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## Field Report

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# First camera trap record of bush dogs in the state of São Paulo, Brazil

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## Abstract

A picture of a bush dog *Speothos venaticus* pair was obtained with a minimum sampling effort of 4,818 camera days, using seven to ten camera traps during 922 days at Parque Estadual Carlos Botelho, an Atlantic forest site. This picture confirms the presence of the species in the state of São Paulo, Brazil.

## Article

Attempts to study bush dogs *Speothos venaticus* in the field have met limited success (Beisiegel 1999, DeMatteo et al. 2004, Lima et al. 2009) and only one study using radio-telemetry exists to this date (Lima et al., unpublished report). Camera trapping is an effective method of studying elusive mammals (Karanth et al. 2004). Since 2005 the carnivore community of Parque Estadual Carlos Botelho (PECB) in the state of São Paulo, Brazil, has been studied using camera traps and other methods. The PECB is located in one of the largest Atlantic forest remnants (Figure 1).

Thirteen carnivore species occur at the PECB, and a previous study using three camera traps (TM 500, Trail Master), over a two year period obtained pictures of five of them (crab-eating raccoon *Procyon cancrivorus*, puma *Puma concolor*, ring-tailed coati *Nasua nasua*, neotropical river otter *Lontra longicaudis* and ocelot *Leopardus pardalis* - Beisiegel 1999). In the current study, a continuous sampling effort using seven to ten camera traps (Tigrinus 4.0 C, Brazil) begun in May 2006. Camera traps were placed at 80 sites distributed within ca. 1,700ha of continuous forest. The total sampling effort from the beginning of the study until November 2008 was 7,417 camera days. Due to camera failures or delays in replacing films or batteries, the sampling was not effectively continuous. A minimum sampling effort of 4,818 camera days can be estimated as the sum of the intervals between each camera placement in a given site and the last picture obtained by this camera. A picture of a pair of bush dogs was obtained on 29 October 2008, at 12:27h (Figure 2), approximately 50m from the site where several bush dog sightings occurred in 1995 (Site A in Beisiegel and Ades 2004).

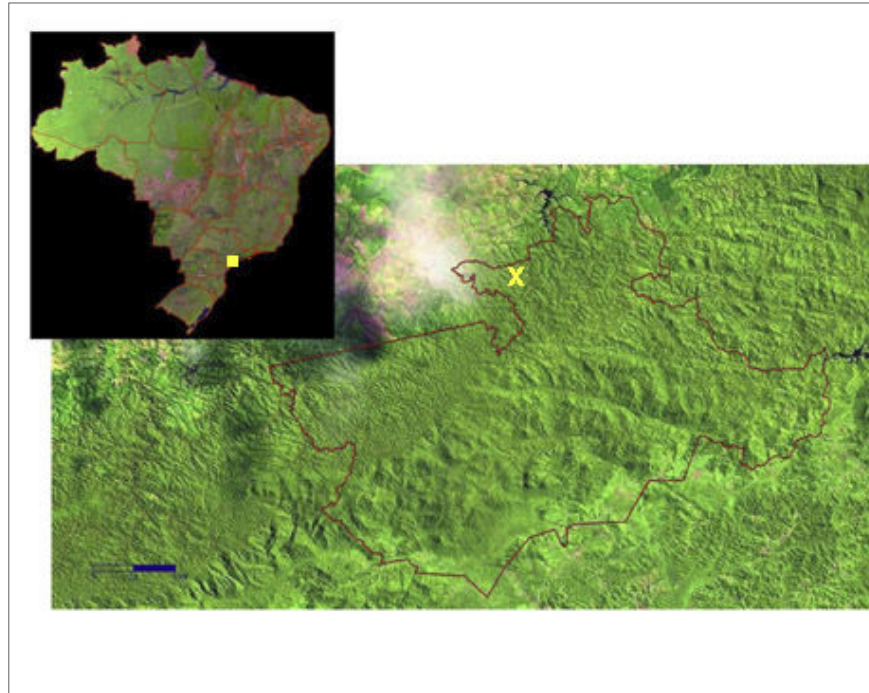


Figure 1. Location of Parque Estadual Carlos Botelho in Brazil (yellow square), and PECB contour showing the site where the picture was obtained (yellow X). Images are Landsat -TM and ETM mosaic, Embrapa 2004.

