

Short Communication

Records of the bush dog *Speothos venaticus* in a continuous remnant of coastal Atlantic Forest in southern Brazil

ROBERTO FUSCO-COSTA and BIANCA INGBERMAN

Abstract The bush dog *Speothos venaticus*, a rarely seen Neotropical canid categorized as Near Threatened globally, is categorized as Vulnerable in Brazil. In the Atlantic Forest occurrence data of this species are extremely rare. Here we document new records of the bush dog in four reserves in a large remnant of continuous coastal Atlantic Forest in Paraná state, southern Brazil. From a total of 4,112 trap days in two camera-trap surveys in 2009 and 2011 we obtained one opportunistic sighting and three independent photographic records of the bush dog. Additionally, park guards reported previous sightings (> 4 years earlier) in three of these reserves, including the reserve where we did not record the species. Our results indicate that the remnant coastal Atlantic Forest of Paraná state is an important region for the conservation of the bush dog in southern Brazil. Given the rarity of this species in its natural habitat we suggest that conservation efforts in this region should focus on minimizing the potential threats (prey depletion from poaching and disease transmission from domestic dog) to the species.

Keywords Atlantic Forest, Brazil, bush dog, camera trap, Paraná, *Speothos venaticus*

The bush dog *Speothos venaticus* occurs from Panama to southern Brazil and is naturally rare or difficult to observe in nature, making it one of the least known Neotropical canids (Ihering, 1911; Zuercher et al., 2004; DeMatteo & Loiselle, 2008; Oliveira, 2009). It is categorized on the global IUCN Red List as Near Threatened (DeMatteo et al., 2011) and as Vulnerable in Brazil, where the main threats are habitat loss and fragmentation, prey depletion from poaching, and transmission of disease from domestic dog (Oliveira & Dalponte, 2008). In the threatened Atlantic Forest (Myers et al., 2000) occurrence data for this species are extremely rare (Beisiegel & Zuercher, 2005; Beisiegel,

2009) and in southern Brazil are limited to a few records from > 15 years ago in the states of Santa Catarina (Ihering, 1911; Cherem et al., 2004) and Paraná (Margarido & Braga, 2004). Here, we document the occurrence of bush dogs in protected areas in a continuous remnant of coastal Atlantic Forest in Paraná using sightings and camera trapping, and reports from park guards.

As part of a project to examine the richness and distribution of medium- and large-sized mammals we have collected data on the occurrence of mammal species in four protected areas (in the category Reserva Particular do Patrimônio Natural) in the Área de Proteção Ambiental de Guaraqueçaba (Environmental Protection Area of Guaraqueçaba). This region lies in one of the largest continuous remnants of the Atlantic Forest in Brazil, connecting preserved forest areas across a coastal mountain range in the states of Paraná and São Paulo (Fig. 1). The four reserves are private areas comprising a total of 21,050 ha of forest on plains and hills (0–800 m altitude), monitored by park guards on a monthly basis. They are connected by a landscape of continuous forest where there are also small rural settlements close to the reserves. From March to September 2009 we placed camera traps on trails at 40 sites (500 m apart) in the 8,700 ha Reserva Natural Rio Cachoeira. We repeated this from April to October 2011, when we also surveyed the 3,300 ha Reserva Natural Morro da Mina, 6,650 ha Reserva Natural Serra do Itaqui and 2,400 ha Reserva Natural Salto Morato. In this second period we surveyed 46 sites (1.5–2 km apart), with camera traps installed both on and off trails (2,354 and 684 trap days, respectively; Table 1). Off-trail camera traps were installed on paths made by animals. All camera traps were installed 20–30 cm above the ground. Consecutive photos of the same species were considered independent records when the interval between them was at least 12 hours. Additionally, we gathered reports of observations of the bush dog from the park guards. Confirmation of species was by photographic identification and descriptions of morphological characteristics.

The surveys of 2009 and 2011 resulted in a total of one sighting and three photographic records of the bush dog, in three of the reserves (Fig. 1, Table 1). We saw three adult individuals in Reserva Natural Rio Cachoeira at 09.45 on 14 September 2009. They were moving on the opposite

ROBERTO FUSCO-COSTA (corresponding author) and BIANCA INGBERMAN Instituto de Pesquisas Cananéia and Universidade Federal do Paraná—Programa de Pós-Graduação em Ecologia e Conservação, Laboratório de Dinâmicas Ecológicas, Centro Politécnico, Jardim das Américas, Caixa Postal 19020, CEP 81531-970, Curitiba, Paraná, Brazil. E-mail rfusco79@yahoo.com.br

Received 7 January 2012. Revision requested 11 March 2012.
Accepted 26 March 2012. First published online 8 October 2012.

