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Records of the bush dog (*Speothos venaticus*) in Central Amazonia, Brazil

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The bush dog (*Speothos venaticus*) is a small Neotropical canid. Although its distribution covers the entire Amazon basin, the occurrence of bush dogs in vast areas of the Amazon remains hypothetical. The records of bush dogs presented in this study reduce a large gap in the known distribution of the species in Central Amazonia and include the 1st documentation of the species from forest seasonally flooded by black water (*Igapó*).

O cachorro-vinagre é um canídeo Neotropical de pequeno porte. Apesar de sua distribuição cobrir toda a Bacia Amazônica, existem apenas alguns registros da espécie neste bioma. Portanto, a ocorrência do cachorro-vinagre permanece hipotética em vastas áreas da Amazônia. Os registros de cachorro-vinagre apresentados neste trabalho reduzem uma enorme lacuna dentro da área de distribuição conhecida para a espécie na Amazônia Central, e incluem a primeira documentação da espécie em floresta sazonalmente alagada por águas pretas (Igapó).

Key words: Amazon, bush dog, camera trap, occurrence, *Speothos venaticus*

The bush dog (*Speothos venaticus*) is a small Neotropical canid, weighing 4–7 kg, that ranges from Panama to northern Argentina (Beisiegel and Zuercher 2005). The species is currently categorized as Near Threatened on the IUCN Red List of Threatened Species (Dematteo et al. 2011). In Brazil, the bush dog is in the official list of threatened species (MMA 2003) and was classified as Vulnerable in the most recent assessment on the species' status (Jorge et al. 2013). The main threats are habitat loss, reduction of prey abundance, and the increasing risk of diseases transmitted by domestic dogs (DeMatteo and Loiselle 2008; Oliveira 2009; Dematteo et al. 2011). The bush dog's status, distribution, and ecology are still poorly understood because of the species' elusive behavior, naturally low density, and large home range (Zuercher and Villalba 2002; Lima et al. 2009, 2015; Michalski 2010). However, there have been some important advances in the knowledge about the species over the last few years (Fernandes-Ferreira et al. 2011; Lima et al. 2012, 2015).

Although the bush dog's distribution covers the entire Amazon, there are few records in this biome (DeMatteo and Loiselle 2008; Oliveira 2009). This may be due in part to the ecological features of the species, such as naturally low density and secretive behavior (Zuercher and Villalba 2002; Beisiegel 2009; Lima et al. 2009), but probably also reflects the logistic difficulties of sampling in the Amazon. Even though the Brazilian Amazon is in the middle of the bush dog's distribution, most reported locations for the species are on the borders of the biome (DeMatteo and Loiselle 2008; Oliveira 2009). Therefore, most of the area of occurrence of the species remains hypothetical (Terborgh et al. 1984). The only reported records of the bush dog in Amazonas State are in the Amazônia National Park (Zuercher et al. 2004), Jaú National Park (Jorge et al. 2013), and Campos Amazônicos National Park (ICMBio 2011; Fig. 1). There are also some imprecise reports of bush dogs from the Negro (Coimbra-Filho 1972), Juruá, Tefé, Urucu, and Purús Rivers (Peres 1991).

Materials and Methods

The records gathered in this study come from 2 camera trap surveys conducted in Amanã Sustainable Development Reserve (2°21′S, 64°16′W) located between the Negro River and the Amazon Rivers, in Central Amazonia (Fig. 2). The Reserve covers 2,350,000 ha of pristine habitat and together with the Jaú National Park (2,367,000 ha) to the east and the Mamirauá Sustainable Development Reserve (1,124,000 ha) to the west,

