SURVEY AND STATUS OF THE MURIQUIS (*BRACHYTELES ARACHNOIDES*) IN THE SERRA DOS ÓRGÃOS NATIONAL PARK, RIO DE JANEIRO

Vânia Luciane Alves Garcia

Seção de Mastozoologia, Departamento de Vertebrados, Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil, e-mail: <vanialagarcia@yahoo.com.br>

Abstract

The Serra dos Órgãos National Park protects 11,800 ha of Atlantic forest in the state of Rio de Janeiro (22°30'S, 43°06'W; 300 to 2,263 m above sea level). Vegetation types include montane dense evergreeen forest up to altitudes of 1,800 m; cloud forest from 1,800 to 2,000 m; and high altitude grassland above 2,000 m. This paper reports on surveys carried out in 10 localities in the park specifically to obtain a minimum estimate of the population of northern muriquis (*Brachyteles arachnoides*). Muriquis were sighted 26 times at altitudes ranging from 800 to 1,500 m. It is possible that they belonged to four groups in which case the minimum number of individuals recorded would be 56. If in fact the sightings were of just two groups, the minimum number of individuals would be 32. Black-horned capuchin (*Cebus nigritus*) and brown howler monkeys (*Alouatta guariba*) were also recorded for the park. The buffy-tufted-ear marmoset (*Callithrix aurita*) was not seen.

Key Words – primates, muriqui, *Brachyteles*, Serra dos Órgãos, Atlantic forest, Brazil

Introduction

There is now some quite substantial information on the populations of the northern muriqui in Minas Gerais (*Brachyteles hypoxanthus*) in the states of Minas Gerais and Espírito Santo, as well as on the occurrence of the southern muriqui (*B. arachnoides*) in São Paulo (Mittermeier *et al*., 1987; Paccagnella, 1991; Pinto *et al*., 1993; Martuscelli *et al*., 1994; Strier and Fonseca, 1996/1997). The same cannot be said of the state of Rio de Janeiro, where the remaining populations have yet to be located and counted — it is still unclear exactly which of the species occur there.

In his survey more than 30 years ago, Aguirre (1971) found that they had disappeared from most of their range in Rio de Janeiro, and estimated a total population of only about 770. From 1999 to 2003, Garcia (2005) surveyed a number of localities in the state (Projeto Muriqui – Rio) in order to identify their continued occurrence there and the status of the populations. Hunting and forest loss continue to be major threats. The "Projeto Muriqui" was created in 2002 in the Serra dos Órgãos National Park as a focus for studies on the conservation of muriquis in Rio de Janeiro. Here I report on the results of one of the projects of this program; a study of the remnant population of muriquis in the park itself.

Methods

Study area

The Serra dos Órgãos National Park, of 11,800 ha, was created in 1939. It covers parts of the municipalities of Petrópolis, Teresópolis, Magé and Guapimirin, in Rio de Janeiro (22°30'S, 43°06'W) (Fig. 1). A number of rivers supplying water to urban centers in the lowlands have their sources in these mountains, including the rios Paquequer, Soberbo, Jacó, Bananal, Bonfim and Santo Aleixo. The terrain is one of steep slopes and rugged mountains, with elevations ranging from 300 to 2,263 m (the Pico da Pedra do Sino). The climate is tropical superhumid, with temperatures during the year averaging 19°C.

The park is largely forested, within the domain of the Atlantic Forest (Rizzini, 1997): lower montane, montane and upper montane dense evergreeen forest (*Floresta Ombrófila Densa*), following the classification of Veloso *et al.* (1991). Following the altitudinal gradient it is possible to identify three phytophysiognomies in the park: montane forest — the majority of the park, with very large trees and a high canopy, at altitudes up to 1,800 m; cloud forest (*Mata Nebular*) — with smaller trees, lower canopy, abundant in epiphytes, from 1,800 a 2,000 m; and high altitude grassland (*Campos de Altitude*) — with shallow soils, bushy and herbaceous plants, many of them of endemic, at altitudes above 2,000 m. Although the forest would appear to be primary — with immense trees, and rich in palms, lianas, and epiphytes — the long history of exploitation of these forests means that they are in fact secondary, but in late stages of succession. Only some parts of the park maintain their original forest cover.

Data collection

In a reconnaissance expedition in January 2002, we visited the park and neighboring areas to determine where muriquis had been seen. Ten areas were selected. Field work was from February to October 2002. To reach the

Figure 1. Location of the Serra dos Órgãos National Park in the state of Rio de Janeiro.

locations where muriquis had been reported, it was necessary to provide training in rock climbing techniques (Fig. 3). The field team included a coordinator in field research, two assistants, three mountain climbers from Teresópolis, two guides from Santo Aleixo (the village near the park), and four porters.

The areas surveyed were some distance from the park headquarters and difficult to reach. We camped in each location for up to 10 days. The porters were dispensed with once camp had been set up. Locations and sightings were mapped using a Geographic Positioning System, although satellite reception was rather intermittent. We also mapped our survey routes and made notes on sightings of other primates and large mammals and birds, as well as all signs of hunting (including traps and hideouts) and encounters with the hunters themselves and their dogs.

