthra: Myrmecophagidae) has three extant subspecies: 1) *M. t. centralis*, occurring in Central America, Colombia, and Ecuador (west of the Andean mountains); 2) *M. t. artata*, including populations in northeastern Colombia and northwestern Venezuela; and 3) *M. t. tridactyla*, in the remainder of the species distribution (Miranda *et al.*, 2014). The species as a whole occurs from Honduras in Central America south into South America, extending from Venezuela to Brazil and Argentina. Historical records suggest that *M. tridactyla* once ranged into Guatemala and potentially Belize, but current evidence suggests the species has been extirpated from those countries (see Gaudin *et al.*, 2018 for further discussion).

In September of 1996, McCain (2001) photographed the first evidence of *M. tridactyla* in Honduras, whose presence had previously been speculated by Goodwin (1942). This specimen was allegedly intended for the illegal trade to Asia. Recently, Turcios-Casco *et al.* (2020) reviewed the geographic distribution of xenarthrans in Honduras, including the giant anteater or *wingku tara* (as it is known in eastern Honduras; Jones Jr., 1965). In their review, Turcios-Casco *et al.* (2020) asserted that *M. tridactyla* only occurs in Colón, Gracias a Dios, and Olancho departments, from 3 to 598 m asl, in subtropical to tropical moist and wet forests.

The giant anteater is usually a solitary animal except for the association between a mother and her offspring, which lasts approximately a year (del Valle Jerez & Halloy, 2003; Gaudin *et al.*, 2018). Data related to reproductive rates of free-ranging animals are scarce (Alberici *et al.*, 2020). In fact, there have been no records of reproductive activity in the wild for *M. tridactyla* in northern Central America (Belize, Guatemala, Honduras, Nicaragua or El Salvador). Here, we report the first such evidence, obtained from a site in northern Honduras.

The results presented herein stemmed from the recommendations of Martínez *et al.* (2020), who suggested that more sampling efforts are needed in the region of Wuarska, which is within the municipality of Iriona, department of Colón. Wuarska includes medium mountainous formations, with elevations that vary from 400–1000 m asl, and is part of the drainage of the Río Plátano basin, which lies within the core zone of the Río Plátano Biosphere Reserve (RPBR). It is characterized by an annual rainfall of 2800 mm, an average temperature of 23°C (Escuela Nacional de Ciencias Forestales, 2013), and consists of very humid subtropical forest (Martínez *et al.*, 2020). As a consequence of Martínez *et al.*'s (2020) proposal, the first permanent monitoring stations for wildlife were established using camera traps within the core zones

of the RPBR, specifically to record *M. tridactyla* and other species of management concern.

Sites for camera traps were selected along likely wildlife movement corridors by searching for animal signs (*e.g.*, tracks, feces, and claw marks) along tree trunks, ravines, and river banks. The distance from one camera station to another was approximately 1 km, and a camera station consisted of two cameras facing one another. A total of six camera stations (12 cameras) were deployed from 12 November 2021 to 30 January 2022 (Martínez *et al.*, 2020). These stations were checked after 78 days in the field, representing a sampling effort of 936 trap/nights.

Among 850 detections, we recorded *M. tridactyla* nine times (detections were considered independent if separated by ≥ 24 h). These nine detections represented at least three distinct individuals: one detection of an adult female with an offspring on its back (detected 18 January 2022; **FIG. 1**), and eight independent detections of a solitary adult (which may or may not have been the same individual) on 23 and 26 November 2021 (15°20'01"N, 85°15'43"W, 470 m asl); 26 November 2021 (15°20'14"N, 85°15'40"W, 425 m asl); and 26 November 2021, 03 January 2022, and 23 January 2022 (15°20'01"N, 85°15'45"W, 475 m asl). Dates were not available for two records at the following stations: 15°20'17"N, 85°15'48"W (411 m asl), and 15°19'33"N, 85°15'33"W (450 m asl).

Photographs of the adult female with an offspring were taken between 09:04–15:54 h, at ambient temperatures of 17.2–22.2°C. Other mammals and birds of conservation interest are listed in **TABLE 1**. Additionally, the cameras detected domestic dogs ($n=25$) and humans ($n=16$), the latter of which were probably hunters.

To our knowledge, our records are the first evidence of giant anteater reproduction in northern Central America and represent the northernmost reproductive population that has been documented. Reproductive activity and behavior are poorly known for giant anteaters in the wild (Rodrigues *et al.*, 2008; Gaudin *et al.*, 2018). Available evidence suggests *M. tridactyla* usually has one offspring every nine months (Gardner, 2008; Rodrigues *et al.*, 2008; Gaudin *et al.*, 2018). Considering that many females are believed to return to their natal area to breed (Collevatti *et al.*, 2007), we urgently recommend protecting the Wuarska site through control and surveillance actions. Wuarska represents one of the most important sites for the conservation of *M. tridactyla* in Honduras (Martínez *et al.*, 2020), as well as for other species of mammals (*e.g.*, *Mimon cozumelae*, Cozumelan golden bat [Ávila-Palma *et al.*, 2019]) and reptiles (*e.g.*, *Polychrus gutturosus*, Berthold's bush anole [Antúnez-Fonseca *et al.*, 2022]).



