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Natural History

Fishing behaviour and novel geographic records of *Speothos venaticus* (Carnivora: Canidae) in the department of Madre de Dios, Peru

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Resumen

El perro de monte (*Speothos venaticus*) es un cánido raro y esquivo con una distribución fragmentada en la selva amazónica y otros biomas neotropicales. Conocido por su comportamiento social y sus adaptaciones únicas para la caza cooperativa, la especie está estrechamente asociada con la vegetación densa del sotobosque y los hábitats acuáticos. Este estudio documenta nuevos registros geográficos y una observación de comportamiento de *S. venaticus* en la región de Madre de Dios, en el sureste de Perú, una parte poco comprendida de su distribución. Reportamos la observación directa de un grupo familiar exhibiendo comportamiento de forrajeo en un hábitat ribereño, con un individuo adulto pescando activamente en un pequeño afluente del Río Las Piedras mientras los juveniles observaban. Registros adicionales en cuatro afluentes de la cuenca del Madre de Dios refuerzan aún más la asociación de la especie con los sistemas fluviales dentro de los bosques primarios de tierras bajas.

Palabras clave: Perro de monte, comportamiento de pesca, biogeografía, selva amazónica, Hábitats ribereños

Abstract

The bush dog (*Speothos venaticus*) is a rare and elusive canid with a patchy distribution across the Amazon rainforest and other Neotropical biomes. Known for its social behavior and unique adaptations for cooperative hunting, the species is closely associated with dense understory vegetation and aquatic habitats. This study documents novel geographic records and a behavioral observation of *S. venaticus* in the Madre de Dios region of southeastern Peru, a poorly understood part of its range. We report a direct observation of a family group exhibiting foraging behavior in a riparian habitat, with an adult individual actively fishing in a small tributary of the Las Piedras River while juveniles observed. Additional records from four tributaries of the Madre de Dios watershed further

underscores the species' association with riverine systems within primary lowland rainforests.

Key words: Bush dogs, fishing behavior, biogeography, Amazon rainforest, riparian habitats

The bush dog (*Speothos venaticus*) is a rare carnivore with a patchy and poorly understood distribution across the Amazon rainforest, extending into other Neotropical biomes such as the Pantanal, Cerrado, and Atlantic Forest (DeMatteo & Loiselle 2008; de Oliveira et al. 2018). *S. venaticus* is a habitat generalist, most often associated with lowland habitats, favoring areas near water sources such as rivers, streams, and wetlands (Beisiegel & Zuercher, 2005; DeMatteo, Michalski & Leite-Pitman 2011). It is a highly social canid that exhibits unique adaptations for cooperative hunting and specializes in capturing elusive prey within densely vegetated habitats (Macdonald 1996; Wallace et al. 2002). Renowned for its proficiency in both terrestrial and aquatic environments, *S. venaticus* has a diet primarily composed of small to medium-sized mammals, such as agoutis (*Dasyprocta* spp.), pacas (*Cuniculus paca*), and armadillos (*Dasypus* spp.) (Peres 1991; Beisegel 1999; Zuercher et al. 2005; de Souza Lima et al. 2012). As an opportunistic species, *S. venaticus*, also preys on birds, reptiles, and amphibians when available (Zuercher, Gipson & Carrillo 2005). Its hunting behavior is marked by exceptional coordination, with packs operating as cohesive units to chase and corner prey, often employing relay-like pursuits or surrounding strategies to exhaust their targets. Notably, *S. venaticus* displays remarkable swimming ability, enabling it to capture large as well as semi-aquatic species like capybaras (*Hydrochoerus hydrochaeris*) (Peres 1991; Wallace et al. 2002). Its short legs and compact body facilitate movement through dense underbrush, while its webbed paws enhance traction in wet terrains (Macdonald 1996). As potential indicators of intact forest ecosystems, *S. venaticus,* rely on contiguous habitats. However, in some of its range, it has been detected in disturbed and anthropogenic environments, such as plantations (DeMatteo et al. 2011; de Souza Lima et al. 2012). Its rarity and cryptic behavior mean that much of its ecology and spatial dynamics in the Amazon region remain poorly documented, underscoring the need for targeted studies to better understand its role in Amazonian food webs and their conservation status (DeMatteo et al. 2011; de Souza Lima et al. 2012).