To locate the muriquis we would watch for them from vantage points, such as rocks or trees that afforded broad views of a valley and the surrounding forest. All day watches were set up at these lookouts while other team members would walk the trails (Fig. 4). We used existing trails mostly, but in some areas it was necessary to cut new ones. Radios "Talk" were used to maintain contact between team members and an HT radio to maintain contact with the park headquarters.

We used "play-backs"—a recording of muriqui vocalizations to increase the chance of locating them. We did four to six play-back sessions a day, each one lasting 15 minutes

Figure 2. View of Serra dos Órgãos National Park, showing some of the rock. Peaks from left to right: Escalavrado, Dedo de Nossa Senhora, Dedo de Deus and Cabeça de Peixe. Photo by José Caldas.

Figure 3. An obstacle met when surveying the muriquis in the Serra dos Órgãos National Park.

Figure 4. One of the of the observation points for muriquis in the Serra dos Órgãos National Park.

(Fig. 5). For each muriqui sighting we noted the following: date, time, number of individuals, age-category and sex when possible, vegetation type, activity when first seen, and the location. We accompanied each muriqui group for as long as possible. We surveyed ten areas, totaling 86 days of field work, averaging 65 hours per expedition. "Playback" recordings of their vocalizations were broadcast for a total of six hours and 55 minutes.

Results

We saw muriquis 26 times, and found indications of hunting on 24 occasions (Table 1). The areas where we found most signs of hunting were Santo Aleixo and Rio Bananal. The majority of them were their hideouts and camps, but we also found nets and various types of traps including shotgun traps (armed), and wooden platforms, and ceven came across the hunters' dogs and the hunters themselves. A black-horned capuchin (*Cebus nigritus*) was in one of the traps (it was photographed and released). Nearly all the camps we found were evidently recent, with the remains of food, a cooking fire, and cooking utensils — ready as such to be used at any time. In most cases we were able plot the location of these camps with the GPS.

Despite the considerable use of the "play-back" recordings, they resulted in replies from the muriquis only twice. On the first occasion the team, watching from a lookout had already seen a group, which was living in the area of

Table 1. Expeditions dates, their duration and hours in the field, time spent in playback sessions, number signs of hunters, sightings of muriquis, and numbers of fecal sample obtained. Serra dos Órgãos National Park, Rio de Janeiro.

Expedition (months) 2002	No. of days	Field work (hours)	Time spent in 'playback'(mins.)	Signs of hunting[1]	Sightings	Number of feces collected
Rio Beija Flor (February)	4	40	0	2	0	0
Dedo de Deus and Cabeça de Peixe (February–March)	5	36	0	1	1	1
Rio Paquequer or Córrego Pedra Açu (March)	7	25	0	1	2	1
Vale das Orquídeas and Basin of the Rio Paquequer or Córrego Pedra Açu (April)	8	77	230	0	1	0
Basons of the rios Jacubá and Beleira and Pedra Itaculumi (Santo Aleixo) (May)	11	66	95	4	0	0
Trilha das Torres da CERJ (Santo Aleixo/Petrópolis) (June)	10	56	0	2	0	0
Basin of the Rio Bananal (July)	10	78	135	4	0	0
Basin of the Rio Soberbo (August)	10	82	105	1	12	3
High altitude grassland and Rio Jacó	10	75	45	2	0	0
Rio Santo Aleixo	11	114	45	7	10	1
Total	**86**	**649**	**655**	**24**	**26**	**6**

[1]Hunters' camps, traps, hunters and their dogs.

the springs of the Rio Paquequer. The muriquis had not seen the observer, who decided to test the recording. The muriquis were moving away, but when they heard the recording the turned about and moved towards the calls. On the second occasion, the observer had just completed a playback session, but was leaving because it was becoming foggy, at which moment an adult female appeared out of the mist in the exact spot were the recording was being played. It would seem that she had responded to the playback even though she did not herself vocalize.