FIGURE 1. Two consecutive photographs of the offspring with its mother recorded in Wuarska, Colón.

Considering our records, those of Martínez *et al.* (2020), and the data reviewed by Turcios-Casco *et al.* (2020), we suspect that there are currently two populations of *M. tridactyla* in Honduras. One is within Wuarska, in northeastern Honduras, and includes the departments of Colón, northern Olancho, and northeastern Gracias a Dios. The other is in southern La Mosquitia and includes southern Gracias a Dios and southeastern Olancho departments. However, most of the surrounding protected areas and

buffer zones of the RPBR have experienced rapid and recent habitat fragmentation due to extensive cattle ranching, illegal poaching, and deforestation (Olsoy *et al.*, 2016; Ordoñez-Mazier *et al.*, 2020; Chinchilla *et al.*, 2022). Thus, it seems likely that there has been a loss of forest connectivity in the corridor of La Mosquitia. Therefore, any potential connection between the populations of *M. tridactyla* in Honduras is becoming less probable and increasingly at risk.

TABLE 1. Species and number of independent events that were recorded from the 12 camera traps in Wuarska, Honduras, along with conservation status as assessed globally by the IUCN Red List of Threatened Species (IUCN, 2022), and for Honduras by WCS (2021). Relevant appendices for international trade in each species, as assessed by CITES (2022) are also included. Blank entries are because some species were not, or could not, be assessed (*i.e.*, they were identified only to genus or family).

Family/species		Events	IUCN (2022)	WCS (2021)	CITES (2022)	
	Atelidae	<i>Ateles geoffroyi</i>	1	EN	EN	II
	Cervidae	<i>Mazama temama</i>	56	DD	CR	–
	Cuniculidae	<i>Cuniculus paca</i>	115	LC	VU	III
	Dasypodidae	<i>Dasypus novemcinctus</i>	8	LC	–	–
	Dasyproctidae	<i>Dasyprocta punctata</i>	450	LC	–	III
		<i>Chironectes minimus</i>	1	LC	–	–
	Didelphidae	<i>Didelphis marsupialis</i>	1	LC	–	–
		<i>Philander opossum</i>	1	LC	–	–
		<i>Leopardus pardalis</i>	24	LC	VU	II
		<i>Leopardus wiedii</i>	16	NT	VU	II
Mammals	Felidae	<i>Panthera onca</i>	1	NT	CR	I
		<i>Puma concolor</i>	11	LC	EN	II
		<i>Herpailurus yagouaroundi</i>	3	LC	–	II
	Mephitidae	<i>Conepatus semistriatus</i>	10	LC	–	–
	Mustelidae	<i>Eira barbara</i>	4	LC	–	III
	Myrmecophagidae	<i>Myrmecophaga tridactyla</i>	9	VU	CR	II
		<i>Tamandua mexicana</i>	1	LC	–	–
	Procyonidae	<i>Procyon lotor</i>	1	LC	–	–
	Sciuridae	<i>Sciurus</i> sp.	1	–	–	–
	Tapiridae	<i>Tapirella bairdii</i>	22	EN	CR	I
	Tayassuidae	<i>Dicotyles tajacu</i>	5	LC	VU	II
		<i>Tayassu pecari</i>	1	VU	CR	II
	Columbidae		2	–	–	–
	Cracidae	<i>Crax rubra</i>	50	VU	VU	III
Birds	Momotidae	<i>Baryphthengus martii</i>	1	LC	–	–
		<i>Crypturellus soui</i>	11	LC	–	–
	Tinamidae	<i>Tinamus major</i>	2	NT	–	–
Other	Dogs		25			
	Humans		16			
Total			850			

Acronyms for IUCN (2022) and WCS (2021) are: **CR**=Critically Endangered, **DD**=Data Deficient, **EN**=Endangered, **LC**=Least Concern, **NT**=Near Threatened, **VU**=Vulnerable. Appendices for CITES (2022): **I**=No international trade, **II**=trade is closely controlled, and **III**=trade is permitted with appropriate permits.

The conservation outlook for the Wuarska population of *M. tridactyla* is relatively poor. If the northernmost population of *M. tridactyla* becomes isolated, genetic variability is unlikely to be maintained, and overall population viability may well be at risk. Considering that 4.8% of our camera detections included people and/or dogs, illegal poaching, coupled with increasing deforestation (Turcios-Casco *et al.*, 2020), means that both the habitats of giant anteaters and the individual animals themselves are at considerable risk. Hunting with dogs is a phenomenon that has been reported in other countries (*e.g.*, Nicaragua [Koster, 2008] and Brazil [de Matos-Dias *et al.*, 2019]). Therefore, hunting policies in Honduras must be thoroughly reviewed because hunters are threatening many species in the country. Hunters have often stated that they kill any anteater (including tamanduas, *Tamandua mexicana*) they encounter in Honduras to prevent the high cost of replacing one of their dogs (the cost of a hunting-trained dog in Honduras is approximately US\$ 250–300) should it be killed by an anteater.