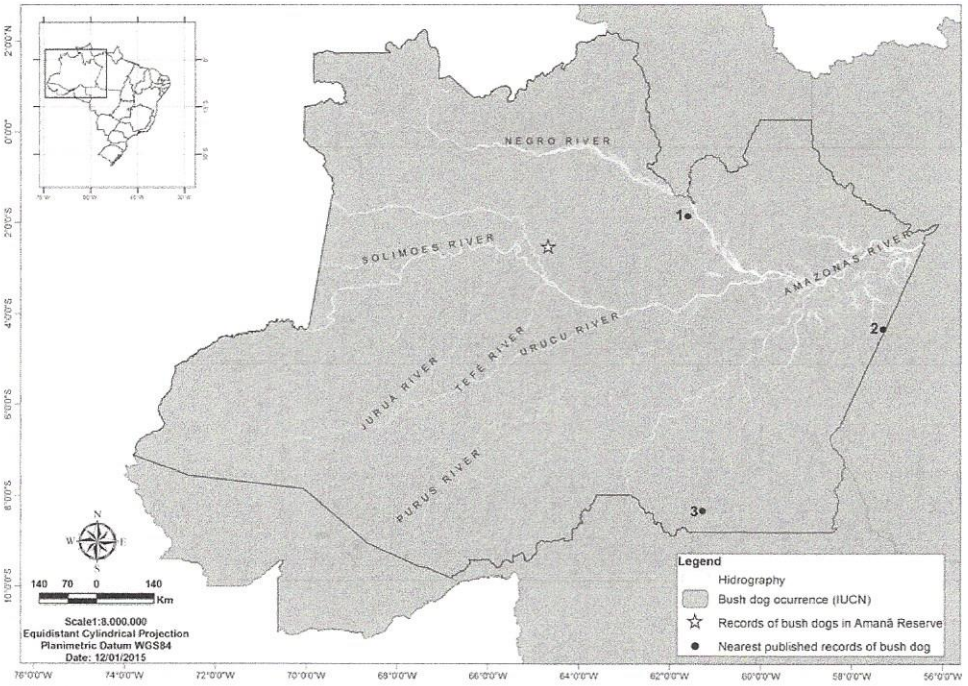

Fig. 1.—Map with records of bush dogs in the Amazonas State, Central Amazonia, Brazil. 1—Jaú National Park (Jorge et al. 2013); 2—Amazônia National Park (Zuercher et al. 2004); 3—Campos Amazônicos National Park (ICMBio 2011).

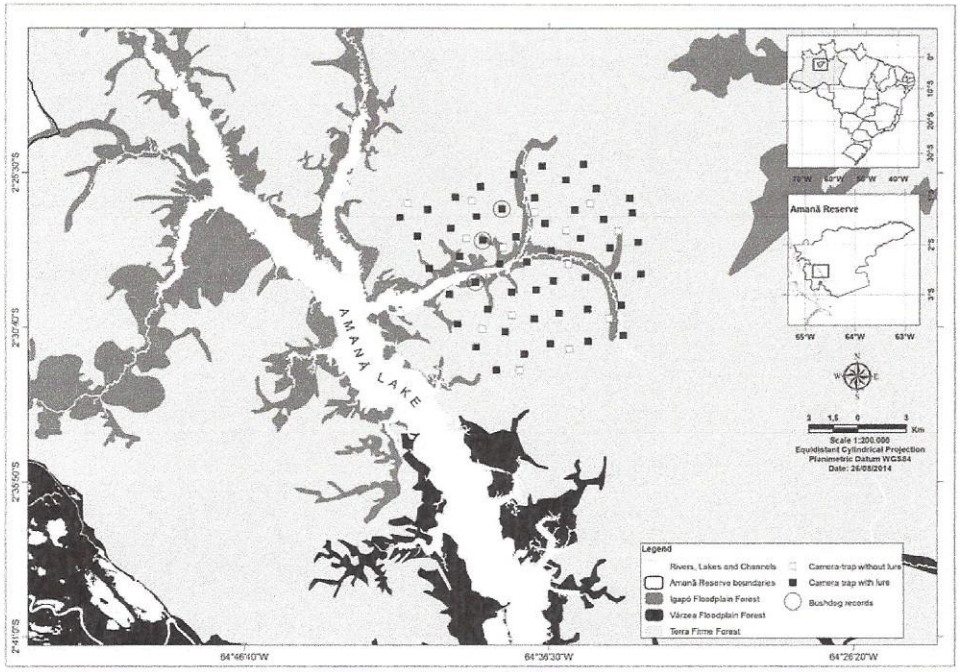

Fig. 2.—Map of the study site with camera trap stations and locations of bush dog records in Amanã Sustainable Development Reserve.

forms one of the largest continuous blocks of protected tropical forest in the world and the core of the Amazon Biosphere Reserve. The survey area was composed of a mosaic of *Terra Firme* Forest and *Igapó* Floodplain Forest. *Terra Firme* is the predominant habitat, covering approximately 84% of the Reserve, and includes all nonfloodable habitats. *Igapó* forests are seasonally flooded by black-water rivers. The climate in the region is tropical humid, with average monthly temperatures around 26°C and an average annual precipitation of 2,373 mm (Ayres 1993).