TABLE 1 Sample effort and records of bush dogs *Speothos venaticus* in four reserves in the coastal Atlantic Forest, southern Brazil (Fig. 1).

Reserve	Year	Camera sites	Camera trap days	Photographic records	Sightings
Rio Cachoeira*	2009	40	1,074	0	1
	2011	16	1,021	0	0
Morro da Mina*	2011	11	810	1	0
Serra do Itaquí	2011	12	782	2	0
Salto Morato*	2011	7	425	0	0
<i>Total</i>			4,112	3	1

*Reserves with previous sightings of bush dogs by park guards

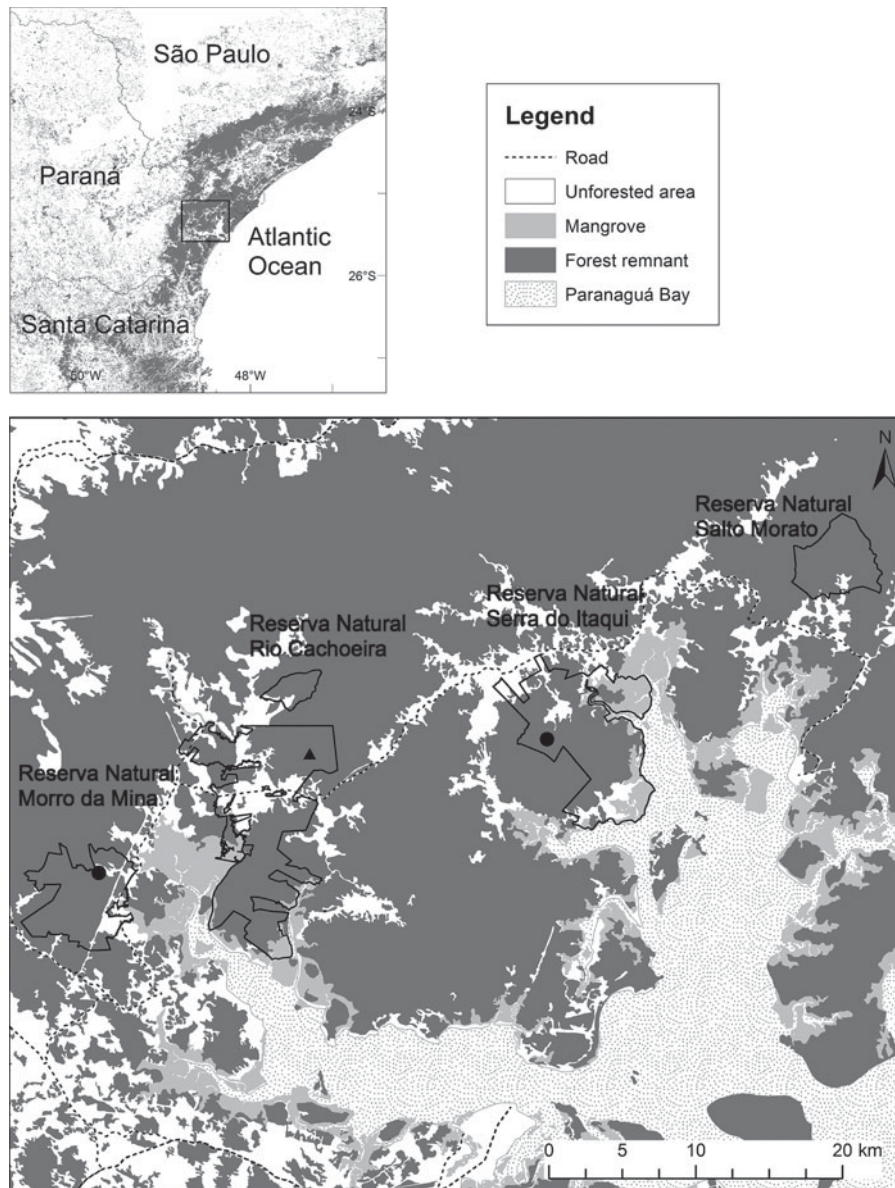


FIG. 1 The study area in a continuous remnant of coastal Atlantic Forest in Paraná state, southern Brazil (indicated by the rectangle on the regional map), with the location of the four reserves where surveys were conducted in 2009 and 2011. The black triangle and black circles indicate the locations of sighting and camera-trap records, respectively, of the bush dog *Speothos venaticus*.

margin of the Turvo River, at c. 5–8 m from us. That record was opportunistic, whilst we were walking the trails to remove our camera traps. In the same area park guards reported the sighting of a single individual in 2006 (J. Veiga & V. Veiga, pers. comm.).