Globally, *M. tridactyla* is currently listed as Vulnerable in the Red List of Threatened Species of the IUCN (2022), and its populations are likely decreasing (Miranda *et al.*, 2014). However, in Honduras, *M. tridactyla* is considered Critically Endangered according to the Honduran Red List of Threatened Species (WCS, 2021). We strongly recommend studying the home range of *M. tridactyla* with a larger camera trapping effort, complemented by radiotelemetry, in the region of Wuarska to determine a specific area for its conservation in the La Mosquitia region. In addition, military patrols must increase in this protected area, not only because it represents an important corridor for biodiversity in northeastern Central America, but because illegal poaching is increasing every year. Additionally, threats that lead to habitat fragmentation and loss for this species are increasing daily, especially in the La Mosquitia region (Ordoñez-Mazier *et al.*, 2020; Chinchilla *et al.*, 2022). Thus, immediate action is required if we are to maintain this northernmost population of *M. tridactyla*.

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REFERENCES

- Alberici, V., A.L.J. Desbiez, A.G. Chiarello & D. Teles. 2020. Survival blueprint for the conservation of the giant anteater, *Myrmecophaga tridactyla*, in the Brazilian Cerrado. An output from the Anteaters & Highways Project, Brazil, and EDGE of Existence fellowship, Zoological Society of London, London, 28 pp.
- Antúnez Fonseca, C., M. Martínez, T. King, D.I. Ordoñez Mazier, L. Wilson & M.A. Turcios-Casco. 2022. Filling a gap in the distribution of the Berthold's Bush Anole, *Polychrus guttuerosus* (Squamata, Polychrotidae), in Honduras. *Herpetozoa* 35: 219–223. <https://doi.org/10.3897/herpetozoa.35.e86751>
- Ávila-Palma, H.D., M.A. Turcios-Casco, D.J. Ordoñez Bautista, M. Martínez & D.I. Ordoñez-Mazier. 2019. First records of *Mimon cozumelae* Goldman, 1914 (Chiroptera, Phyllostomidae) in the Río Plátano Biosphere Reserve in northeastern Honduras. *Check List* 15: 1113–1118. <https://doi.org/10.15560/15.6.1113>
- Chinchilla, S., E. van den Berghe, J. Polisar, C. Arévalo & C. Bonacic. 2022. Livestock-carnivore coexistence: moving beyond preventive killing. *Animals* 12: 1–15. <https://doi.org/10.3390/ani12040479>
- CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora. 2022. <https://www.cites.org>. Accessed on 1 November 2022.
- Collevatti, R.G., K.C.E. Leite, G.H.B. de Miranda & F.H.G. Rodrigues. 2007. Evidence of high inbreeding in a population of the endangered giant anteater, *Myrmecophaga tridactyla* (Myrmecophagidae), from Emas National Park, Brazil. *Genetics and Molecular Biology* 30: 112–120. <https://doi.org/10.1590/S1415-47572007000100020>
- de Matos-Dias, D., F. Miranda & F. Guimarães-Rodríguez. 2019. New record of giant anteater *Myrmecophaga tridactyla* (Pilosa, Myrmecophagidae) in Northeast Brazil. *Neotropical Biology and Conservation* 14: 129–135. <https://doi.org/10.3897/neotropical.14.e34842>
- del Valle Jerez, S. & M. Halloy. 2003. El oso hormiguero, *Myrmecophaga tridactyla*: crecimiento e independencia de una cría. *Mastozoología Neotropical* 10: 323–330.
- Escuela Nacional de Ciencias Forestales. 2013. Plan de manejo Reserva del Hombre y la Biosfera Río Plátano (2013–2025). Asociación Internacional de Fomento (AIF) e Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF), Comayagüela, M. D. C. 252 pp.
- Gardner, A.L. 2008. Suborder Vermilingua Illiger 1811. Pp. 168–177 in: *Mammals of South America*. Volume 1: marsupials, xenarthrans, shrews, and bats (A.L. Gardner, ed.). University of Chicago Press, Chicago, Illinois. <https://doi.org/10.7208/chicago/9780226282428.001.0001>

