



First documented record of interaction between vampire bat,
Desmodus rotundus (É. Geoffroy, 1810), and the Greater Naked-tailed Armadillo,
Cabassous tatouay (Desmarest, 1804), Brazil

Primeiro registro documentado de interação entre o morcego-vampiro,
Desmodus rotundus (É. Geoffroy, 1810), e o tatu-de-rabo-mole-grande, *Cabassous*
tatouay (Desmarest, 1804), Brasil

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Abstract: We reported the interaction between a common vampire bat (*Desmodus rotundus*) and a greater naked-tailed armadillo (*Cabassous tatouay*) recorded by camera traps in an Atlantic Forest remnant called 'Mata da Sucupira Torta' in Paraíba state, Brazil, in September 2023. This documented biological interaction corroborates the high plasticity of *D. rotundus* in the search for prey and underscores the urgency of understanding the processes that structure predator-prey relationships, especially in areas increasingly impacted by human activities. This observation also highlights the importance of using alternative methods to address gaps in our understanding of the ecological dynamics between predators and prey.

Keywords: Atlantic Forest. Ecological interaction. Predator. Prey.

Resumo: Relatamos o primeiro registro de interação entre um morcego-vampiro comum (*Desmodus rotundus*) e um tatu-de-rabo-mole-grande (*Cabassous tatouay*) com armadilhas fotográficas em um remanescente de Floresta Atlântica denominado 'Mata da Sucupira Torta', no estado da Paraíba, Brasil, em setembro de 2023. Esta interação biológica documentada corrobora a alta plasticidade de *D. rotundus* na busca por presas e reforça a urgência de compreender os processos que estruturam as relações biológicas entre predador-presa, especialmente em áreas que rapidamente estão sendo impactadas por atividades humanas. Essa observação enfatiza a importância do uso de métodos alternativos para preencher lacunas no entendimento das dinâmicas ecológicas entre predadores e presas.

Palavras-chave: Floresta Atlântica. Interações ecológicas. Predador. Presa.

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INTRODUCTION

Vampire bats belong to the Desmodontinae subfamily and are endemic to the Neotropics. In Brazil, three species are recognized: Hairy-legged vampire bat, *Diphylla ecaudata* Spix, 1823, white-winged vampire bat, *Diaemus youngii* (Jentink, 1893), and common vampire bat, *Desmodus rotundus* (É. Geoffroy, 1810). They are widely distributed in diverse ecosystems, including the Atlantic Forest (Martins et al., 2007). While *D. ecaudata* and *D. youngii* preferentially feed on the blood of birds (Scheffer et al., 2015), *D. rotundus* feeds mainly on the blood of mammals, including horses and cattle, and occasionally attacks humans (Hernández-Pérez et al., 2019; Hayes & Piaggio, 2018).

Among the vampire bats, *D. rotundus* is a medium-sized species, being the largest in the group, more common and widely distributed across the Americas (Greenhall et al., 1983). It is the only species described to typically attack and feed on both wild and domestic mammals (Hernández-Pérez et al., 2019; Brown & Escobar, 2023). Currently, the species is classified as Least Concern at the global level on the Red List of Threatened Species (Barquez et al., 2015), but it is not included in the National List of Threatened Species (MMA, 2022). The conversion of habitat by human activity has increased the availability and abundance of domestic species, mainly for livestock expansion (Mialhe & Moschini, 2020). This may contribute to changes in the ecological interactions between prey and vampire bats in many regions.

Despite the relevance of vampire bats and their natural distribution being restricted to the Neotropics, most information on ecological interactions is quite limited to a few regions such as Mexico (Hernández-Pérez et al., 2019), Costa Rica (Amit & Valverde-Zúñiga, 2022), Venezuela (Fischer et al., 2021), Argentina (Calfayan et al., 2019), and in some locations of Brazil (Gnocchi & Srbek-Araujo, 2017; M. Oliveira et al., 2022; Morais & Novaes, 2024). These animals are present in all Brazilian ecosystems, covering all states in Brazil (Martins et al., 2007), but information on the ecological interaction between vampire bats and wild prey in northeastern Brazil remains incipient (Feijó et al., 2023).

The greater naked-tailed armadillo *Cabassous tatouay* (Desmarest, 1804) stands out as the largest species within its genus and is characterized by the absence of tail shields, a trait it shares with other *Cabassous* species (Hayssen, 2014; Desbiez et al., 2022). Despite being widely distributed, particularly in habitats like the *Cerrado*, Atlantic Forest, and Pantanal, many uncertainties persist regarding its exact occurrence and population status (Desbiez et al., 2022). The uncertain distribution is attributed to its fossorial behavior and nocturnal and solitary habits, possibly resulting in low population density estimates (Rocha et al., 2024).