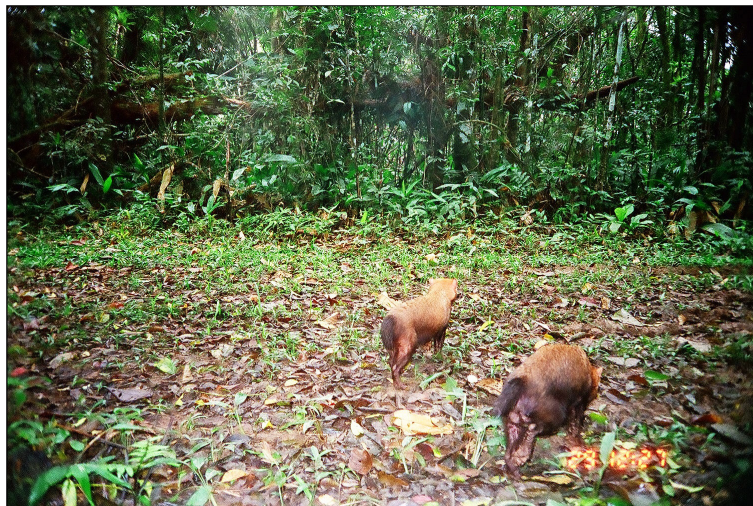


Figure 2. Camera trap picture of bush dogs at Parque Estadual Carlos Botelho on 29 October 2008.

Camera traps have been kept almost continuously on this site since May 2006, with a minimum sampling effort of 719 camera days. The camera was placed at an internal road and, unlike most carnivores which were pictured at the site following this road, the two bush dogs appear to be crossing it, supporting the assumption of Lima et al. (2009) that they avoid walking along roads.

Twenty-nine mammal species could be identified from 1,453 pictures obtained. Twenty-four of these species were recorded in the first year of the study and only five in the subsequent period. All carnivore species present at the PECB, except the neotropical river otter, were captured by camera traps in this study; bush dogs were the last mammal species

captured (Table 1), and five of the medium and large terrestrial and scansorial mammals known to occur at the PECB have yet to be captured: white-lipped peccary *Tayassu pecari*, tapeti *Sylvilagus brasiliensis*, seven-banded armadillo *Dasyus septemcinctus*, southern tamandua *Tamandua tetradactyla*, and orange-spined hairy dwarf porcupine *Sphiggurus villosus*.

Although population density is only one of the determinants of sampling success in camera trap studies (Tomas and Miranda 2004, Rowcliffe et al. 2008), it may be suggested that very low population densities, possibly associated with large home range areas, must explain the low sampling success for bush dogs and the null sampling success for the white-lipped peccary, while inadequate sampling of their preferred habitats, probably associated with low population densities, may be responsible for the low or null sampling success of arboreal, semi-fossorial or open habitat species such as the southern tamandua, greater naked-tailed armadillo *Cabassous tatouay*, tapeti and seven-banded armadillo.

This is the first camera trap picture of bush dogs within the state of São Paulo and, to my knowledge, the first from within the Atlantic forest. This result emphasizes (1) the intensive sampling effort and long time needed to study bush dogs through camera trapping; (2) bush dogs have large home ranges (Lima et al., unpublished report), and they may use some routes repeatedly to travel through these ranges, as indicated by the repetition of records of the species at the same site despite the long time lapse; this possibility should be considered when planning studies of this species, for instance by keeping long term samplings by camera traps in the sites where sightings and tracks of the species are reported; (3) the importance of the PECB and its surrounding areas, the Alto Paranapanema and Ribeira Valley region, to the conservation of Atlantic forest fauna. This region includes 4,500km<sup>2</sup> in protected areas and its mammalian fauna is still complete (Vivo and Gregorin 2001). This situation is rare, if not unique, for the Atlantic forest. It is possible that bush dog groups range through most of this area, which is highly threatened by illegal poachers, palm harvesters, and by the occupation by indigenous people and other human dwellers. Further, the region experiences encroachment by

activities which may conflict with conservation, such as mining and diverse monocultures.

