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MICO HUMERALIFER ROADKILL IN THE AMAZON NATIONAL PARK, BRAZIL

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José Santos Nascimento Filho

Introduction

Roads can have a negative impact on wildlife (Forman and Alexander, 1998; Laurance *et al.*, 2009) and when these roads cross protected areas, such as in the Amazon National Park, they can cause a considerable impact on populations (Gumier-Costa and Sperber, 2009; Murali Krishna *et al.*, 2013). Primate roadkill has rarely been recorded because the concern for monitoring fauna roadkill has developed only recently in Brazil (Cáceres *et al.*, 2010; Garbino, 2011; Gumier-Costa and Sperber, 2009; Secco and Bager, 2014).

The tassel-eared marmoset (*Mico humeralifer*) is a neotropical primate in the Callitrichidae family. Its occurrence is restricted to the Amazon, in the area south of the Amazon River and west of the Tapajós River, in the States of Pará and Amazonas. In this area between rivers, their presence is registered in three major conservation units: one with full protection, the Amazon National Park; and two for sustainable use, the Tapajós-Arapiuns Extractive Reserve and Amana National Forest. *Mico humeralifer* was categorized as of "least concern" (LC) in the latest assessment of threatened species (Buss and Ravetta, 2015).

The Amazon National Park has 1,084,895 ha and is situated in western Pará State (Figure 1a). It is transected by the Trans-Amazonian Highway (BR-230) in the Itaituba – Jacareacanga stretch, which is unpaved, 112 km long, and has little vehicular traffic (Brusnello *et al.*, 2010). The Park had its boundaries amended by Law number 12 678 of June 25, 2012 (Brazil, 2012). One of the objectives of this amendment was to enable the construction of the São Luiz Hydropower Plant (UHE), which will cause flooding in the southern part of the Park reaching stretches of the BR-230 highway (Fig. 1a). In addition to all the negative impacts related to habitat alteration, this venture should cause an increase in vehicle traffic on BR-230. Despite the existence of the highway and considering the rich fauna of primates in the Amazon National Park (Branch, 1983), there are no published record of primates run over by vehicles in the area (Brusnello *et al.*., 2010).

Observations and discussion

In August of 2010, we found a male tassel-eared marmoset (*Mico humeralifer*) (Fig. 1b) that died from being run over on the BR 230 Trans-Amazonian Highway, inside the Amazon National Park in Itaituba, PA (04031'26.1"S and 56018'2.2"W-Datum SAD69). Other marmosets were on the same road, at a distance of approximately 70 m from the dead marmoset during its removal by the researchers (Fig. 1c).

Biological material (fur and muscle samples) and some biometric data were collected from the dead marmoset and sent to the National Center for Research and Conservation of Brazilian Primates (CPB/ICMBIO). The animal was deposited in the Emilio Goeldi Museum, in Belém (PA). The animal's biometric data were: 130.68 g weight, 550 mm total length, 220 mm head-body length, 330 mm tail length, and 145 mm chest circumference. The low weight of the

