

## MURIQUI POPULATIONS REPORTED IN THE LITERATURE OVER THE LAST 40 YEARS

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**Abstract**

Aguirre (*O mono Brachyteles arachnoides* (*E. Geoffroy*). *Situação Atual da Espécie no Brasil*. Acad. Brasil. Ciênc., Rio de Janeiro, 1971) identified 61 localities for the occurrence of the mureiqui (*Brachyteles arachnoides*) in the states of Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo and Paraná. He estimated a total population of 2,791–3,226 mureiquis, contrasting with a population of about 400,000 he reckoned would have existed in 1500. Accepting the position that there are two species, Aguirre's (1971) data suggested a maximum of 996 individuals for the northern mureiqui (*Brachyteles hypoxanthus*) and about 2,230 for the southern mureiqui (*B. arachnoides*). Current population estimates for the northern mureiqui have indicated at least 864 individuals in the wild. Data available for the southern mureiqui, suggest a minimum population of about 1,300. These numbers combined approximate to the total population of 2,230 estimated by Aguirre (1971). Further population surveys for mureiquis in the states São Paulo, Rio de Janeiro and Bahia are urgently needed, along with comparative studies on their basic ecology, diet and behavior in the different-sized forest fragments and the more extensive forests. Although stochastic effects could rapidly eliminate the very small isolated populations of the northern mureiqui, in larger forests, persistent threats, such as hunting, could gradually but invidiously reduce those of the southern mureiqui.

**Key Words** – primates, mureiqui, *Brachyteles*, population, distribution, conservation, Atlantic forest, Brazil

**Introduction**

Aguirre (1971) identified 61 localities for the occurrence of the mureiqui (*Brachyteles arachnoides*) in the states of Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo and Paraná. Twenty-eight of them were based on museum specimens that had precise collection locations. Of these 61 localities, Aguirre (1971) considered that mureiquis could still be found in only 30 at the time of his survey: seven in the state of Bahia, seven in Espírito Santo, four in Minas Gerais, six in Rio de Janeiro and six in São Paulo. Aguirre (1971) had no information on any possible remaining populations in Paraná. He estimated a total population of 2,791–3,226 mureiquis, contrasting with a population of about 400,000 he reckoned would have existed in 1500. Accepting the position that there are two species (Rylands *et al.*, 2000), Aguirre's (1971) data suggested a maximum of 996 individuals for the northern mureiqui (*Brachyteles hypoxanthus*) and about 2,230 for the southern mureiqui (*B. arachnoides*).

Approximately 10 years later, Mittermeier *et al.* (1982) revisited some of the areas cited by Aguirre (1971). They were doubtful that *B. hypoxanthus* had survived in two of them, the Rio Doce State Park in Minas Gerais and the Nova Lombardia Biological Reserve in Espírito Santo, and were able to confirm just two populations, those of the Caratinga Biological Station (EBC) (now the Private

Natural Heritage Reserve "Feliciano Miguel Abdala" (RPPN-FMA)), in Minas Gerais, and the Fazenda Barreiro Rico, in São Paulo (*B. arachnoides*). The total numbers actually recorded did not exceed 100 individuals (Mittermeier *et al.*, 1982). They failed to locate any new populations. That same year, Kinzey (1982) provided a general review of the Atlantic forest primates, but mentioned no new localities for *Brachyteles*. His study examined particularly primate biogeography in relation to the Pleistocene refuge theory then in vogue, looking at evidence for centers of primate endemism in eastern, south-eastern and southern Brazil (Kinzey, 1982; for a review see Rylands *et al.*, 1996). Alves (1986) found two populations which had not been reported previously; the first a forest in the municipality of Manhuaçu, Minas Gerais, now the Mata do Sossego Private Natural Heritage Reserve (RPPN), with 21 individuals counted, and the second in the Caparaó National Park, where 19 mureiquis were seen at the Córrego do Calçado, in the municipality of Ibitirama in Espírito Santo.

On the basis of the accumulating literature on mureiquis, Mittermeier *et al.* (1987) estimated a minimum population of 386 (northern and southern forms combined), in 11 localities, all previously cited by Aguirre (1971) except for Cunha State Park in São Paulo, (contributing 16 individuals). The review by Nishimura *et al.* (1988) provided a synthesis of what was then known of the populations and

distribution of the genus. Their population estimate, based on the same sources, was similar—385.