- Gaudin, T.J., P. Hicks & Y. Di Blanco. 2018. *Myrmecophaga tridactyla* (Pilosa: Myrmecophagidae). *Mammalian Species* 50: 1–13. <https://doi.org/10.1093/mspecies/sey001>
- Goodwin, G.G. 1942. Mammals of Honduras. *Bulletin of the American Museum of Natural History* 79: 107–195.
- IUCN–International Union for the Conservation of Nature. 2022. The IUCN Red List of Threatened Species. Version 2022-1. <https://www.iucnredlist.org>. Accessed on 1 November 2022.
- Jones, J.K., Jr. 1965. Some Miskito Indian names for mammals. *Journal of Mammalogy* 46: 353–354. <https://doi.org/10.2307/1377878>
- Koster, J.M. 2008. Giant anteaters (*Myrmecophaga tridactyla*) killed by hunters with dogs in the Bosawas Biosphere Reserve, Nicaragua. *Southwestern Naturalist* 53: 414–416. <https://doi.org/10.1894/PS-38.1>
- Martínez, M.A., M.A. Turcios-Casco & S.P. Amador. 2020. On the conservation of *Myrmecophaga tridactyla* (Pilosa: Myrmecophagidae) in the core of Río Plátano Biosphere Reserve, Honduras. *Mammalia* 84: 581–585. <https://doi.org/10.1515/mammalia-2019-0152>
- McCain, C.M. 2001. First evidence of the giant anteater (*Myrmecophaga tridactyla*) in Honduras. *Southwestern Naturalist* 46: 252–254. <https://doi.org/10.2307/3672542>
- Miranda, F., A. Bertassoni & A.M. Abba. 2014. *Myrmecophaga tridactyla*. The IUCN Red List of Threatened Species 2014: e.T14224A47441961. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T14224A47441961.en>. Accessed on 2 September 2022.
- Olsoy, P.J., K.A. Zeller, J.A. Hicke, H.B. Quigley, A.R. Rabinowitz & D.H. Thornton. 2016. Quantifying the effects of deforestation and fragmentation on a range-wide conservation plan for jaguars. *Biological Conservation* 203: 8–16. <https://doi.org/10.1016/j.biocon.2016.08.037>
- Ordoñez-Mazier, D.I., H.D. Ávila-Palma, J.A. Soler-Orellana, E.J. Ordoñez-Trejo, M. Martínez & M.A. Turcios-Casco. 2020. Rediscovery of *Vampyressa thylene* (Chiroptera, Phyllostomidae) in Honduras: updated distribution and notes on its conservation. *Neotropical Biology and Conservation* 15: 379–390. <https://doi.org/10.3897/neotropical.15.e53766>
- Rodrigues, F.H.G., I.M. Medri, G.H.B. de Miranda, C. Camilo-Alves & G. Mourão. 2008. Anteater behavior and ecology. Pp. 257–268 in: *The biology of the Xenarthra* (S.F. Vizcaíno and W.J. Loughry, eds.). University Press of Florida, Gainesville.
- Turcios-Casco, M.A., et al. 2020. The xenarthrans of Honduras: new records, main threats, and comments on their conservation status. *Edentata* 21: 13–18. <https://doi.org/10.2305/IUCN.CH.2020.Edentata-20-1.3.en>
- WCS – Wildlife Conservation Society. 2021. Lista Roja de especies amenazadas de Honduras (Informe Técnico). Tegucigalpa, M.D.C. (Honduras): WCS, MiAmbiente, UNAH–VS, ICF, IUCN. 139 pp.

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News

CHANGES TO EDENTATA—NOW CALLED XENARTHRA!

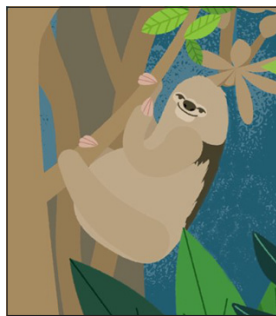
As you certainly know, Edentata is a taxonomically incorrect name for anteaters, sloths and armadillos. We thought now is the right time to correct the name of our Journal and Newsletter to *Xenarthra*.

In addition, starting next year, we will publish articles in their final version, with their corresponding DOIs, as soon as they have been accepted for publication. By speeding up the publication process, we hope to benefit authors and stimulate submissions. Remember, this is your journal and your place to publish all your observations and findings related to the conservation of the Xenarthra!

Many thanks to Gabriela Hidalgo (Scholarly Communications Librarian) and Sarina van der Ploeg (Publications Officer) from IUCN's Knowledge Management and Library Team for their help during the transition process.

NEW EDUCATION STRATEGY— WELCOME TO THE TEAM, KENNY!

Kenny Coogan earned a BS in Animal Behavior and then worked in the education and animal ambassador departments at zoos and aquariums for twelve years. The animals he cared for ranged from giant Pacific octopus to bald eagles, but his favorites were the Xenarthrans including three-banded and nine-banded armadillos, Hoffman's sloths and vested tamanduas. He then went on to teach biology and agriculture to middle school students. During that time, he happened to say that he loved sloths and then received over 50 plush, plastic, framed, LEGO, and handmade sloth gifts from his students. He recently earned his Master's in Global Sustainability. Kenny is passionate about the planet and the life it supports. He has created educational content for many



organizations including TED-Ed where his videos have been viewed over 10 million times.

Kenny was designated Education Coordinator of our Specialist Group in September to help develop a new education strategy. He has increased our presence on social media by scheduling timely posts (e.g., International Sloth Day, World Anteater Day), as well as creating and distributing animated videos and monthly webinars on our new YouTube channel. Visit our sites to learn more:

Instagram: https://www.instagram.com/iucn_anteater_sloth_armadillo

Facebook: <https://www.facebook.com/xenarthrans>

YouTube: <https://www.youtube.com/@xenarthrans>

Webinars: <https://xenarthrans.org/education/webinars-2>

Our webinars are perfect for conservationists, zoo professionals, mammalogists and people who love xenarthrans. We have been ecstatic by the number of people who are attending the webinars live. This shows that there is a need for us to be educating the public.

