



A new population of the endangered *Brachyteles arachnoides* (É. Geoffroy, 1806) (Primates: Atelidae) in the state of Paraná, southern Brazil

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Abstract: The endangered southern muriqui or mono [*Brachyteles arachnoides* (É. Geoffroy, 1806)], is a primate endemic to the Atlantic Forest of Brazil. One known extant population is found at the southern limit of its distribution, in the state of Paraná, where it is regionally classified as Critically Endangered. Here, we report on a new population in southern Brazil. Additionally, we express our concern about the conservation status of this species in Paraná, because both populations are in small, isolated and unprotected forest fragments.

Key words: southern muriqui; occurrence record; Atlantic Forest; conservation; fragmentation

The largest New World primate is the endangered muriqui, genus *Brachyteles* Spix, 1823, endemic to the Atlantic Forest of Brazil (Aguirre 1971; Nishimura et al. 1988). This biome is also one of the most endangered in the world (Myers et al. 2000), with only ca. 12% of its original area remaining, scattered among many fragments that vary in size (Ribeiro et al. 2009). The two recognized species of muriqui are the northern muriqui, *Brachyteles hypoxanthus* (Kuhl, 1820) and the southern muriqui, *B. arachnoides* (É. Geoffroy, 1806) (Lemos de Sá et al. 1990; Rylands et al. 1995; Groves 2001). *Brachyteles arachnoides* is threatened due to habitat loss and poaching and is classified as "Endangered" by the IUCN (Mendes et al. 2008). The historical geographic distribution of *B. arachnoides* included the states of Rio de Janeiro, São Paulo and Paraná (Aguirre 1971; Groves 2001; Koehler et al. 2002; Cunha et al. 2009; Ingberman et al. 2016). Today, the southern muriqui is still found in

these states, but the distribution is much more restricted, fragmented and poorly known. Its presence in the state of Paraná was suggested by Krieg (1939 *apud* Hill 1962: 357), who stated that "... the range extends southwards beyond the Rio Ribeiro (i.e., Rio Ribeira de Iguapec) into the northern part of the state of Paraná...". Subsequently, Aguirre (1971) and Martuscelli et al. (1994) also affirmed its presence in Paraná. Nonetheless, these affirmations remained unsupported due to the lack of voucher material. Recently *B. arachnoides*, locally called mono in Paraná, was seen in the municipality of Castro (24°58'06.2" S, 049°38'30.5" W, Koehler et al. 2002). Due to the lack of information, *B. arachnoides* is regionally classified as Critically Endangered (Margarido and Braga 2004). Here, we report finding a new population of *B. arachnoides* as the second confirmed population in the state of Paraná.

In June and July 2008, we interviewed seven residents in the region in which the mono was most likely to be found (municipalities of Castro, Cerro Azul and Doutor Ulysses, Figure 1). During the last 100 years, this region has suffered extensive deforestation due to agriculture and now has several isolated forest fragments in a landscape of crops, pasture and extensive plantation of *Pinus* spp. (Pereira and Scrocucco 2010). The interviews were aimed at finding remnant mono populations. Through the interviews, monos were suggested to be present in five forest fragments, although some sightings were more than 20 years prior to the interviews. In several interviews, it was also suggested that at the Fazenda Olho d'Água currently has monos.

Based on information obtained in the interviews, we organized a field expedition in the area where monos

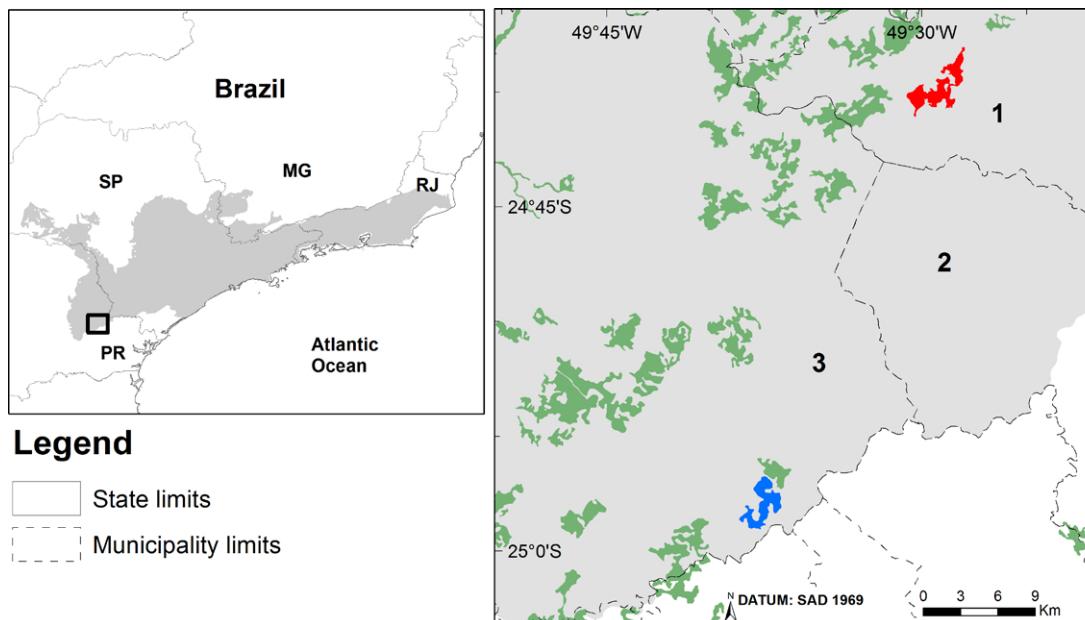
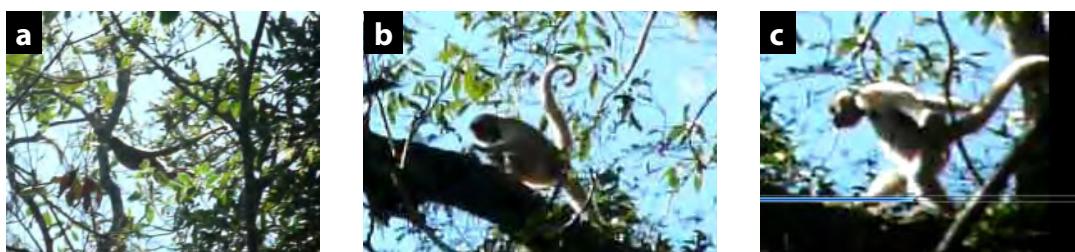