Rylands *et al.* (1988) identified two places in the Rio Jequitinhonha valley in Minas Gerais and Bahia, where local people reported that miquis were present until the 1970s or 80s. They indicated further forest patches where local people reported that miquis could still be found, but they remained unconfirmed. Oliver and Santos (1991), likewise, indicated two localities in the far south of Bahia—the Boca do Córrego, in the municipality of Belmonte, and the Serra da Onça, near Arataca and Jussari—where miquis might still survive. Oliver and Santos (1991) concluded from their extensive surveys that the miquis was virtually extinct in Bahia. On the basis of interviews, Mendes (1991), suggested that miquis could be found in some parts of the mountainous interior of central Espírito Santo, in the region of Domingos Martins (district of Pedra Azul) and Itarana, but reported that a large part of the populations reported by Aguirre (1971) had been lost (Forno Grande State Park, for example). Mendes (1991) also indicated the extinction of miquis in the Santa Lúcia and São Lourenço biological stations, in the municipality of Santa Teresa, even though both were cited by Aguirre (1971).

Paccagnella (1991) carried out a census of the miquis in the Carlos Botelho State Park (PECB), in the municipalities of São Miguel Arcanjo, Capão Bonito and Sete Barras. Walking 214 km of trails in the park, Paccagnella (1991) estimated a population of 500 to 800 miquis, taking into consideration 24,152 ha of the 37,432 ha of the park (about 65% of the PECB) that was believed to provide suitable habitat.

Pinto *et al.* (1993) reported the presence of miquis in the Augusto Ruschi Biological Reserve (formerly called Nova Lombardia), municipality of Santa Teresa, Espírito Santo, even though in very low numbers) (see Vieira and Mendes, 2005). A year later, Martuscelli *et al.* (1994) indicated 14 new locations for miquis in São Paulo, Paraná and Rio de Janeiro, noting the first record for an oceanic island, in the Ilha do Cardoso State Park off the coast of São Paulo), where five miquis were seen on two occasions. Martuscelli *et al.* (1994) made further attempts to find the miquis there, but considering that hunting on the island has always been intense, and despite the fact that it is now a State Park, they believed the species was already extinct there. Martuscelli *et al.* (1994) summed 303 “new” miquis in the state of São Paulo, but were unable to see any in Rio de Janeiro, even though they discovered two localities not reported by Aguirre (1971): Bocaina National Park and Cairuçu Environmental Protection Area (APA). Martuscelli *et al.* (1994) also found evidence for the presence of miquis in two localities in Paraná: Jaguariaíva and Guaraqueçaba Environmental Protection Area (APA). Two miquis were seen in this latter locality, providing the first register for the state of Paraná. Martuscelli *et al.* (1994) also

collected a skull and partial skeleton of a recently hunted animal in Guaraqueçaba.

A number of new records appeared in the years following, most especially of the southern miquis (*B. arachnoides*). Antonietto and Mendes (1994), for example, saw 15 individuals in the municipal Environmental Protection Area (APA) São Francisco Xavier, in São Paulo. Câmara (1995) obtained an entire skeleton from Itatiaia National Park, Rio de Janeiro, and Oliveira and Manzatti (1996) counted 22 miquis in the Fazenda São Sebastião do Rio Grande, em Pindamonhangaba, São Paulo.

Strier and Fonseca (1996–1997) re-assessed the numbers of miquis seen in the wild and counted 19 areas for the occurrence of the two species; eight new areas since the listing Mittermeier *et al.* (1987). Strier and Fonseca (1996–1997) summed 1,158 individuals in all; 234 northern miquis and 924 southern miquis—numbers still far lower than were estimated by Aguirre (1971).

Auricchio (1997) found three dead miquis in the Serra da Escorregosa, municipality of Sertão do Poruba, São Paulo. Auricchio and Silva (2000) subsequently saw a group of at least 10 in the Cubatão section (municipality of Cubatão) of the Serra do Mar State Park. Koehler *et al.* (2002, 2005) recorded eight miquis in the municipality of Castro, Paraná, later confirmed as part of the only group in the area, totaling 23 individuals (Pereira *et al.*, 2005).

