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Mammalogy Notes ISSN 2382-3704
https://doi.org/10.47603/mano.vol11n1.482

Natural History

First records of the Northern Brown Brocket, *Passalites nemorivagus* (Cuvier, 1817) (Artiodactyla: Cervidae) from Isla de Barú, Departamento de Bolívar, Colombia

Juan Salvador Mendoza Roldán *[1], Santiago Madriñan[2]

1 Universidad del Norte, Puerto Colombia, Barranquilla, Colombia.
2 Jardín Botánico de Cartagena, Guillermo Piñeres, Turbaco, Colombia.
* Correspondencia: js.mendoza122@uniandes.edu.co

Resumen

Presentamos el primer reporte de *Passalites nemorivagus* para la Isla de Barú, Departamento de Bolívar, Colombia. Evidencias directas (fototrampeo) e indirectas (huellas, excretas y letrinas) comprueban la presencia de la especie para los bosques secos presentes en esta isla.

Palabras clave: Caribe Colombiano, venado, Primer registro, Bosque seco tropical

Abstract

In this report, we present the first documented records of *Passalites nemorivagus* on Isla de Barú, Departamento de Bolívar, Colombia. These records were obtained through direct evidence (camera trapping) and indirect evidence (tracks, scats, and latrines). Our findings indicate that this species inhabits the dry forests of this island.

Key words: Colombian Caribbean, brocket deer, First record, Tropical Dry Forest

The species within genus *Mazama* have been reassigned on the base of the polyphyly within the genus, that shows an extreme case of morphological convergence (Duarte et al. 2008). Initially the genus was split into two genera *Mazama* and *Subulo*, and later the genus *Passalites,* was revalidated (Morales-Donoso et al. 2023). The Northern Brown Brocket, *Passalites nemorivagus* was initially described as a subspecies of *Mazama cita* (Allen 1915), and it has been suggested that it is composed of several species (Groves & Grubb 2011; Solari et al. 2013; Morales-Donoso et al. 2023). The occurrence of the Northern brown brocket deer in Colombia has been reported for the Amazon and Caribbean regions, from 0 to 500 masl (Rossi et al. 2010; Alberico et al. 2000). Two brocket species are found in the Caribbean region of Colombia, the Northern brown brocket deer and the red brocket deer

Mazama americana (Eisenberg 1989; Solari et al. 2013), being the latter the most listed species for the Caribbean lowlands (Avendaño-Maldonado et al. 2021; Muñoz & Hoyos 2012). The grayish brown to chocolate brown pelage of *Passalites nemorivagus*, with no trace of reddish tone, is the main diagnostic characteristic of this species, useful to distinguish the species from the red brocket deer (Rossi et al. 2010; Cifuentes-Rincón et al. 2020).

The Isla de Barú is a peninsula in Colombia covering a territory of 7.650 hectares and a length of 35 km. It is located in the Bolivar department, between Islas del Rosario Archipelago (10,1664, -75,8046) and the city of Cartagena de Indias (10,2875, -75,5233), ranging in elevations between 0 and 59 m. The peninsula belongs to the district of Cartagena and is subdivided by the communities of Ararca, Santa Ana and Barú. The Isla de Barú is part of the lower Canal del Dique region, and it is separated from the mainland by a freshwater Canal. This region comprises part of Los Corales del Rosario y de San Bernardo National Park protected area. The island is covered by mangrove forests and small, highly fragmented dry forest patches. This area has undergone accelerated urban development due to the construction of roads and touristic infrastructure in the last decade (Parques Nacionales Naturales de Colombia 2020). The island's climate has low annual precipitation (1.056 mm) and a bimodal rain pattern, with a prolonged dry season from December to April, receiving less than 50 mm of rainfall per month (Pasquini et al. 2018).