Another aspect of the new education strategy is to engage students in K-12 classes. Kenny is currently working on creating puzzles, mazes, and worksheets for all Xenarthra. They can be viewed on our website at <https://xenarthrans.org/kids-corner>. Please visit our website regularly to stay informed about new education activities and materials!



SAVE THE DATES:

International Armadillo Day: August 13

International Sloth Day: 3rd Saturday of October
(date changes year to year)

World Anteater Day: November 19

SLOTH RE-ASSESSMENTS FOR THE IUCN RED LIST

On 22 April 2022, our Specialist Group held a virtual meeting to conclude the re-assessment process of all sloth species for the IUCN Red List of Threatened Species. The workshop was facilitated by Marcelo Tognelli and Mariella Superina. Fourteen experts actively participated in the discussion of the assessments, whereby we updated the information on sloth distribution, population status, and threats. The population status of all sloth species is now listed as decreasing, mainly due to habitat loss. Four species have been significantly affected by wildfires. No changes have been made to the categories and criteria. Four species are listed as Least



Concern, *Bradypus torquatus* as Vulnerable, and *Bradypus pygmaeus* as Critically Endangered. The updated assessments will be included in the December 2022 Red List Update.

ANTEATER (RE-)ASSESSMENTS FOR THE IUCN RED LIST

In August 2022 our Specialist Group initiated the re-assessment of the two *Tamandua* species and *Myrmecophaga tridactyla*, as well as the assessment of the recently described *Cyclopes* species. As a first step, the available information on the ten anteater species was reviewed and updated by 16 experts. The assessments were then discussed during a virtual meeting held on 28 October 2022, which was attended by nine experts and facilitated by Marcelo Tognelli and Mariella Superina. The assessments will be submitted to the IUCN Red List Unit for their review and inclusion in the Red List at the beginning of 2023.



NEW CONSERVATION INITIATIVES FOR GIANT ANTEATERS IN GUYANA

The South Rupununi Conservation Society (SRCS) is a grassroots conservation organization largely made up of people from indigenous communities in the south of Guyana. The SRCS is proud to announce the creation of the Katoonarib Giant Anteater Community Conservation Zone. Katoonarib is a Wapishana village in the South Rupununi savannas, whose residents were concerned they were not observing as many giant anteaters as they had in the past. Since 2020, 59 camera traps have been used to monitor the land of Katoonarib and 3 other communities, and a strong population of mostly nocturnal and crepuscular giant anteaters has been recorded. More than 80 giant anteaters have been individually identified, based on pelage patterns. In response, Katoonarib Village has declared all of



their Titled Land and Customary Land, totaling approximately 52,500 ha, to be a Community Conservation Zone, where giant anteaters are monitored and protected by community members. The SRCS hopes this is the first of many upcoming interconnected community-owned and managed conservation areas for xenarthrans and other vulnerable wildlife and plants in the South Rupununi.

As part of the SRCS's Environmental Education program in 14 primary and secondary schools across the region, local children now design and set camera trap surveys, and collect and analyze data on their wildlife. They will be using these data, plus the SRCS's raw data from giant anteater and other surveys, to plan and implement further conservation initiatives in their communities. In addition, Giant Anteater Nature Fairs were held in two villages, and hundreds of community members, from the youngest to the oldest, celebrated their ongoing roles in anteater research and conservation by creating art, planting trees, playing games and "making friends" with their local anteaters. The SRCS is grateful for the support of their partners: the Sustainable Wildlife Management Programme, the GEF Small Grants Programme, the South Rupununi District Council and the communities of the Rupununi. Find out more at <https://www.srcs-gy.com>.

NEW SLOTH SPECIES DESCRIBED: *BRADYPUS CRINITUS*

Flávia R. Miranda and colleagues published an article in which they present a taxonomic revision of maned sloths, subgenus *Bradypus* (*Scaeopus*). This taxon is endemic to the Brazilian Atlantic Forest. Until recently, it was composed of a single species, the Vulnerable *Bradypus torquatus*. Their review is based on coalescent species delimitation analyses using two mitochondrial and three nuclear genes, morphological analyses, and field observations. Their integrative approach demonstrates that two species of maned sloth can be recognized: the northern maned sloth (*Bradypus torquatus* Illiger, 1811) occurring in the Brazilian states of Bahia and Sergipe, and the southern maned sloth (*Bradypus crinitus* Gray, 1850), occurring in Rio de Janeiro and Espírito Santo states. The two species are estimated to have diverged in the Early Pliocene and are allopatrically distributed. The IUCN SSC Anteater, Sloth and Armadillo Specialist Group's Taxonomy Subcommittee has carefully evaluated the proposed taxonomic change. Based on the evidence presented in this integrative taxonomic review, the subcommittee members have decided that the two distinct species of maned sloths should be recognized. The new conservation status of both maned sloths will be assessed as soon as possible.

