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SHORT COMMUNICATION

First confirmed records of the bush dog (Carnivora: Canidae) for Costa Rica

Primeiros registros confirmados do cachorro-vinagre (Carnivora: Canidae) para a Costa Rica

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Abstract

The bush dog, *Speothos venaticus*, is one of the rarest and less known carnivore species, distributed from Panama to Argentina, with most of the information for the species derived from anecdotal records. To date, there are no previously confirmed evidences for its occurrence in Costa Rica. Here we present the first confirmed records of the bush dog for the country and a new elevational record for the species. During extensive camera-trap surveys in Las Tablas Protected Zone, Talamanca Mountains of Costa Rica, we detected bush dogs in a primary montane forest at 1,500 m. The low frequency among our survey, and the absence of previous records, despite surveys for over 10 years in the area, reinforce the idea of the cryptic behavior of the species and its natural rareness. The species' distribution may be underestimated.

Keywords: camera-trapping, Central America, species of cryptic behavior, distribution.

Resumo

O cachorro-vinagre, *Speothos venaticus*, é uma das espécies de carnívoros mais rara e menos conhecida, com distribuição do Panamá a Argentina, sendo a maioria das informações derivada de registros informais. Até o momento, não havia registros confirmados para a Costa Rica. No presente trabalho, apresentam-se os primeiros registros confirmados do cachorro-vinagre para a Costa Rica e um novo registro de ocorrência da espécie em altitude elevada. Durante extensivos levantamentos usando armadilhas-fotográficas na Zona Protegida de Las Tablas, nas Montanhas Talamanca da Costa Rica, detectamos o cachorro-vinagre em uma localidade de floresta montana primária a 1.500 m de elevação. A baixa frequência de detecções em nossa pesquisa e a ausência de registros anteriores, apesar dos levantamentos realizados há mais de 10 anos na área, reforçam a ideia do comportamento enigmático e da raridade natural da espécie. Assim, sua distribuição conhecida pode estar subestimada.

Palavras-chave: armadilhas-fotográficas, América Central, espécie de hábitos crípticos, distribuição.

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Bush dog, *Speothos venaticus* (Lund, 1842), is a rare Neotropical canid occurring from Eastern Mesoamerica, south to Argentina and Paraguay (DeMatteo *et al.,* 2011). Despite its considerable large distribution, it is considered one of the rarest and least known canids in the continent (DeMatteo and Loiselle, 2008). Most of basic ecological and biological aspects of *S. venaticus* remain unknown, and most of the knowledge is still derived from occasional and sporadic observations (Defler, 1986; Peres, 1991; Strahl *et al.,* 1992; Aquino and Puertas, 1997; Silveira *et al.,* 1998; Silva Jr. and Soares, 1999; Barnett *et al.,* 2001; Zuercher, 2002; Beisiegel and Ades, 2004; Beisiegel and Zuercher, 2005; DeMatteo and Loiselle, 2008; DeMatteo *et al.,* 2011; Fusco-Costa and Ingberman, 2012). Classified as Near Threatened by the IUCN Red List of Threatened Species, it is considered to have suffered at least 25% populational decline, getting close to the threshold for the Vulnerable category (DeMatteo *et al.,* 2011). Further studies on ecology and research on its conservation status are needed.

Historically the species have been considered to range from Panama to Argentina, with some authors suggesting its occurrence also in some areas of Costa Rica on its border with Panama (de la Rosa and Nocke, 2010). However, such statement has no supporting observations or evidence, nor even precise locality descriptions, thus the species have not been included on the mammal lists of Costa Rica (Rodríguez- Herrera *et al.,* 2002, 2005, 2012*,* 2014). A recent paper on *Speothos venaticus* from Panama reported 11 new confirmed records in the country using camera-traps, also stating the absence of confirmed records from Costa Rica, but suggesting that it could potentially cross the border between both countries (Meyer *et al.,* 2015). Here we present the first confirmed record of the bush dog in Costa Rica expanding its elevation range and the current known limits of its distribution to the Northwest.