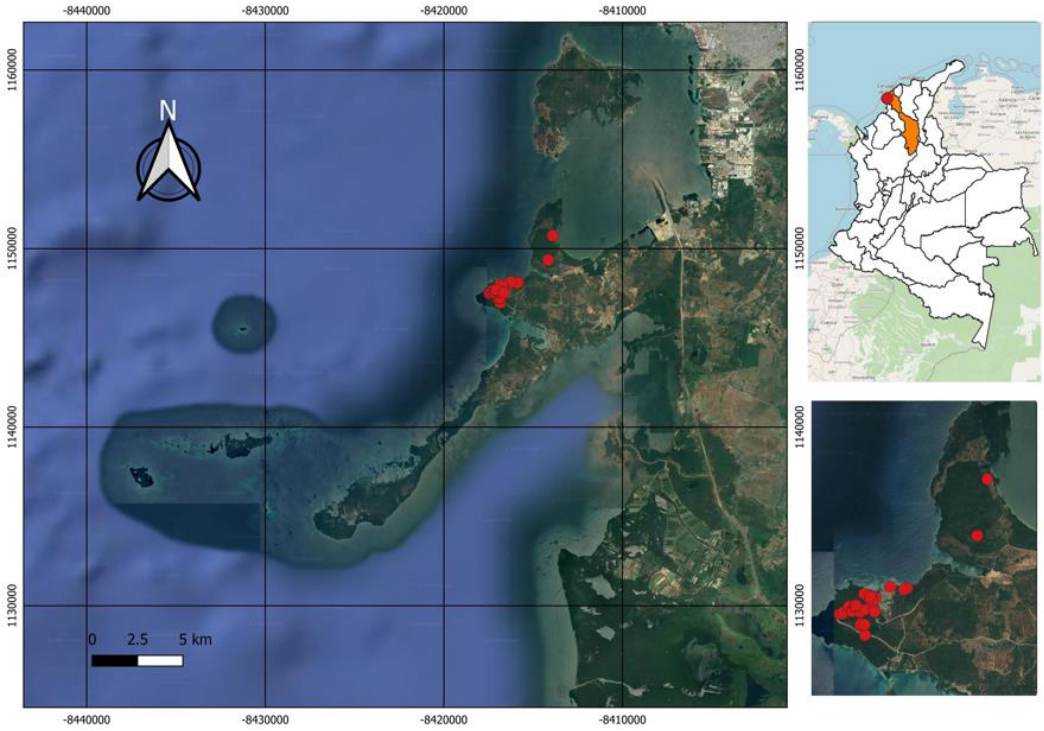

FIGURE 1. Records of *Passalites nemorivagus* from Isla de Barú, Colombia.

In this note, we present evidence of the presence of *P. nemorivagus* in the dry forest patches located in the locality of Ararca, Isla de Barú. This represents the first confirmed records of this species in the studied locality (Figure 1). Records on the presence of the species were made in July, August, December 2018, January 2019, and later in May 2020.

Indirect evidence recorded during field work such as tracks and scats, were photographed next to a scale. Species confirmation was made using camera trap images and using a field guide with reference measurements and images of tracks (Morales-Jimenez et al. 2004). We collected 25 records from scats and latrines, and 11 from tracks. The number of individuals based on indirect evidence was determined by the number of track trails on site, only on two occasions, we could confirm the presence of two individuals based on tracks alone. Single dung piles were classified as scats and several dung piles with old and fresh scats were classified as latrines (Table 1).

Two camera traps programmed to continuously record 10-second videos throughout 24 hours were set. One of them, was placed at the border of a freshwater temporal pool from January to the beginning of February 2019 for a total of 40 trap nights. Another camera was placed next to a latrine with fresh scats inside a dry forest patch dominated by *Neltuma julisflora* (Fabaceae) and *Conocarpus erectus* (Combretaceae) in May 2020, for a total of 10 trap nights.

The species was captured on camera traps in six separate events. In 2019, the camera placed near the temporal pool captured four events. The first recording occurred In January 25 with a solitary male at 18h:48 min (Figure 2a). Next day, a male and a female were recorded drinking water during the daytime at 17h:52 min. (Figure 2b). The following day, a solitary male was recorded at 07h:06 min (Figure 2c). And later, on the first day of February a solitary female was recorded at 01h:58 min, (Figure 2d). In 2020, the species was recorded on two occasions. An adult female and a male were recorded on May 18th, while moving through the forest at 16h:40 min (Figures 2E and 2F). The next day, a female was filmed moving through the same area at dawn 18h:30 min (Table 1).

TABLE 1. Northern brown brocket deer (*P. nemorivagus*) records for the study area

Record	Date	Decimal Latitude	Decimal Longitude	Number of individuals
Tracks	7/31/2018	10.256217	-75.607600	1
Scats	7/31/2018	10.258333	-75.600800	1
Scats	7/31/2018	10.258048	-75.601476	1
Tracks	8/7/2018	10.258580	-75.604440	1
Tracks	8/7/2018	10.256768	-75.608629	2
Tracks	8/7/2018	10.256372	-75.609029	2
Tracks	8/7/2018	10.256894	-75.609488	1
Tracks	8/7/2018	10.257132	-75.610102	1
Tracks	12/12/2018	10.256068	-75.608864	1
Tracks	12/13/2018	10.256068	-75.608864	1
Tracks	12/16/2018	10.255760	-75.608467	1