Although classified as of Least Concern (LC) by the The International Union for Conservation of Nature (IUCN) (Desbiez et al., 2022) and absence in the National MMA list (MMA, 2022), *C. tatouay* faces significant threats such as illegal hunting and retaliation, driven by the consumption of its meat in many local communities, often justified as a recreational and cultural practice (S. Oliveira et al., 2015). Consequently, in some regional red lists, the species is classified as presumably threatened (Rio de Janeiro) and nearly threatened (Minas Gerais) (Desbiez et al., 2022). Given the interaction of *C. tatouay* with humans and the lack of knowledge about its distribution, ecology, and behaviour, new records are essential to advance the scientific understanding of this species.

There are several records of interactions between vampire bats and large and medium-sized wild mammals, such as deer, capybaras, wild pigs, and armadillos (Calfayan et al., 2019; Hernández-Pérez et al., 2019; Brown & Escobar, 2023). Although there are documented cases of species from the order Cingulata, such as the Giant Armadillo *Priodontes maximus* (Kerr, 1792) and the Nine-banded Armadillo *Dasypus novemcinctus* Linnaeus, 1758, being preyed upon by vampire bats (Ríos-Solís et al., 2021; M. Oliveira et al., 2022), scientific knowledge about the interaction between these groups is still minimal. Specifically for *C. tatouay*, there are no documented records of its interaction with vampire bats (Rocha et al., 2024), highlighting the gaps in our understanding of the ecology

and interaction between these hematophagous bats and their prey. Here, we documented the first record of ecological interaction between a *D. rotundus* and *C. tatouay*.

MATERIAL AND METHODS

The study area is an Atlantic Forest remnant called 'Mata da Sucupira Torta' in Paraíba state, Brazil (Figure 1A). This forest remnant covers approximately 10,000 ha and includes seasonal semideciduous forest and savanna forest (IBGE, 2004; MapBiomas, 2022). The matrix surrounding

this remnant is used for agricultural purposes, mainly sugar cane monoculture, and for grazing domestic cattle (Almeida & Souza, 2023). The study is part of the project of Long-term monitoring and occupancy of birds and mammals in a highly fragmented landscape (SisBio/ICMBio nº 89190).

During the rainy season (May to September 2023), we randomized 19 geographic points and installed a camera trap at each one (model HC900A), fixed on trees at approximately 40 cm above the forest floor to record animal activity and potential interactions (Figure 1B).