The Talamanca mountain range is located between Costa Rica and Panama, being the largest unfragmented forest in the country and one of the largest in Mesoamerica (González-Maya and Cardenal-Porras, 2011). The mountain range is currently largely sheltered under five protected areas, one protected zone, numerous indigenous reserves and private properties (González-Maya *et al.,* 2012). The study site is located within Las Tablas Protected Zone (LTPZ), in Finca Las Alturas, a 14,000 ha property mostly with primary forest, in the buffer zone of La Amistad International Park (González-Maya and Mata-Lorenzen, 2008). LTPZ is mainly dominated by Tropical Montane Forests (Holdridge, 1967), ranging from approximately 800 to 2,100 m. The annual precipitation is 3,500 mm in average and the mean temperature 27°C in the region (González-Maya and Mata-Lorenzen, 2008).

We carried out a survey using 47 camera-traps (Bushnell, 8M Trophy Cam 119456C, Bushnell Outdoor Products) between November 2015 and May 2016 in order to estimate occupancy patterns of medium and large-sized mammals in the area. Cameras were established covering the entire property, always on trails and old logging-roads, with a minimum distance of 1.5 km between stations; cameras were located at 30 to 50 cm above ground on a tree, and located in areas likely used by mammals (González-Maya *et al.,* 2012).

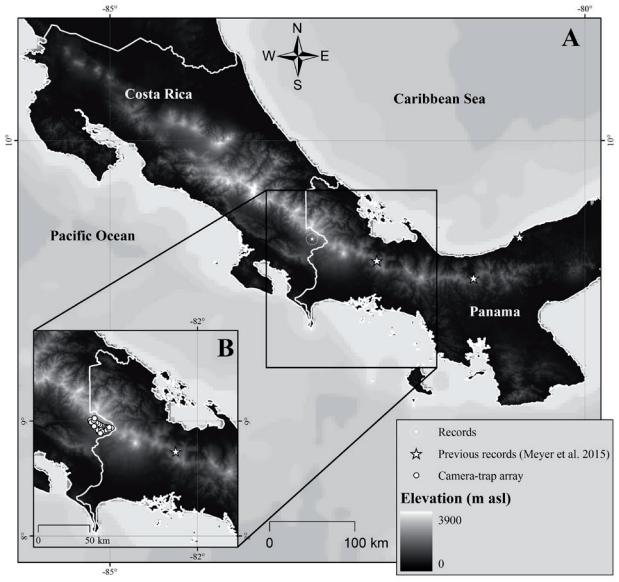

Figure 1. Location of the first confirmed records of the bush dog, *Speothos venaticus*, for Costa Rica. (A) location of records for Costa Rica and Western Panama and (B) camera array location in Costa Rica.

Among a total trapping effort of 5,640 trap-nights, covering 135.46 km^2 (Minimum Convex Polygon of the cameras), we obtained ~16,000 photographs of 23 mammal species, distributed in 7 orders and 14 families. In one of the camera-trap stations, located approximately 9.08 km from the border with Panama (8.96124 N, -82.87083 W, at 1,511 m; Figure 1), we obtained two independent photographic records of the bush dog (Figure 2). The first record was obtained on March 1, 2016, at 8h28 a.m., and included three individuals, apparently two adults and one juvenile (Figure 2A); the second record was also obtained on March 01, 2016, at 10h35 a.m., including only one individual (Figure 2B). The records were obtained in mature Montane Forest, located on an old-logging road crossing low intervened forest, approximately 600 m from the Bellavista river.

These two records are the first confirmed for the species in Costa Rica, increasing the number of confirmed carnivore species in the country to 25 (Rodríguez-Herrera *et al.,* 2014). Although these records do not expand considerably the range of the species, especially in proportion to the entire distribution, it does expand the range for about 65 km, into a new country and a new elevation. Previous records of the