Miranda, F.R., G.S.T. Garbino, F.A. Machado, F.A. Perini, F.R. Santos & D.M. Casali (2022). Taxonomic revision of maned sloths, subgenus *Bradypus* (*Scaeopus*), Pilosa, Bradypodidae, with revalidation of *Bradypus crinitus* Gray, 1850. *Journal of Mammalogy*: gvac059. <https://doi.org/10.1093/jmammal/gvac059>

THESIS ABSTRACTS

RIQUEZA, ABUNDÂNCIA E USO DO HABITAT DE XENARTHAS NA AMAZÔNIA BRASILEIRA

A Floresta Amazônica compreende uma das mais ricas biodiversidades do planeta, mas vem sofrendo com o constante risco de degradação. Entre seus habitantes está a magna Ordem dos Xenarthras, que inclui os tatus (Ordem Cingulata), preguiças e tamanduás (Ordem Pilosa). Essas espécies possuem morfologia e fisiologia peculiares e algumas delas correm risco de extinção. Apesar da importância do grupo, os estudos sobre estes animais em florestas contínuas ainda são escassos. O objetivo deste trabalho foi estudar a riqueza de espécies de Xenarthras, os padrões de atividade e as preferências de habitat através de anos de levantamentos de dados com câmeras traps, e assim obter informações sobre a ecologia básica dessas espécies na Floresta Amazônica brasileira. Cinco áreas protegidas inseridas no Bioma Amazônico foram contempladas pelo Protocolo TEAM de monitoramento de fauna e resultaram nos dados utilizados neste trabalho. Os registros utilizados foram obtidos entre os anos de 2015 a 2019, totalizando 4.044 registros independentes de Xenarthras, obtidos a partir de um esforço amostral de 57.805 dias/câmeras traps. Através destes dados, foi possível descrever a riqueza de espécies de Xenarthras, a taxa de detecção, a proporção de registros e o padrão de atividade das espécies identificadas. Registros com intervalos de uma hora foram considerados eventos independentes. Os padrões de atividade foram obtidos através do pacote *Overlap* em ambiente R. Espécies ameaçadas de extinção estiveram presentes em todos os locais pesquisados e um total de sete espécies de Xenarthras foram identificadas. Para as espécies *Priodontes maximus*, *Myrmecophaga tridactyla* e *Tamandua tetradactyla*, também foram realizados estudos sobre o uso do habitat, através de modelos de ocupação do tipo *single season* (estação única), utilizando os dados do ano de 2018. O pacote *Unmarked* foi utilizado como base para a execução dos modelos e todas as análises foram realizadas no software *RStudio*. Foram observadas diferenças nas taxas de detecção entre as áreas. Os padrões de atividade encontrados foram semelhantes aos encontrados para outros Biomas, com exceção do *M. tridactyla*, que apresentou atividade diurna bem marcada. Poucas das variáveis testadas demonstraram influenciar no uso do habitat pelas espécies-alvo dos modelos, sendo que o *P. maximus* demonstrou maior probabilidade de ocupação em áreas com maior altura de dossel, o *M. tridactyla* apresentou correlação com menores níveis de altitude e para o *T. tetradactyla* não foi identificada uma variável significativa na escolha do habitat. Para todas estas espécies houve uma grande diferença entre a probabilidade

de detecção e ocupação, demonstrando o fator da detecção imperfeita dos modelos de ocupação, especialmente para o *T. tetradactyla*. Sabe-se que algumas espécies de Xenarthras podem alterar seu padrão de atividade e escolha de habitats diante da temperatura e das ameaças. Conhecer essa característica ecológica pode contribuir para um melhor entendimento de como esses animais ocupam a Floresta e podem responder a diferentes alterações na paisagem na região. Neste estudo, um número relevante de registros de Xenarthras foi analisado, fornecendo conhecimentos básicos sobre a ecologia dessas espécies no Bioma Amazônia.

Prestes Margarido, M. 2022. Riqueza, abundância e uso do habitat de Xenarthras na Amazônia brasileira. Master's thesis, Programa de pós-graduação em ciência animal, Universidade Estadual de Santa Cruz, Ilhéus, Bahia. Advisor: Flávia R. Miranda. E-mail: mairaprestesmargarido@gmail.com