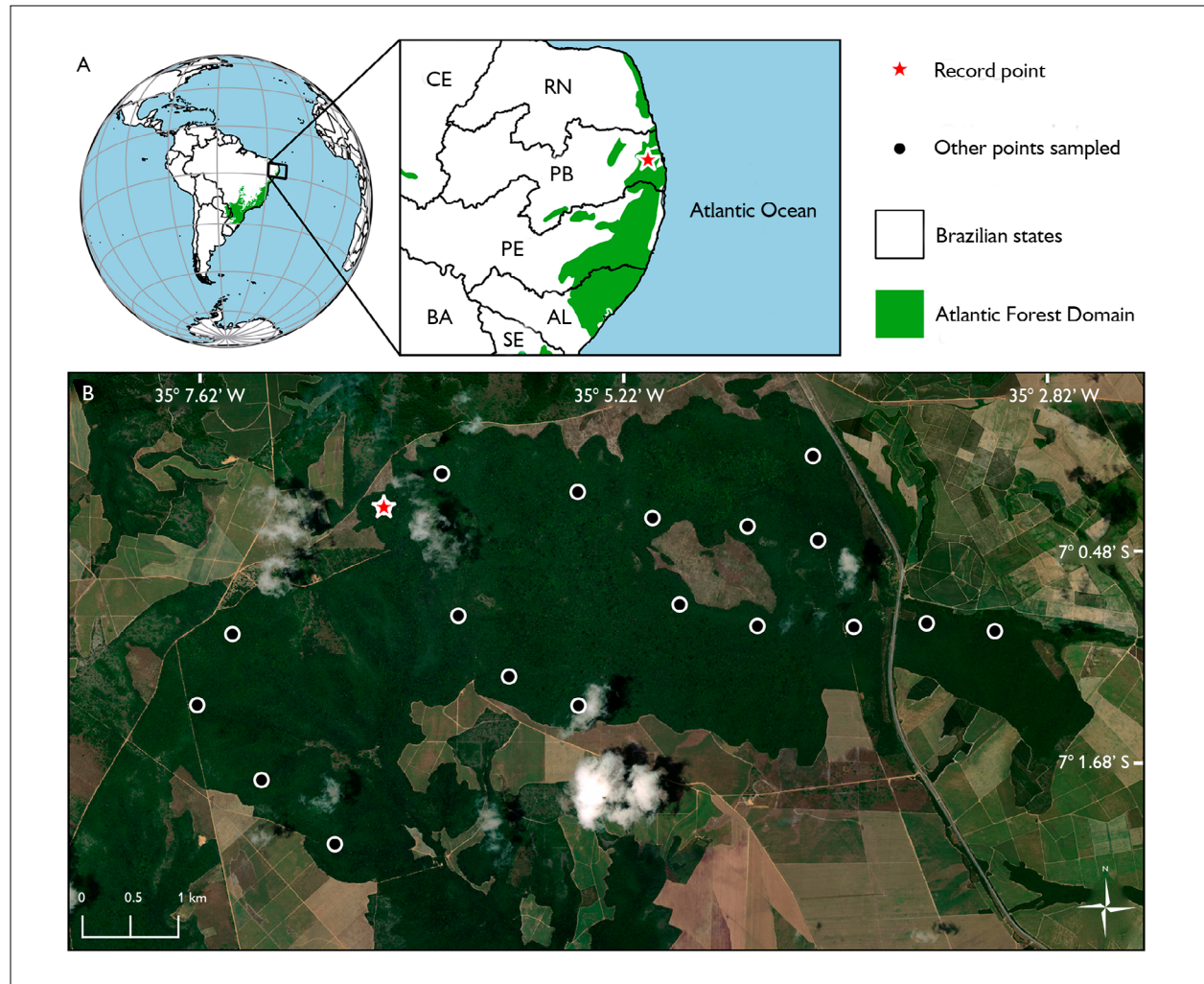


Figure 1. Location of the interaction record between *Desmodus rotundus* and *Cabassous tatouay*: A) the location is situated in the Atlantic Forest domain, Paraíba State, Brazil; B) the record occurred in a semideciduous seasonal forest approximately 160 m from the forest edge, from a long-term monitoring project of terrestrial vertebrates using 19 camera traps. Map: C. Salustio-Gomes (2024).

After establishing sampling points, camera traps were deployed at watering sites, fruit-and seed-bearing areas, natural burrows, fallen logs, vines serving as vertical substrates, slopes, and other structural features frequently utilized by mammals for movement, vigilance behaviour or refuge. All camera traps were located at least 150 m from the forest edge and a minimum of 750 m apart.

RESULTS

We recorded an ecological interaction event between *D. rotundus* and *C. tatouay* at 22h06 on 21 September 2023. The record occurred inside the semideciduous seasonal forest (7° 00' 13.93" S, 35° 06' 34.75" W) located approximately 160 m from the forest edge (Figure 1B). We recorded a single adult individual of *C. tatouay* foraging, followed by an attack of an individual of *D. rotundus* (Figure 2A; see video 1 in supplementary material)¹. Initially, the vampire bat landed on the ground near the armadillo's tail (Figure 2B; see video 1 in supplementary material). It then reached the prey by hopping and bit the tail (Figure 2C; see video 1 in supplementary material). Apparently as a probable antipredator response, the armadillo attempted to dislodge the bat using its hind limbs, followed by

vigorous digging behavior that directed ground toward the bat to repel the attacker. The bat remained attached to the tail for approximately 20 seconds before detaching and staying on the ground nearby. In a subsequent video recorded two minutes later, the bat was still near the armadillo (see video 2 in supplementary material)². It was not possible to confirm whether further interactions occurred. At 22h10, the bat took flight, landed briefly on a nearby tree, and then exited the camera trap's field of view (see video 2 in supplementary material).

DISCUSSION

Although interactions between vampire bats and various mammal species (Calfayan et al., 2019; Brown & Escobar, 2023), including other armadillo species (Brown & Escobar, 2023; M. Oliveira et al., 2022; Ríos-Solís et al., 2021; Zortéa et al., 2018), have been documented, we present the first interaction of *D. rotundus* attacking an armadillo of the genus *Cabassous*, specifically *C. tatouay*.

The diet of *D. rotundus* includes the blood of various taxa of mammals, birds, and occasionally humans (Greenhall et al., 1983), with most predation records in the literature involving wild or domestic mammals