Data were collected in 2 consecutive camera trap surveys conducted during the dry season (when the water level in the region is low) on the edge of Amanã Lake. Surveys were carried out from January to March 2013 and from December 2013 to April 2014 in a combined sampling effort of 4,894 camera traps × days. In the 1st year, the survey grid had 50 camera trap

stations, 1.7–2 km apart, covering an area of 140 km^2 (minimum convex polygon). Each camera trap station was composed of 2 camera traps (model PC 800 Hyperfire, Reconyx Inc., Holmen, Wisconsin), facing each other 4–5 m apart with a lure of fresh sardine and eggs placed in the center. Lures were refreshed every 2 weeks. In the 2nd year, 14 camera trap stations were added to the grid, without the lure, making the camera trap density higher, 1–2 km apart, but not altering the sampled area (Fig. 2). Camera trap stations were installed on natural paths made by animals with the exception of 3 that were installed on human trails (about 5 km long, 2–3 m wide, and regularly maintained).

Results

We recorded bush dogs in 3 independent events at 3 different camera trap stations (Fig. 2). The 1st record was a pack of at least 5 individuals in February 2013 at 10:20 h (2°27′46.116″S/64°38′42.180″W). The 2nd was of 1 individual in December 2013, at 07:20 h (2°26′42.576″S/64°38′03.804″W; other individuals were possibly present in the background due to movements of vegetation but could not be confirmed). These 2 records were made in the *Terra Firme* forest close to small streams. The 3rd record was of 2 males in the *Igapó* portion of the grid in January 2014, at 09:40 h (2°29′09.528″S/64°38′56.184″W), 100 m from a major tributary (80 m wide) of Amanã Lake (Fig. 3). All records were obtained in stations with lures, away from human trails and > 7 km away from human settlements. Bush dogs spent less than 10 s in front of the cameras. Other mammalian carnivores photographed during this study were jaguar (*Panthera onca*), puma (*Puma concolor*), ocelot (*Leopardus pardalis*), margay (*L. wiedii*), tayra (*Eira barbara*), coati (*Nasua nasua*), and domestic dog (*Canis familiaris*). The bush dog was the only wild canid photographed.

Discussion

Although local people had reported the occurrence of the bush dog in Amanã reserve and a track that could have been from a bush dog was found during a line-transect survey of the area a few years ago (J. V. Amaral, Instituto de Desenvolvimento Sustentável Mamirauá, pers. comm.), this is the 1st undeniable evidence of bush dog occurrence in the region. To our knowledge, this is the 1st time the bush dog has been recorded in *Igapó* floodplain forest.

Our data corroborate bush dog behavior described in other studies. Records occurred in the morning indicating diurnal activity and bush dogs were moving in groups (Kleiman 1972; Beisiegel and Zuercher 2005; Lima et al. 2012). Lima et al. (2009) suggested that bush dogs avoid walking along roads. In this study none of the records occurred on camera traps placed on human trails. The large survey effort and low capture rate highlight the challenge of detecting bush dogs due to their naturally low density. Similar efforts generated similar results in other studies in a fragmented landscape in southern Amazonia (Michalski 2010) and in an area of continuous Atlantic forest in southwest Brazil (Beisiegel 2009). There are no accurate estimates of the density of bush dogs. However, based on their large home ranges (Beisiegel 2009; Lima et al. 2009, 2015) and the low frequency of registers in camera traps, they are assumed to occur at very low densities. If camera traps reflect the frequency of use of the area by bush dogs, there must be less than 1 group for several hundred square kilometers in our study site.

Information about bush dog distribution, habitat use, and preferences are crucial to formulate conservation strategies for the species (Sillero-Zubiri et al. 2004). Since bush dogs are rarely seen or hunted in the Amazon (Dematteo 2008), we consider that understanding their ecology and the impact of diseases transmitted from domestic dogs are research priorities in Central Amazonia.

Fig. 3.—Two male bush dogs photographed by camera traps in Amanã Sustainable Development Reserve, in January 2014.

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