In Rio de Janeiro, Garcia and Andrade Filho (2002; Garcia, 2005) counted 17 miquis, in two groups in the Serra dos Órgãos National Park (municipalities of Teresópolis, Guapimirim, Magé and Petrópolis). They were seen at the highest altitude ever recorded for the species (2,000 m above sea level). Cunha (2003, 2004) again recorded *B. arachnoides* in the park, counting 16 individuals in one group. Romanini-Oliveira *et al.* (2005) also attempted, unsuccessfully, to habituate a group of 20–40 miquis resident in the Serra dos Orgãos National Park.

In 2006, Macedo (2006) confirmed the record of Câmara (1995) sighting a group of at least 35 adults and 10 juveniles and infants in the Itatiaia National Park, although still unable to ascertain which of the two species they belonged. A skin kept in the Visitor’s Center of the park is identifiable as *B. hypoxanthus* (S. L. Mendes, pers. comm.), but this being at the supposed limits of the ranges of both species, further surveys are needed.

It is evident that *B. hypoxanthus* is the more threatened of the two miquis, even though a number of new populations have been found in recent years. Fontes *et al.* (1996) saw two lone females in a forest fragment in the Ibitipoca State Park, in Lima Duarte, Minas Gerais, one of them in a group howler monkeys (*Alouatta guariba*). The population estimate for *B. hypoxanthus* increased somewhat with its discovery in Santa Maria do Jetibá, Espírito Santo,

**Table 1.** Locality records for *Brachyteles* registered by Aguirre (1971) and Martuscelli *et al.* (1994), compared with those listed in the review of Strier and Fonseca (1996–1997) and findings in the last decade.