Here, we present novel geographic records of *S. venaticus* from the Madre de Dios region of Peru, gathered from tracks found in stream habitats and a direct observation of its hunting behavior. Specifically, we document an observation of *S. venaticus* actively fishing on a small tributary of the Las Piedras River in southeastern Peru. Although commonly associated with aquatic systems, we are not aware of literature detailing observations of *Speothos venaticus* consuming fish, and fish as a prey item are missing from diet studies and reviews (e.g., Beisiegel & Zuercher 2005; Zuercher et al. 2005; de Souza Lima *et al.* 2009). This rare account not only expands the known distribution of *Speothos venaticus* within the Amazon basin but also highlights the adaptability of its foraging strategies in aquatic environments.

All of the observations we report are opportunistic. Most of the track observations were made during conservation and green investment endeavors, such as conservation concession steward and funding acquisition workshops on the Los Amigos River and Las Piedras River. Green investment efforts included senior field biologists and organization

leaders, who presented the area's research and conservation goals to potential donors. Additional observations were made during research projects on stream-dwelling fauna and mammal surveys (e.g., Payne et al. 2024). Geographic positions were acquired using Garmin handheld GPS devices (Garmin® 62s and 64s models). Track identification was informed using Pocock (1914), Leite Pitman & Williams (2004), and Emmons & Feer (1997)

On October 31 of 2021, at 10h30, we observed a group of four S. *venaticus* over 10 minutes at the Loretillo stream (-12.03, -69.52; 240 masl) in a riparian primary forest. The group consisted of one pup, two juveniles and one adult. Initially, we observed the three younger individuals running from the upper bank down into the stream and then disappearing. At 10h35, approximately 5 m downstream, we observed an adult *S. venaticus* catching fish in the eddy of a deep bend of the river while the pups watched (Figure 1a). Upon detecting our group of eight observers (Mohsin Kazmi, Victor Huinga, Willian Durand, and five tourists), the pups remained cautious until the adult fled, after which they retreated into the dense forest along a well-worn game trail (Figure 1B). Tracks were then found 3 m upstream from the initial observation point. Additionally, we collated track observations taken in the Madre de Dios region since 2012 (Table 1, Figure 2 A, B). We present eight records from four tributaries of the Madre de Dios watershed. All records were made on small riverine systems of the Las Piedras River, Los Amigos River, Tambopata River, and the Heath River.

FIGURE 1. A) Two juvenile *Speothos venaticus* and a pup watched as an adult fished in the Loretillo stream, Las Piedras, Peru B) Although the juveniles and pup were aware of the observers, they only retreated after the adult detected the observers and fled.

This study contributes insights into the distribution and behavioral ecology of *S. venaticus* in the Madre de Dios region of southeastern Peru. *S. venaticus* records are rare; however, they have been reported from across the department, including Manu National Park (Patterson et al. 2006), the Las Piedras River (Payne et al. 2024), the Los Amigos River (Tobler et al. 2008) and Tambopata National Park (Pacheco et al. 2011). The observation of a family group exhibiting foraging behavior in an aquatic habitat is consistent with the species' adaptability and preference for riparian forests and habitats. However, our review of the literature has not found any record of the species consuming fish (Beisiegel & Zuercher

2005; Zuercher et al. 2005; de Souza Lima et al. 2009), making this possibly the first report of such a diet item. These records are the first from the Loretillo, El Gato, and Amiguillos Rivers. Integrating this novel observation with eight additional observations from small tributaries of the Las Piedras, Los Amigos, Tambopata, and Heath River tributaries highlights the potential importance of riparian habitats for *S. venaticus* in the Amazon.