Bush dogs are listed as Data Deficient within the state of São Paulo (São Paulo 2008), but arguably this classification is not appropriate for the species. The Guidelines for using IUCN categories and criteria (IUCN 2008) stresses that "precise information on scarce taxa is usually lacking" and that "all data available must be used in full when making a red list assessment". There is a dearth of information on the distribution and population of bush dogs in São Paulo state; the only published records of the species are at the PECB (Beisiegel and Ades 2004) and their occurrence is suspected in the adjacent Parque Estadual Intervalles (Vivo and Gregorin 2001). These areas are situated at the Alto Paranapanema and Ribeira Valley region, suggesting that the present distribution of the species is restricted to this region (< 5,000m<sup>2</sup>). Due to the very large sampling effort required to record bush dogs, it also is possible that they are present in the largest Atlantic forest park in the state, the Parque Estadual da Serra do Mar (3,154km<sup>2</sup>) which is adjacent to the Vale do Ribeira and Alto Paranapanema region. Even with this, its extent of occurrence would still be <20,000km<sup>2</sup>. Additionally, although they are not subjected to direct poaching pressure or human-wildlife conflicts (DeMatteo 2008) bush dogs are suffering continuous habitat loss and degradation due to the threats described above. I would therefore argue that there is enough evidence for listing bush dogs in the state of São Paulo as VU B1ab (if assuming that they also occur at the Parque Estadual da Serra do Mar) or EN B1ab (if occurring only in the Alto Paranapanema and Ribeira Valley region).

Bush dogs are classified as Near Threatened by the IUCN due to very low population densities across a large range (Zuercher et al. 2008). However, within this range there is great variation in the extent of protected areas, exposure to threats such as diseases transmitted by domestic animals and human encroachment (see DeMatteo and Loiselle 2008, Jorge 2008, Oliveira 2009), and therefore the species conservation status also varies across its geographical range.

Table 1. Mammal species identified from camera trap records at Parque Estadual Carlos Botelho, Brazil, from May 2006 to November 2008, sampling time required to obtain the first picture since the beginning of the study, and number of pictures obtained.

Species	Sampling time (days to 1 <sup>st</sup> photo)	Number of photos* (over entire sample period = 922 days)
<i>Mazama americana</i>	3	85
<i>Leopardus pardalis</i>	4	45
<i>Metachirus nudicaudatus</i>	5	7
<i>Philander frenata</i>	11	72
<i>Sciurus ingrami</i>	19	18
<i>Procyon cancrivorus</i>	23	27
<i>Panthera onca</i>	30	20
<i>Tapirus terrestris</i>	30	161
<i>Cerdocyon thous</i>	31	17
<i>Eira barbara</i>	62	10
<i>Chironectes minimus</i>	72	3
<i>Leopardus wiedii</i>	73	7
<i>Lepus europaeus</i>	75	22
<i>Puma concolor</i>	77	72
<i>Nasua nasua</i>	114	9
<i>Cuniculus paca</i>	131	29
<i>Dasypus novemcinctus</i>	134	2
<i>Dasyprocta azarae</i>	184	2
<i>Didelphis aurita</i>	192	100
<i>Mazama gouazoubira</i>	195	1
<i>Myrmecophaga tridactyla</i>	220	17
<i>Pecari tajacu</i>	288	4
<i>Puma yagouaroundi</i>	308	4
<i>Cabassous tatouay</i>	345	1
<i>Galictis cuja</i>	451	2
<i>Monodelphis scalops</i>	645	1
<i>Didelphis albiventris</i>	779	1
<i>Leopardus tigrinus</i>	837	4
<i>Speothos venaticus</i>	891	1

\* all pictures of the same species taken in a site in a 10min. interval were considered as one photo

With its high human density and habitat fragmentation, the state of São Paulo may be one of the areas where the future of bush dogs is most endangered.

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