Camera trap	1/25/2019	10.256475	-75.608747	1
Camera trap	1/26/2019	10.256475	-75.608747	2
Camera trap	1/27/2019	10.256475	-75.608747	1
Camera trap	2/1/2019	10.256475	-75.608747	1
Scats	4/5/2020	10.248359	-75.609852	latrine
Scats	4/8/2020	10.248339	-75.609864	latrine
Scats	4/10/2020	10.250625	-75.610675	latrine
Camera trap	5/18/2020	10.254550	-75.612187	2
Camera trap	5/19/2020	10.254550	-75.612187	1
Scats	4/15/2020	10.250441	-75.610917	latrine
Scats	4/20/2020	10.250780	-75.610726	1
Scats	4/21/2020	10.250593	-75.610069	latrine
Scats	4/22/2020	10.250495	-75.609904	latrine
Scats	5/1/2020	10.250593	-75.610069	latrine
Scats	5/8/2020	10.252833	-75.615358	latrine
Scats	5/10/2020	10.252892	-75.614727	latrine
Scats	5/10/2020	10.253282	-75.614479	latrine
Scats	5/10/2020	10.253437	-75.613439	1
Scats	5/11/2020	10.254433	-75.613313	latrine
Scats	5/12/2020	10.253477	-75.612807	1
Scats	5/13/2020	10.253444	-75.612670	latrine
Scats	5/14/2020	10.253272	-75.610960	latrine
Scats	5/16/2020	10.253748	-75.610015	1
Scats	5/16/2020	10.254396	-75.612122	1
Scats	5/16/2020	10.254524	-75.611956	latrine
Scats	5/16/2020	10.254758	-75.611971	1
Scats	5/17/2020	10.254681	-75.611852	latrine
Scats	5/18/2020	10.253654	-75.607996	1
Scats	5/19/2020	10.253312	-75.607828	latrine
Tracks	5/20/2020	10.269470	-75.585670	1
Tracks	5/21/2020	10.281488	-75.583482	1

We recorded that the species has a predominantly diurnal activity pattern (07h:06 min-17h:52 min), with a crepuscular and nocturnal activity peak (18h:30 min- 01h:58 min). It showed frequent movements to freshwater temporal pools in the dry season (January), throughout the entire day. During this month, tracks were mostly found along freshwater temporal pools and streams. During the wet season (August), tracks were mostly found along paths in the forest and under the canopy of trees with fallen fruits from *Geoffroea spinosa* (Fabaceae), *Malpighia glabra* (Mapighiaceae), and *Cordia sebestena* (Boraginaceae). This could indicate that the species may opportunistically forage on fallen fruits in the peak production of this resource. Accordingly, the species feeding ecology in

the Amazon shows that fruit material represents 87% of the total dietary elements, with selectivity for pulpy fruits (Rossi et al. 2010).

We also observed for *P. nemorivagus* the presence of latrines with fresh and old scats. This suggests that this species displays similar behavior to that described for other brocket deer (*Mazama gouazoubira*), involving the frequent remarking and counter-marking of latrines (Figure 3), which function as indicators of territory ownership and chemical communication (Black-Décima et al. 2010; Rossi et al. 2010).

The resident population of this species on the island could face near threats imposed by habitat loss from urban and touristic development, hunting, and isolation because of connectivity loss among the remaining dry forest patches. We believe that conservation efforts and further research are needed to protect *P. nemorivagus*, the largest herbivorous mammal in Isla de Barú.

FIGURE 2. Activity of *P. nemorivagus* recorded by camera trapping in Isla de Barú, Departamento de Bolívar, Colombia. A) Adult male and female visiting a temporal pool during the day (1/26/2019), B) Solitary adult male visiting temporal pool during the day (1/27/2019), C and D) Adult male and female recorded while crossing through the forest during the day (5/18/2020), E and F) Crepuscular and nocturnal activity.

FIGURE 3. Evidence on the presence of *P. nemorivagus* for the study area A) scats in a latrine, B) tracks.

ACKNOWLEDGMENTS

Research was made possible thanks to Jardín Botánico de Cartagena Guillermo Piñeres. We thank Diego Gomez, Adolfo Mulet Paso, Eber Ropain and Yeison Herrera for their support during field work. We thank the editorial team from Mammalogy Notes and two anonymous reviewers for their very important comments and corrections to the manuscript.

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Editor: Lain Pardo

Received: 2024-10-29

Reviewed: 2024-11-28

Accepted: 2025-03-03

Published: 2025-03-25