Figure 1. Location of the area (square on insert map) with the historical geographic range of *Brachyteles arachnoides* (gray area), based on species distribution modeling by Ingberman et al. (2016), and current forests fragments (green) in the state of Paraná, southern Brazil. The Fazenda João Paulo II is shown in blue and the location of the new population, Fazenda Olho D'água, is shown in red. Numbers indicate the municipalities of: **1** – Doutor Ulysses, **2** – Cerro Azul, and **3** – Castro. Abbreviations of Brazilian states: MG – Minas Gerais, RJ – Rio de Janeiro, SP – São Paulo, PR – Paraná.

were expected to be. After ~90 min of searching in the Fazenda Olho d'Água ($24^{\circ}40'13''S$, $049^{\circ}30'16''W$; Figure 1) at 11:28 a.m. we saw three monos traveling in the canopy (Figure 2). While the interviewee indicated that there were many individuals, we only saw and videoed those three individuals, but we heard others nearby and so were unable to count all members of the group. We clearly identified the species as *B. arachnoides* based on morphology and coloration (yellowish-brown pelage, protruding abdomen, long prehensile tail, large body size, elongated limbs), locomotor and postural behaviour (brachiation and bipedalism; Hill 1962; Nishimura et al. 1988; Figure 2) and also because no other local primates resemble the mono. The other two sympatric primates, brown howler monkey *Alouatta guariba clamitans* and the capuchin monkey *Sapajus nigritus*, are darker, smaller with roughly equal limb lengths and they do not brachiate. We also recognize that these individuals could only have been *B. arachnoides* (and not *B. hypoxanthus*) because, while we did not clearly see the vestigial or absent thumb or the entire

black or pink mottled face (cf. Lemos de Sá et al. 1990) that clearly identify the species, we were outside of *B. hypoxanthus* range and more than 500 km south of the nearest reported population (Groves 2001; Ingberman et al. 2016). Therefore we conclude that the observed individuals were *B. arachnoides*.

This new population of mono is approximately 37 km NE of the other known population in Paraná (Fazenda João Paulo II, Figure 1), in a ~700 ha forest fragment (Fazenda Olho d'Água). The population in Fazenda João Paulo II, found in 2002 (Koehler et al. 2002), is at least 14 years old and seems to be stable where reproduction has been observed (Koehler et al. 2005; Ingberman et al. 2009). This newly identified population at Fazenda Olho d'Água has also been recently reported to us by the local people in 2015 as still living in the fragment (Ingberman 2015). Both populations are on unprotected private lands and in isolated forest fragments. The area of these fragments is predicted to maintain the populations for at least 50 years (Jerusalinsky et al. 2011), but the fragments are too small for long-term persistence



Figures 2. Video frames showing *Brachyteles arachnoides* at the Fazenda Olho D'Água. In these captured frames, the identifying morphological and postural characteristics are clearly seen. **a)** shows brachiation, protruding abdomen and long prehensile tail. **b)** illustrates the large body size and yellowish-brown pelage. **c)** shows bipedalism.

(>1,000 years; Brito and Grelle 2006). Brito and Grelle (2006) estimated that an area of 11,500 ha is necessary to maintain a long-term demographic and genetically minimum viable population. Because we have not actively searched for monos in several of the nearby existing fragments (Ingberman 2015), we recommend additional surveys that might find other populations. For mono populations to persist at the southern extreme of their range, we first need to know where populations are and then how to plan for connecting these isolated populations through strategically designed corridors. Additionally, legally protecting these two populations of mono should be an important priority in the conservation agenda in the state of Paraná, and as such the state authorities together with environmental institutions should implement a population monitoring program and create and fund legally protected areas.

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