The three photographic records were obtained between 07.00 and 11.00 at two sites on trails, parallel to and c. 50 m from a perennial river. In Reserva Natural Serra do Itaquí an adult individual was recorded on 2 consecutive days on 18–19 August 2011. In Reserva Natural Morro da Mina two



PLATE 1 Camera-trap photograph of bush dogs *Speothos venaticus* in Reserva Natural Morro da Mina, Paraná state, southern Brazil (Fig. 1).

adults were recorded (Plate 1) on one occasion on 6 October 2011. In all photographs the bush dogs were walking along trails. Despite our photographic records the park guards in Reserva Natural Serra do Itaquí reported no evidence of the species there. In Reserva Natural Morro da Mina two park guards reported a sighting of two bush dogs in 2004 (A. Gonçalves & A. Pinheiro, pers. comm.). In Reserva Natural Salto Morato we did not obtain confirmation by camera trapping that the bush dog is present, although a guard observed the species there in 2000 (P. Moraes-Filho, pers. comm.).

Lima et al. (2009) and Beisiegel (2009) recorded bush dogs crossing trails or roads but our photographic records indicate they also walk along trails. Our limited data support suggestions that the bush dog is diurnal (Beisiegel & Zuercher, 2005), moves or forages near water courses (Langguth, 1975; Zuercher et al., 2004) and is rarely observed (Ihering, 1911; Barnett et al., 2001; DeMatteo, 2008; Beisiegel, 2009; Michalski, 2010). Even using camera traps, which have been widely used to detect and study elusive species of mammals (O'Connell et al., 2011), the probability of detecting bush dogs seems to be extremely low. Studies reporting photographic records of the bush dog had a large sampling effort and a low capture success: Michalski (2010) 6,721 trap days, two records; Beisiegel (2009) 4,818 trap days, one record; our study 4,112 trap days, three records. With such limited data, including untested and potentially incorrect assumptions (e.g. constant detection probability across space and time, positive linear relationship between photographic capture rates and true abundance; O'Connell et al., 2011) it is difficult to make comparisons of occupancy or relative abundance between areas. Regardless of the method or the region studied, the difficulty of locating and studying the bush dog is presumed to be associated with a low population density, a large home range, and the secretive habits of the species (Zuercher et al., 2004; Beisiegel, 2009; Lima et al., 2009).

Our records and the previous sightings by park guards indicate that the bush dog occurs in the four reserves surveyed, and presumably throughout the forest within which these areas lie. This suggests that the coastal Atlantic Forest of Paraná is an important region for the conservation of this species, as this forest lies within one of the largest remnants of this biome and includes a number of protected areas and remote places that are difficult to access. However, there are potential threats (prey depletion from poaching and transmission of diseases from domestic dogs; DeMatteo, 2008; Oliveira, 2009) to the bush dog in the region, with evidence of hunting pressure and of the occurrence of domestic dogs within and outside the protected areas (Andriguetto-Filho et al., 1998; pers. obs.). Our results reinforce the importance of these four reserves, which bush dogs may be using as shelter for feeding and reproduction. Given the apparent rarity of this species we recommend that long-term efforts are taken to guarantee its conservation in this region, in particular the reduction of poaching and control of domestic animals. These recommendations have been passed to the managers of the reserves, who work with the environmental police to reduce threats to wildlife.

Acknowledgements

We thank the Fundação Grupo Boticário de Proteção a Natureza (FGBPN) for financing this research, Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental and FGBPN for granting authorization to work in the four reserves and providing encouragement and logistical support, the employees of the reserves, especially the park guards, for their contribution to our field work, and Emygdio L.A. Monteiro-Filho and two anonymous referees for helpful comments.