SAÚDE E PREVALÊNCIA DE PARASITOS EM PREGUIÇA-DE-COLEIRA (*BRADYPUS TORQUATUS*) ILLIGER, 1811

A preguiça-de-coleira (*Bradypus torquatus*, Bradyrodidae, Pilosa, Xenarthra) é uma espécie endêmica da Mata Atlântica, reconhecida atualmente como vulnerável (VU). Estudos envolvendo a espécie são escassos e dependendo da temática, inexistentes. O *Amblyomma varium* é um carrapato encontrado quase que exclusivamente em mamíferos da superordem Xenarthra, e apesar de existirem estudos significativos envolvendo a sua descrição, ainda há discordância entre autores sobre algumas características. Além disso, não há estudos publicados relatando doenças transmitidas por *A. varium* envolvendo a espécie *Bradypus torquatus*. A análise bioquímica e hematológica é considerada o método de avaliação de saúde mais comum em animais silvestres, sendo essencial para avaliar a condição de indivíduos e populações. Apesar disto, infelizmente ainda não há nenhum estudo publicado envolvendo valores bioquímicos em *B. torquatus* e há apenas um estudo sobre valores hematológicos com um número baixo de indivíduos de preguiça-de-coleira. Ademais, o contato de indivíduos com humanos e animais domésticos aumenta a possibilidade de disseminação de agentes parasitários para novos ambientes e espécies silvestres, tornando imprescindível o estudo da saúde e circulação de agentes em populações de animais silvestres, principalmente em espécies ameaçadas de extinção. Com isso, o objetivo deste estudo é relatar as novas descobertas do carrapato *Amblyomma varium* Koch, 1844 encontrado parasitando preguiças-de-coleira de vida livre da Mata Atlântica do nordeste e sudeste do Brasil (Capítulo 1), apresentar valores hematológicos de preguiças-de-coleira de vida livre e fornecer os primeiros valores bioquímicos publicados para

B. torquatus da Mata Atlântica (Capítulo 2) e identificar pela primeira vez, hemoparasitos (*Hepatozoon* spp., *Anaplasma* spp., *Babesia* spp., *Ehrlichia* spp., *Mycoplasma* spp. e *Rickettsia* spp.) em amostras de sangue de preguiças-de-coleira da Reserva Ecológica da Sapiranga, nordeste do Brasil. No Capítulo 1, observa-se que mais de 50% dos indivíduos capturados estavam parasitados por adultos ou ninfas de *A. varium*, e apenas um espécime de *B. torquatus* apresentou parasitismo simultâneo pelos dois estágios de *A. varium*. Ainda neste capítulo, a variação no comprimento dos espinhos na coxa IV em machos de *A. varium* é confirmada e esta característica é relatada pela primeira vez no nordeste do Brasil. No Capítulo 2, amostras de sangue de 30 indivíduos foram submetidas a análises hematológicas e 8 a análises bioquímicas. Os resultados somam aos dados divulgados anteriormente na literatura, permite comparações adicionais entre os resultados, auxilia na avaliação da saúde de preguiças-de-coleira de vida livre e fornece os primeiros valores bioquímicos publicados para *B. torquatus* da Mata Atlântica. No Capítulo 3, 29 amostras de preguiças-de-coleira de vida livre foram testadas para *Hepatozoon* spp., *Anaplasma* spp., *Babesia* spp., *Ehrlichia* spp., *Mycoplasma* spp. e *Rickettsia* spp. por reação em cadeia da polimerase (PCR). Do total de amostras, 11 foram positivas para *Hepatozoon* spp. Não houve positividade para *Anaplasma* spp., *Babesia* spp., *Ehrlichia* spp., *Mycoplasma* spp. e *Rickettsia* spp. neste estudo. As informações aqui compartilhadas contribuem como dados importantes para o fortalecimento dos estudos voltados à Medicina da Conservação dos Xenarthras envolvendo a preguiça-de-coleira.

Simas Bernardes, F.C. 2022. Saúde e prevalência de parasitos em preguiça-de-coleira (*Bradypus torquatus*) Illiger, 1811. Master's thesis, Programa de pós-graduação em ciência animal, Universidade Estadual de Santa Cruz, Ilhéus, Bahia. Advisor: Flávia R. Miranda. E-mail: bernardes.fernandasimas@gmail.com

IN MEMORIAM

GUSTAVO ALBERTO BOUCHARDET DA FONSECA (1956–2022)

I was in Sinop in the northern part of the state of Mato Grosso on August 31, 2022, attending the 19th Congress of the Brazilian Primatological Society. It was a warm sunny morning, and we were having a really pleasant productive event. However, everything suddenly changed when I got an email message from my good friend Claude Gascon from the Global Environment Facility. He said it was urgent. I asked what it was, and he replied that he had to tell me in person and not via email. I quickly called, and had one of the biggest shocks of my life—Gustavo Fonseca, my great friend of nearly 40 years, had suddenly passed away in his sleep earlier that



morning. I couldn't believe it. How was that possible? He had just been at meetings the previous several days, and he seemed to be in vibrant good health and very actively engaged in his work as the Director of Programs at the Global Environment Facility where he had been a key figure for the past 15 years. But sadly, it was true. Gustavo, only 65, had left us. I am still trying to come to grips with this tragedy. It is almost incomprehensible.

For those of you who might not have known him as well as I did, Gustavo was a force of nature, a real leader, a world class biologist, and an astute politician. I first met him in 1983 at Fazenda Montes Claros, the famous research site for the northern muriqui monkey (*Brachyteles hypoxanthus*) in the Brazilian state of Minas Gerais. Like me, Gustavo was a primatologist who had started out working on the black-pencilled marmoset (*Callithrix penicillata*) in the Brasilia area and was carrying out a short-term project on the muriqui. We immediately hit it off and began a friendship that lasted for the next four decades.