Aguirre (1971)	Martuscelli <i>et al.</i> (1994)	Strier and Fonseca (1996–1997)	New localities: 1997 to 2006
<p><b>Minas Gerais (4)</b></p> <ol style="list-style-type: none"> <li>Fazenda Rochedo, Rio Casca</li> <li>Serra do Brigadeiro, Ervália &amp; Carangola</li> <li>Rio Doce State Park, Coronel Fabriciano</li> <li>Fazenda Montes Claros, Caratinga</li> </ol> <p><b>Espírito Santo (7)</b></p> <ol style="list-style-type: none"> <li>Brejetuba, Afonso Cláudio</li> <li>Córrego São Fernando, Domingos Martins</li> <li>Nova Lombardia, Santa Teresa</li> <li>Pico do Tamanco and Pedra Azul, Domingos Martins &amp; Alfredo Chaves</li> <li>Forno Grande, Castelo</li> <li>Jatibocas, Itarana</li> <li>Barra Encoberta, Itarana</li> </ol> <p><b>Rio de Janeiro (6)</b></p> <ol style="list-style-type: none"> <li>Matas Morumbeca, Santa Maria Madalena, São Fidélis &amp; Campos</li> <li>Rio Bonito, Silva Jardim, Cachoeiras de Macacu, Casimiro de Abreu &amp; Friburgo</li> <li>Fazenda do Subaio &amp; Fazenda do Carmo, Cachoeiras de Macacu</li> <li>Serra dos Órgãos National Park, Magé &amp; Teresópolis</li> <li>Itatiaia, Rezende</li> <li>Horto Florestal Mambucaba, Angra dos Reis</li> </ol> <p><b>São Paulo (6)</b></p> <ol style="list-style-type: none"> <li>Fazenda do Veado &amp; Serra da Bocaina, São José do Barreiro &amp; Bananal</li> <li>Alto Paraibuna, Ubatuba, São Luís de Paraitinga &amp; Parati (Rio de Janeiro)</li> <li>Serra Paranapiacaba, Iporanga, Eldorado, Capão Bonito, Sete Barras, Juquiá, Itanhém &amp; others</li> <li>Nascentes dos rios Pardo, Jacupiranga &amp; Serra Negra, Jacupiranga, Barra do Turvo &amp; Guaraqueçaba (Paraná)</li> <li>Dep. Água e Esgoto (DAE), Santos, Mogi das Cruzes &amp; Salesópolis</li> <li>Fazenda Barreiro Rico, Anhembi</li> </ol> <p><b>Bahia (7)</b></p> <ol style="list-style-type: none"> <li>Chapori, Una</li> <li>Córrego Mundo Novo, Pau Brasil</li> <li>Riacho Duas Barras, Caatiba</li> <li>Serra Couro d'Anta, Itapetinga</li> <li>Serra Pateirão, Encruzilhada</li> <li>Serra da Gabiarra, Santa Cruz de Cabrália</li> <li>Farinha Lavada e Água Limpa, Guaratinga &amp; Jucuruçu</li> </ol>	<p><b>Rio de Janeiro (2)</b></p> <ol style="list-style-type: none"> <li>APA Cairuçu, Parati</li> <li>Bocaina Natinal Park, Parati, São José do Barreiro &amp; Angra dos Reis</li> </ol> <p><b>São Paulo (10)</b></p> <ol style="list-style-type: none"> <li>APA Municipal de São Francisco Xavier, Pindamonhangaba</li> <li>Mongangá Nucleus, Serra do Mar State Park</li> <li>Nucleus Curucutu, Serra do Mar State Park</li> <li>Núcleo Pedro de Toledo/Itariri, Serra do Mar State Park</li> <li>Jurupará State Park, Ibiúna</li> <li>Ilha do Cardoso State Park, Cananéia</li> <li>Turístico do Alto Ribeira State Park, Iporanga, Apiaí</li> <li>Jacupiranga State Park, Cananéia, Jacupiranga, Barra do Turvo &amp; Eldorado</li> <li>Maciço da Juréia, Juréia-Itatins Ecological Station</li> <li>Maciço Itatins, Juréia-Itatins Ecological Station</li> </ol> <p><b>Paraná (2)</b></p> <ol style="list-style-type: none"> <li>Jaguariaíva, Jaguariaíva</li> <li>APA Guaraqueçaba, Guaraqueçaba</li> </ol>	<p><b>Minas Gerais (7)</b></p> <ol style="list-style-type: none"> <li>Ibitipoca State Park<sup>1</sup>, Lima Duarte</li> <li>Sossego Private Reserve (RPPN) Simonésia<sup>2</sup></li> <li>Rio Doce State Park, Marliéria</li> <li>Serra do Brigadeiro State Park, Araponga</li> <li>Feliciano Miguel Abdala Private Reserve (RPPN) (former Caratinga Biological Station – EBC), Caratinga</li> <li>Fazenda Esmeralda, Rio Casca</li> <li>Fazenda Córrego de Areia, Peçanha</li> </ol> <p><b>Espírito Santo (2)</b></p> <ol style="list-style-type: none"> <li>Augusto Ruschi Biological Reserve, Santa Teresa</li> <li>Caparaó National Park<sup>2</sup>, Divino de São Lourenço</li> </ol> <p><b>São Paulo (10)</b></p> <ol style="list-style-type: none"> <li>Fazenda São Sebastião do Rio Grande<sup>3</sup>, Pindamonhangaba</li> <li>Serra do Mar State Park</li> <li>São Francisco Xavier, Pindamonhangaba</li> <li>Fazenda Barreiro Rico, Anhembi</li> <li>Juréia-Itatins Ecological Station, Iguape</li> <li>Jacupiranga State Park, Cananéia</li> <li>Jurupará State Park, Ibiúna</li> <li>Carlos Botelho State Park, São Miguel Arcanjo</li> <li>Intervales State Park, Capão Bonito</li> <li>Turístico do Alto Ribeira State Park, Iporanga, Apiaí</li> </ol>	<p><b>Minas Gerais</b></p> <ol style="list-style-type: none"> <li>Fazenda Duas Barras<sup>4</sup>, Santa Maria do Salto</li> <li>Mata Escura Biological Station<sup>4</sup>, Jequitinhonha</li> </ol> <p><b>Espírito Santo</b></p> <ol style="list-style-type: none"> <li>Santa Maria do Jetibá<sup>5</sup>, Santa Maria do Jetibá</li> </ol> <p><b>São Paulo</b></p> <ol style="list-style-type: none"> <li>Serra da Escorregosa<sup>6</sup>, Sertão do Poruba</li> <li>Núcleo Cubatão<sup>7</sup>, Serra do Mar State Park</li> </ol> <p><b>Paraná</b></p> <ol style="list-style-type: none"> <li>Castro<sup>8</sup></li> </ol>
30 localities	7 new localities	4 new localities	6 new localities

Obs.: <sup>1</sup>Fontes *et al.* (1996); <sup>2</sup>Alves (1986); <sup>3</sup>Oliveira & Manzatti (1996); <sup>4</sup>Melo *et al.* (2004); <sup>5</sup>Mendes (este volume); <sup>6</sup>Auricchio (1997); <sup>7</sup>Auricchio & Silva (2000); <sup>8</sup>Koehler *et al.* (2002).