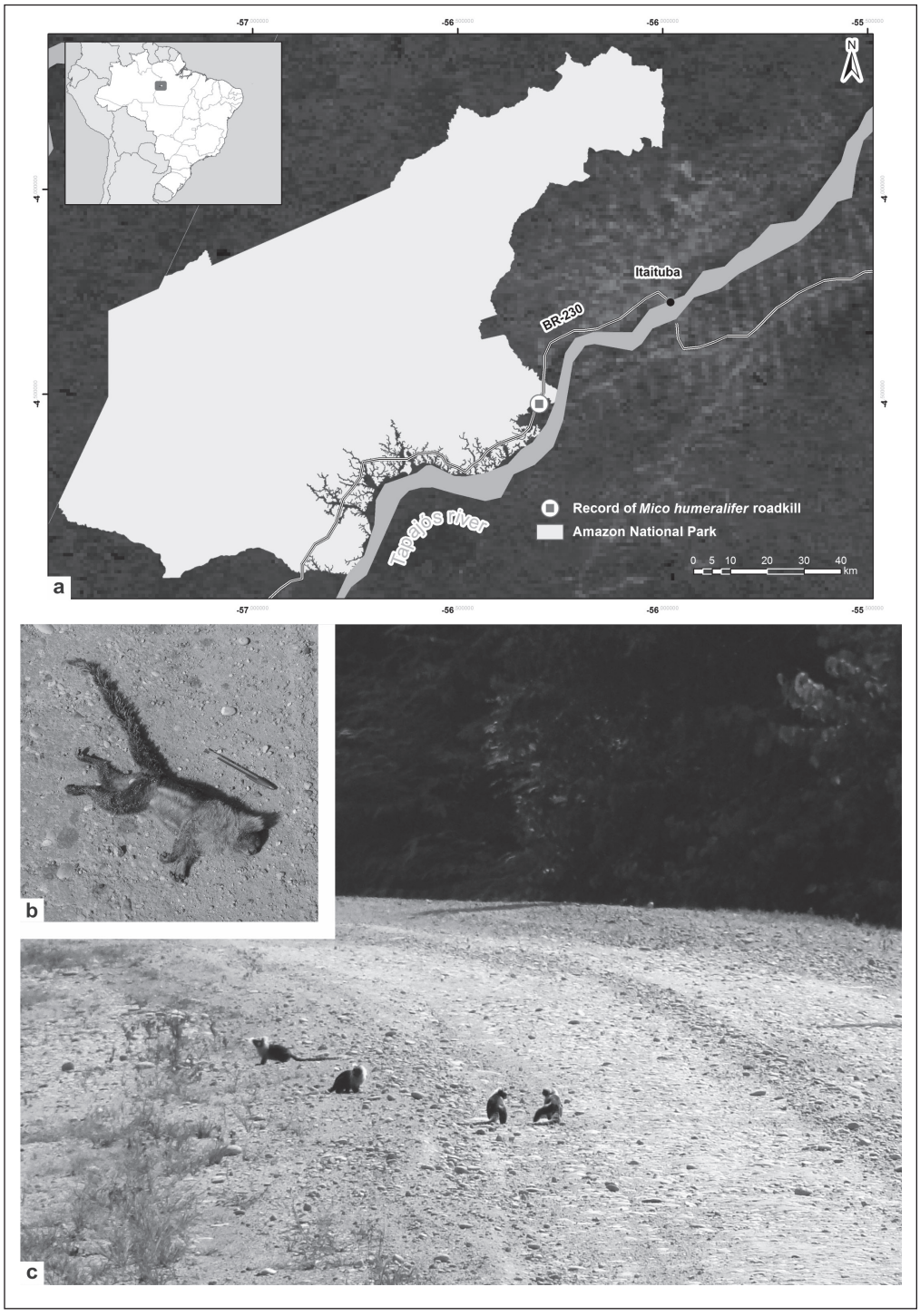

Figure 1. a) Location of the roadkill site of tassel-eared marmoset (*Mico humeralifer*) in the Amazon National Park, Itaituba (PA); b) *Mico humeralifer* trampled inside the Amazon National Park, BR-230; c) Group of *Mico humeralifer* on the edges of the BR-230 highway.

studied animal may indicate young age because the average adult weight is 475 + 42 g (Muniz *et al*., 1986). The relative length measurements are within the limits known for the species (200 to 270 mm head-body length and 310 to 370 mm tail length, n = 10) (Ferrari, 2008).

One of the factors that may lead groups of marmosets to cross the highway is the search for food, which is a determinant of their behavior (Oates, 1987; Lambert, 1998). The availability of water and overnight shelters also contribute to highway crossings, exposing these animals to the risk of roadkill. Road crossings are reinforced by the preference of marmosets for areas of secondary forest (Branch, 1983; Rylands and Mittermeier, 2013) because the vegetation on the edge of the road is attractive to the species. Although factors suggest that marmosets could be victims of road accidents, there have been no previous records in the Amazon National Park of trampled marmosets or primates in general, particularly in the road stretch reported here. This lack of records may be related to factors such as the low flow of

vehicles, unpaved road, weak tracking activity of accidents, and high rate of carcass removal by scavengers and carnivorous species.

Considering the impact that highways can have on primates, roadkill is the second most cited impact by specialists because of its potential to adversely affect the local abundance of a species living close to a highway area (Secco and Bagger, 2014). Fauna roadkill incidents in the Amazon National Park can be expected to intensify due to a considerable increase in traffic that should occur with the construction of the São Luiz Hydroelectric Plant. The planned construction of new road sections, related to the formation of the hydroelectric lake, could also strongly impact the primate community. In the Carajás National Forest, for example, Gumier-Costa and Sperber (2009) recorded the roadkill of primates such as *Saguinus* sp., *Alouatta* sp., and *Cebus apella* in a stretch of just 25 km of a paved road with a high flow of vehicles. Therefore, the development of continuous monitoring of roadkill incidents in the BR-230 highway in the Amazon National Park is necessary from the beginning of the hydroelectric plant construction. This monitoring system will contribute to proposed mitigating measures for the impact of increased regional traffic on local wildlife.

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