References

- ANDRIGUETTO-FILHO, J.M., KRÜGER, A.C. & LANGE, M.B.R. (1998) Caça, biodiversidade e gestão ambiental na Área de Proteção Ambiental de Guaraqueçaba, Paraná, Brasil. *Biotemas*, 11, 133–156.
- BARNETT, A., SHAPLEY, R. & ENGSTROM, M.D. (2001) Records of the bushdog, *Speothos venaticus* (Lund, 1842), from Guyana. *Mammalia*, 65, 232–237.
- BEISIEGEL, B.D.M. (2009) First camera trap record of bush dogs in the state of São Paulo, Brazil. *Canid News*, 12, 1–5.
- BEISIEGEL, B.D.M. & ZUERCHER, G.L. (2005) *Speothos venaticus*. *Mammalian Species*, 783, 1–6.
- CHEREM, J.J., SIMÕES-LOPES, P.C., ALTHOFF, S. & GRAIPEL, M.E. (2004) Lista dos mamíferos do estado de Santa Catarina, sul do Brasil. *Mastozoologia Neotropical*, 11, 151–184.
- DEMATTEO, K.E. (2008) Using a survey of carnivore conservationists to gain new insight into the ecology and conservation status of the bush dog. *Canid News*, 11, 1–8.
- DEMATTEO, K., LEITE-PITMAN, M.R.P. & MICHALSKI, F. (2011) *Speothos venaticus*. In *IUCN Red List of Threatened Species v. 2012.1*. [Http://www.iucnredlist.org](http://www.iucnredlist.org) [accessed 26 June 2012].

- DEMATTEO, K.E. & LOISELLE, B.A. (2008) New data on the status and distribution of the bush dog (*Speothos venaticus*): evaluating its quality of protection and directing research efforts. *Biological Conservation*, 141, 2494–2505.
- IHERING, H. (1911) Os mamíferos do Brasil meridional: Carnívora. *Revista do Museu Paulista*, 8, 147–272.
- LANGGUTH, A. (1975) Ecology and evolution in South American canids. In *The Wild Canids. Their Systematics, Behavioral Ecology and Evolution* (ed. M.W. Fox), pp. 192–206. Van Nostrand Reinhold Company, New York, USA.
- LIMA, E.D.S., PINTO, R.S., & DALPONTE, J.C. (2009) Habitat use and diet of bush dogs, *Speothos venaticus*, in the northern Pantanal, Mato Grosso, Brazil. *Mammalia*, 73, 13–19.
- MARGARIDO, T.C.M. & BRAGA, F.G. (2004) Mamíferos. In *Livro Vermelho da Fauna Ameaçada no Estado do Paraná* (eds S.B. Mikich, R.S. Bérnils & P.A. Pizzi), pp. 25–142. Secretaria Estadual de Meio Ambiente/Instituto Ambiental do Paraná, Curitiba, Brazil.
- MICHALSKI, F. (2010) The bush dog *Speothos venaticus* and short-eared dog *Atelocynus microtis* in a fragmented landscape in southern Amazonia. *Oryx*, 44, 300–303.
- MYERS, N., MITTERMEIER, R.A., MITTERMEIER, C.G., FONSECA, G.A.B.D. & KENT, J. (2000) Biodiversity hotspots for conservation priorities. *Nature*, 403, 853–858.
- O'CONNELL, A.F., NICHOLS, J.D. & KARANTH, K.U. (eds) (2011) *Camera Traps in Animal Ecology: Methods and Analyses*. Springer, New York, USA.
- OLIVEIRA, T.G. (2009) Distribution, habitat utilization and conservation of the Vulnerable bush dog *Speothos venaticus* in northern Brazil. *Oryx*, 43, 247–253.
- OLIVEIRA, T.G. & DALPONTE, J.C. (2008) *Speothos venaticus* (Lund, 1842). In *Livro Vermelho da Fauna Brasileira Ameaçada de Extinção* (eds A.B.M. Machado, G.M. Drummond & A.P. Paglia), pp. 783–784. Ministério do Meio Ambiente, Brasília, Brazil.
- ZUERCHER, G.L., SWARNER, M., SILVEIRA, L. & CARRILLO, O. (2004) Bush dog *Speothos venaticus* (Lund, 1842). In *Canids: Foxes, Wolves, Jackals and Dogs. Status Survey and Conservation Action Plan* (eds M. Hoffmann & C. Sillero-Zubiri), pp. 76–80. IUCN/Species Survival Commission Canid Specialist Group, Gland, Switzerland.

Biographical sketches

ROBERTO FUSCO-COSTA'S main research interests are wildlife ecology and conservation. Since 2003 he has been developing research on the ecology and conservation of mammalian carnivores in coastal areas of the Atlantic Forest of southern Brazil. He is currently investigating the occurrence and biogeography of threatened medium- and large-sized mammals in protected areas in this region. BIANCA INGBERMAN'S main research interests are ecology and species' conservation. For the past 10 years she has been developing research with primates and medium- and large-sized terrestrial mammals in the Atlantic Forest of southern Brazil.