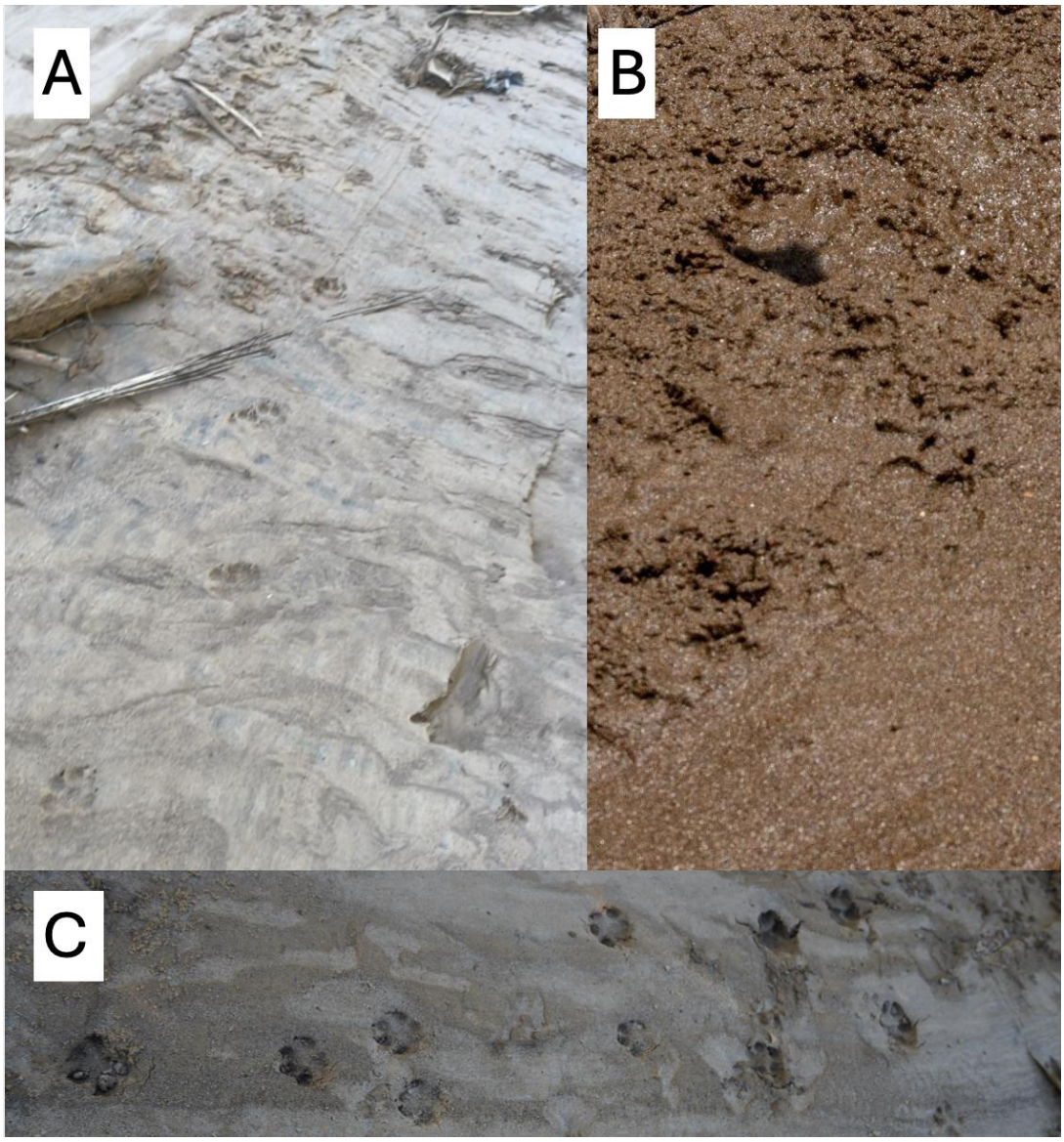

FIGURE 2. Tracks of *Speothos venaticus* observed on beaches of the Amiguillos (A), Loretillo (B), and El Gato (C) tributaries between 2012 and 2024.

TABLE 1. Novel Records of *Speothos venaticus* observed in the Madre de Dios region of Peru

Locality	Date and Time (Y-M-D)	Latitude	Longitude	Elevation (masl)	Description
Stream near San Antonio Park Ranger Station, Heath River	2012-06-15 12h00	-12.66	-68-74	200	Tracks of at least two individuals were found near the confluence of a small, muddy stream
Small stream system deriving from a Terra firme ridge line that flows into the Las Piedras River	2013-09-01 13h00	-12.03	-69-70	280	Tracks found 710 m from the Las Piedras River. Small stream, but water and small waterfalls <3 m are present year-round. Tracks were found periodically on this stream between September and December, 2013
Large stream system that flows into the Las Piedras River	2012-12-05	-12.02	-69-71	260	Tracks found 1.750 m from the Las Piedras River. Two *S. venaticus* previously reported by Payne et al. 2024
El Gato River	2015-06-20 15h20	-12.87	-69.45	205	Tracks or a pair of tracks of two individuals were found following the water edge of the El Gato river. The tracks weaved in and out of the forest for a length of beach of 30 m.
Amiguillos River	2021-07-22 13h30	-12.40	-70.30	260	Tracks found on the beach margin
Amiguillos River	2021-07-22 15h45	-12.36	-70.42	280	Tracks found on the beach margin
Confluence of the Los Amigos and Amiguillos Rivers	2021-10-31 10h30	-12.44	-70.25	250	Tracks found on the beach margin
Loretillo Stream, Las Piedras	2024-10-31 10h30	-12.03	-69.52	240	Fishing behavior reported in the results

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