where Mendes *et al.* (2005b) found groups in a number of partially isolated forest fragments, 15 in all, with numbers ranging from one to 20 individuals, providing an estimate of at least 115 overall. Recently, Melo *et al.* (2004) located two new populations in the Rio Jequitinhonha valley, one with a minimum of 28 individuals, Mata Escura Biological Reserve, municipality of Jequitinhonha, Minas Gerais, another, with seven individuals in large remnant forest covering the state limits of Minas Gerais and Bahia, in the Fazenda Duas Barras, between Santa Maria do Salto, Minas Gerais and Guaratinga, Bahia. This last is currently the only known population in Bahia (Melo *et al.*, 2004).

An intensive survey carried out by Strier *et al.* (2002) in the Feliciano Miguel Abdala Private Reserve (RPPN-FMA) resulted in a population count of 157. More recently, Strier and Boubli (2006) confirmed four groups, totaling 230 muriquis. The occurrence of muriquis in the Fazenda Córrego de Areia in the municipality of Peçanha, Minas Gerais, was reported by Aguirre (1971), but the fate of the population remained unknown (Mittermeier *et al.*, 1987) until Hirsch *et al.* (2002) visited the area and counted 13 muriquis there, including some infants.

Mendes *et al.* (2003) identified a group of 12 muriquis in the vicinity of the Ibitipoca State Park, an area known as the Mata dos Luna, in Santa Rita do Ibitipoca, Minas Gerais. This population has been studied by Ferraz *et al.* (2005), who accompanied its decline to just five males. More critical has been the situation of the small group of the Fazenda Esmeralda, Rio Casca Minas Gerais, where Melo *et al.* (2005) found only three individuals remaining. Aguirre (1971) had estimated seven or eight muriquis there, and there were 18 in the group when Lemos de Sá (1991) was studying them in 1986 and 1987. In 2006, only one male remained, who was living with a band of capuchin monkeys (*Cebus nigritus*) (F. R. de Melo, unpublished data).

Further studies in Minas Gerais have allowed for a recount of the key populations of the northern muriqui in three key areas. Dias *et al.* (2005) estimated a minimum of 370 in: the Serra do Brigadeiro State Park, the RPPN Mata do Sossego Private Reserve (RPPN) in Simonésia and, despite the fears of Mittermeier *et al.* (1982), the Rio Doce State Park. Marliéria. Gomes and Melo (2005) have also confirmed the occurrence of at least three groups, a total of 135 individuals, in the Caparaó National Park, all in the part in Espírito Santo.

## Conclusions

Current population estimates for the northern muriqui are examined in more detail by Mendes *et al.* (2005a), who have indicated at least 864 individuals in the wild. Data available for the southern muriqui, suggest a minimum population of about 1,300. These numbers combined approximate to the total population of 2,230 estimated by Aguirre (1971). Table 1 compares the populations listed by

Aguirre (1971) and Strier and Fonseca (1996–1997) and the most recent information we report here.

Further population surveys for muriquis in the states of São Paulo, Rio de Janeiro, and Bahia are urgently required for a better understanding of the conservation status of the two species. Comparative studies are needed on their basic ecology, diet and behavior in the different-sized forest fragments and more extensive forests, to better understand how they occupy degraded forests and the relation of these aspects, especially diet, to their demography and, hopefully, population growth and stability in protected areas (Talebi *et al.*, 2005a, 2005b). Lacking long-term studies of this sort, along with regular population monitoring, it will be difficult to revert the constant threat of imminent extinction that both species faces. They are present in numerous protected areas—national, state and private—that should at least provide some protection from forest loss and hunting. The Carlos Botelho, Serra do Mar and Intervales state parks, in São Paulo, and the Serra do Brigadeiro and Rio Doce state parks in Minas Gerais now hold the largest populations of the two species. Stochastic effects could rapidly eliminate the very small isolated populations of the northern muriqui, and albeit in larger forests, persistent threats, such as hunting, could gradually but invisibly reduce those of the southern muriqui.

Brito and Grelle (2006) have analyzed the northern muriqui populations using the program VORTEX. They concluded that they need areas larger than 11,570 ha to maintain genetic viability. Their results indicated that the majority of the populations are currently too small (even though they are able to persist for some time) to be genetically viable in the long term, due to the inevitable gradual loss of heterozygosity.

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