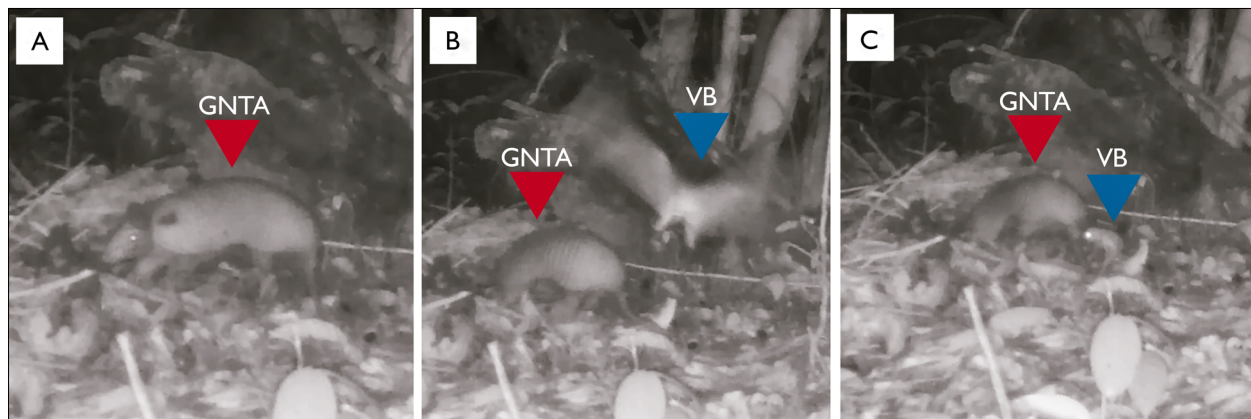


Figure 2. Image records of the interaction between *Desmodus rotundus* (VB) and *Cabassous tatouay* (GNTA) in the Atlantic Forest domain, Paraíba State, Brazil. We documented (A) *C. tatouay* foraging, (B) *D. rotundus* in flight, and (C) *D. rotundus* interacting with *C. tatouay*. Images: R. M. C. Paixão (2024).

¹ Link for the video: <https://boletimcn.museu-goeldi.br/bcnaturais/article/view/1042/672>

² Link for the video: <https://boletimcn.museu-goeldi.br/bcnaturais/article/view/1042/673>

(Brown & Escobar, 2023). The nocturnal activity of Cabassous armadillos suggests they could be potential prey; however, their fossorial behavior likely makes such interactions rare, explaining the scarcity of predation records involving *C. tatouay* (Rocha et al., 2024).

C. tatouay predominantly inhabits primary and secondary forests and is rarely found in degraded areas (Desbiez et al., 2022). In contrast, populations of vampire bats benefit from the abundant availability of food in degraded environments, primarily due to the establishment of large-scale domestic animal farming operations (M. Oliveira et al., 2022), which may also enhance their reproductive success. Nonetheless, vampire bat colonies depend on shelters in forested or protected areas rather than open degraded habitats (Vargas-Mena et al., 2020; Morais & Novaes, 2024). This difference in habitat use likely reduces encounters between these species and, consequently, lowers the detection probability of such interactions by observers.

The ecological significance of this first documented interaction is underscored by the rarity and consequent low detectability of the Greater Naked-tailed Armadillo *C. tatouay* within its natural habitats, which remains poorly documented due to the substantial field effort required to record the species. Camera trap studies provide a valuable alternative by enhancing the probability of detecting such interactions, which are considerably more challenging to observe through traditional field methods (Frey et al., 2017; Soriero et al., 2018; Moore et al., 2021; Ferry et al., 2024; Nicvert et al., 2024).

Understanding the ecology of species interaction requires increased attention, especially in forest habitats vulnerable to anthropogenic disturbances. While armadillos are frequently hunted and illegally consumed by local communities in the region, the potential for disease transmission by these species remains unknown (S. Oliveira et al., 2015). This highlights the ongoing importance of educational practices and environmental monitoring to protect forest habitats, conserve game

animal populations, discourage the illegal use of wildlife by human communities and safeguard public health from potential risks.

Additionally, this rare record is important for understanding predation by *D. rotundus* and contributes to future behavioral studies of both species. Finally, camera traps have proven effective for fauna monitoring by facilitating efficient data collection on behaviour and species distribution across different conservation areas and are invaluable for documenting novel and rare interspecific interactions.

CONCLUSION

The documentation of this interaction between *D. rotundus* and *C. tatouay* not only gives a novel insight into the ecological and behavioural dynamics between predator-prey but also increases the richness of taxa on which *D. rotundus* feeds on. This initial documentation highlights significant gaps in our knowledge, underscoring the need for further research using precise sampling methods. Furthermore, it emphasizes the value of camera trap studies in capturing rare interspecific interactions that are unlikely to be documented through more traditional field methods.

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AUTHORS' CONTRIBUTION

R. M. C. Paixão contributed to project administration, formal analysis, conceptualization, methodology, resources, validation, supervision, and writing (original draft writing, review and editing investigation); A. S. Sampaio contributed to project administration, formal analysis, conceptualization, methodology, resources, validation, supervision, and writing (original draft writing, review and editing investigation); J. C. C. Abraão Filho contributed to resources and writing (data curation, proofreading and editing); A. J. N. Silva contributed to resources and writing (data curation, proofreading and editing); T. C. Callado contributed to resources and writing (data curation, proofreading and editing); J. C. Vargas-Mena contributed to resources and writing (data curation, proofreading and editing); and Salustio-Gomes contributed to project administration, formal analysis, conceptualization, methodology, resources, validation, supervision, and writing (original draft writing, review and editing investigation).