Gustavo had a very long list of major accomplishments. Born in the state of Minas Gerais, he grew up in Brasilia at a time when Brazil's new capital was being built. He studied Biology at the University of Brasilia, graduating in 1978, and then went to the University of Florida, Gainesville to do his Masters and Ph.D. from 1982 and 1988. He specialized on the primates and small mammals of

Brazil's Atlantic Forest, one of the world's highest priority biodiversity hotspots, and was instrumental in putting the Atlantic Forest on the international conservation map. After finishing his doctorate, he moved to the Federal University of Minas Gerais in Belo Horizonte, becoming a professor at the Department of Zoology in the Institute of Biological Sciences, working closely with another great pioneer, Prof. Celio Valle. Very quickly, he created a Graduate Program there in Ecology, Management and Wildlife, in part modelled on the program that he had been in at the University of Florida. This was the first course of its kind in Brazil. In part because of Gustavo, we based our WWF-funded work on the primates of the Atlantic Forest at the university in Belo Horizonte and worked closely with students there to carry out our program over the decade of the 1980s. While in Minas Gerais, he also was instrumental in 1988 in the founding of the Fundação Biodiversitas, long one of the leading conservation NGOs in the country.

When I moved from WWF-US to become president of Conservation International in 1989, Gustavo was a strong ally in helping me to create a Brazil Program for that organization, and a couple of years later I invited him to become the Executive Director of our program there. Under his leadership, it grew rapidly to become our largest field program, and we later promoted him to lead our entire South America program, overseeing activities throughout the continent.

Gustavo shared with me a love for the work of IUCN. During the 1990s and the early part of the 2000s, we served together on the Steering Committee of the Species Survival Commission, and he was a member of the World Commission on Protected Areas as well. He also was the Chair of the SSC Anteater, Sloth and Armadillo Specialist Group, which was originally called the Edentate Specialist Group, from 1991 to 2008. Among others, he initiated the Specialist Group's newsletter *Edentata* in 1994.

In 1999, Conservation International was awarded a very generous gift from Gordon Moore, co-founder of Intel and a CI board member, to create a new Center for Applied Biodiversity Science (CABS). CI's CEO Peter Seligmann and I had a quick discussion about who might best lead this center, and we almost immediately settled on Gustavo as the obvious choice. Soon thereafter, he moved to Washington, DC and within the next few years turned CABS into one of the world's leading organizations for conservation science, with a publication record comparable to or exceeding that of the best university programs in the world. As if that weren't enough, we also put him in charge of all conservation field programs and science at CI, a real tribute to his intellect and his capacity.

In 2007, a great opportunity presented itself for Gustavo to move to the Global Environment

Facility, one of the products of the great Rio 92 Earth Summit (which Gustavo himself had participated in) and the biggest funding mechanism in the world for biodiversity conservation. There he took on the role of Director of Programs, reporting to then CEO Monique Barbut. At the GEF, Gustavo transformed the organization from a siloed funder of environmental projects focused separately on climate change, land degradation, and biodiversity, to a funder of integrated projects and programs aimed at arresting the drivers of environmental degradation, and, in so doing, producing multiple benefits in protecting species and habitats, mitigating climate change by securing carbon in tropical forests, and creating landscapes where land and soil quality could sustain rich biodiversity as well as other productive uses. He occupied this key position under three GEF CEOs, most recently under our great friend Carlos Manuel Rodríguez from Costa Rica, and it was this position that Gustavo held at his untimely death on August 31.

Gustavo had hundreds of publications to his credit and a number of books, several of which we coauthored, and he received a number of prizes, among them the Rodolfo von Ihering Award from the Brazilian Mammalogical Society (1988), the Order of the Golden Ark from the Dutch government (2001), the University of Florida's Distinguished Alumnus Award, and the Florida Museum of Natural History's Oliver Austin Award for outstanding research in the natural sciences.

I had the great privilege of working closely with Gustavo from the early 1980s through the 1990s and 2000s and made many international trips with him. These included visits to Botswana, Samoa, Indonesia, the Andean countries, and of course many visits to Brazil. He was always an amazing friend who pushed everyone around him to expand their thinking on a wide variety of issues and to not just accept established ideas. I learned a great deal from him, and always enjoyed his company. In the many different positions he held, he was able to save species, create many new protected areas, influence public policies, and move large amounts of funding to places that needed it most. What is more, he helped to train many students while in his university positions, and they continue to carry his legacy forward today.

Gustavo was truly a unique individual, a great leader, and a loyal friend. I will miss him, as will many other people whose lives he influenced in so many ways. Gustavo is survived by his mother Marisa, his sister Anna, his wife Glauca, his three sons, Bruno, Lucas and Caio, and a grandson, Bernardo.

Russell A. Mittermeier
Chief Conservation Officer, Re:wild
Chair, IUCN SSC Primate Specialist Group
September 14, 2022



Edentata

The Newsletter of the IUCN/SSC Anteater, Sloth and Armadillo Specialist Group
December 2022 • Number 23

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