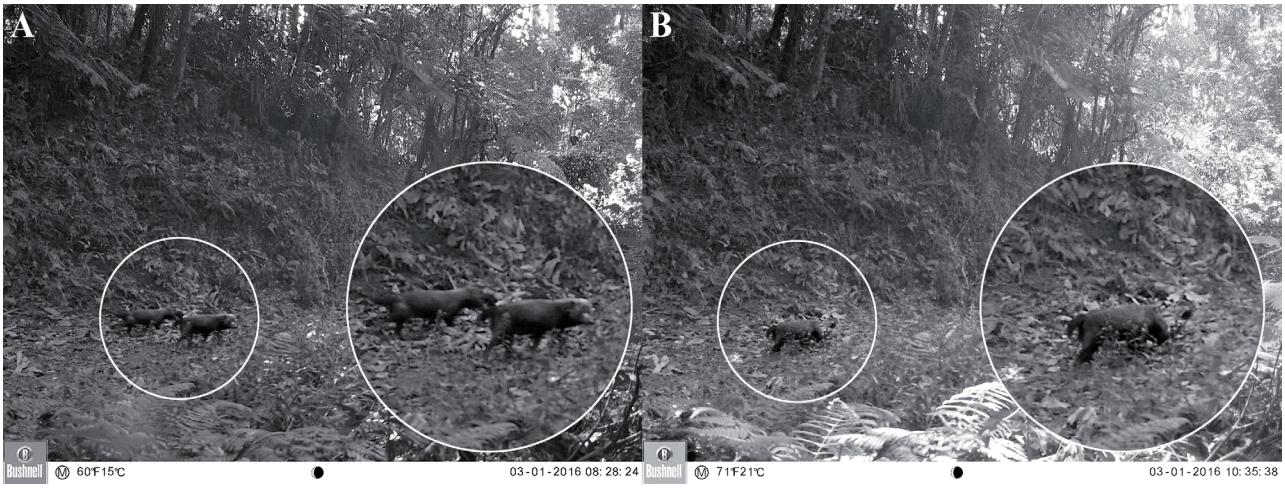

Figure 2. First confirmed records (A, B) of the bush dog, *Speothos venaticus*, for Costa Rica. Inset circles details the individuals.

species were generally obtained in lowlands, with the highest elevation recorded from museum collection reaching 600 m (M136285; American Museum of Natural History), while the highest record for Panama was at 620 m (Meyer *et al.,* 2015). There are accounts reporting the presence of the species at higher elevations (<1500 m) only for Bolivia (Anderson, 1997), constituting anecdotal records without confirmed evidence to date (Beisiegel and Zuercher, 2005; DeMatteo *et al.,* 2011). Thus, our records may represent the highest elevation for the species across its range.

PPrevious studies proposed the likely connection between habitats in Western Panama and Costa Rica, and the potential and historic presence of *Speothos venaticus* in the country, even indicating that the species "may still survive" in the country (de la Rosa and Nocke, 2010; DeMatteo *et al.,* 2011). To date, no confirmed, inferred or suspected records exist for the country, and the only one, mentioned in an outreach publication, has been erroneously carried through literature. Interestingly, even when the original publication does not include the type of evidence or a precise location, and is not even included on the published species' range map (de la Rosa and Nocke, 2010), some publications interestingly provide a precise location (DeMatteo and Loiselle, 2008), and some other mention the record, but does not include it on the range maps (De Matteo *et al.,* 2011). Nevertheless, we acknowledge the proximity of the closest record in Panama, which could lead to hypothesize the potential presence of the bush dog in Costa Rica. Furthermore, the Talamanca mountains, and specially the Pacific slope in which the study site is located, despite still showing a considerably good conservation status, has suffered from severe fragmentation in recent years and most forest patches are currently isolated longitudinally, with forest on this slope limiting at 1,500 m, being isolated from forested landscapes on the lowlands (González-Maya *et al.,* 2012; González-Maya *et al.,* 2014; González-Maya *et al.,* 2015). Thus, potential populations in the lowlands of the country are isolated from the present locality both within Costa Rica and Panama.

Our records increase the knowledge for the species and mammal fauna of the country, especially considering that this is the Northern- and Westernmost limits of its distribution, but also highlight the local rarity of the species. The species' rareness is not only based on the low frequency of detections among our survey (2 in over 16,000 events), but also in the fact that this is the first record despite our work with camera-traps for over 10 years in the area (González-Maya and Schipper, 2008; Schipper, 2010; González-Maya and Cardenal-Porras, 2011; González-Maya *et al.,* 2012). These unique records reinforce the idea of the cryptic behavior of this species. Furthermore, given the extensive deforestation of the Talamanca range, especially on the Pacific slopes where our records were obtained, and that most of the habitat in the range is located above 1,500 m, (González-Maya *et al.,* 2014; González-Maya *et al.,* 2012; González-Maya *et al.,* 2015), there is likely not many areas within Costa Rica where the bush dogs could occur. Hunting and deforestation can still be significant threats to the species, unless direct actions related with hunting control and connectivity are taken in the area. More focused and species-specific research seems warranted to further estimate the extent of occurrence of the species across this shared ecoregion. Conservation actions should be directed mostly considering the rareness and potential vulnerability of the bush dog in both countries.

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