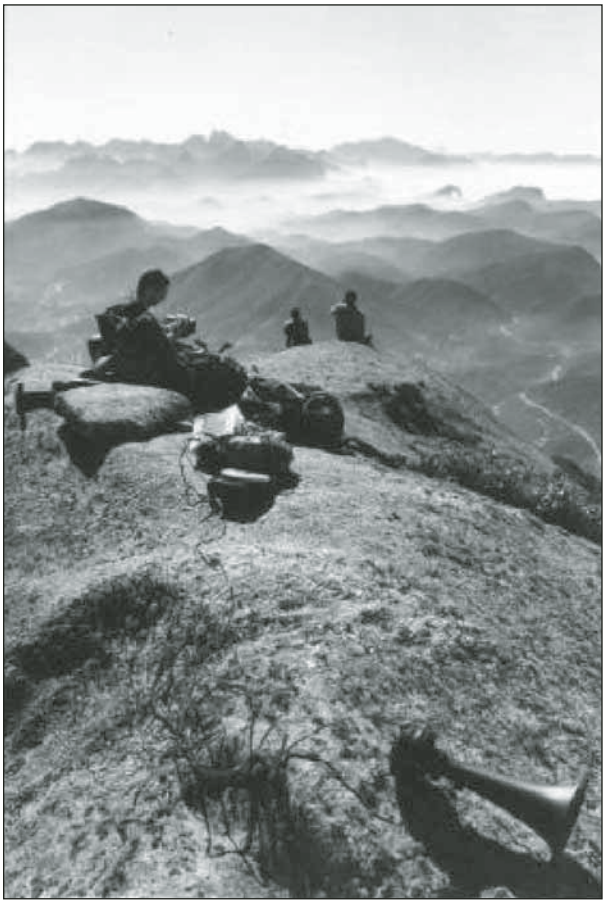

Figure 5. Testing the "playback" equipment, Serra dos Órgãos National Park, Rio de Janeiro.

The muriquis we saw in the Serra dos Órgãos National Park looked more like the southern muriqui (*B. arachnoides*) than the northern (*B. hypoxanthus*). Their faces were very black. They were very difficult to observe. On seeing us they would make alarm calls. One individual would show intimidating behavior, calling, while the rest of the group would slip away quietly. They were seen in four areas of the park: in the forests adjacent to the Pedra do Dedo de Deus and the Pedra da Cabeça de Peixe (individuals were seen, and photographed going up and down the latter, which is entirely forested), and areas of the springs of the rios Paquequer, Soberbo and Roncador (or Santo Aleixo) (Table 2). When we saw them near the Dedo de Deus (in March) they were eating fruits of a *Myrcia* (Myrtaceae) tree, the seeds of which were consistently found in the feces we collected in the area of the Rio Soberbo in August. It would seem that the species fruits for prolonged periods or that the mountainous terrain provides for different climates in the various parts of the park that in staggered fruiting. The muriquis of the Rio Soberbo were also seen eating fruits of *Crysophyllum viride* (Mart. & Eichler), a tree of the Family Sapotaceae. We found seeds of at least six other species in their feces, but they could not be identified. The high altitudes and humid conditions year round in many parts of the park, we believe favor fruit production even in the dry season, when they would be lacking in drier forests.

If the muriquis seen in each of the four areas are different groups, we have a minimum count of 56 for the park. We saw muriquis at altitudes ranging from 800 to 1,500 m. One record, a photograph taken by a tourist of a muriqui walking on the ground was at 2,000 m in the high altitude grassland. This is the highest elevation recorded for the species, which Aguirre (1971) believed should be between 1,800 and 2,000 m. The best estimates for group composition came from observations of the Rio Soberbo and Paquequer muriquis. Solitary females, females with infants, juveniles of different sizes, and adults.

Two other primates were observed besides the muriquis: the black-horned capuchin (*Cebus nigritus*) and the brown howler monkey (*Alouatta guariba*) (Fig. 6). The buffy-tufted-ear marmoset (*Callithrix aurita*) certainly

Table 2. Sightings of muriquis in the Serra dos Órgãos National Park, Rio de Janeiro.

Location	Altitude (m)	Number of indivíduals	Age/sex composition[1]	Forest type[2]	Activity when first seen
Forest adjacent to the mountain peaks of Dedo de Deus and Cabeça de Peixe	1.300	7	3AD, 1AM, 1AF, 2JU	MF	Eating fruit
Rio Paquequer basin (Córrego Pedra Açu)	1.500	17	1AM, 6AD, 1AF+1, 9UN	MF	Traveling
Rio Soberbo basin	1.250–1.493	20	2AF+1, 5JU, 12AD	MF and HAF	Eating fruit
Rio Roncador (Santo Aleixo)	800–1.200	12	10AD, 2JU	MF	Vocalizing
Total		**56**			

[1]AM = adult male; AF+1 = adult female with infant; JU = juveniles; UN = sex and age unknown; AD = adults
[2]MF = montane rain forest; HAF = high altitude rain forest.

occurred in the region in the past (specimens in the Museu Nacional of Rio de Janeiro), but it was never seen. An introduced black-tufted-ear marmoset (*Callithrix penicillata*) was seen near the park headquarters. Muriquis were the most frequently seen of the primates, even though they were only found in four areas. Capuchins and howler monkeys were seen in most of the areas we visited, but only very infrequently.

Table 3. Population density estimates for muriquis, *Brachyteles*. For the Serra dos Órgãos National park (this study) the estimated minimum number of muriquis was divided by the area of the park (in bold).

Local	Estado	Área (km^2)	Densidade (ind/km^2)
Jacupiranga State Park	SP	300.00	0.0067
Jurupará State Park	SP	263.00	0.0190
Alto Ribera State Park	SP	350.00	0.0343
Serra do Mar State Park	SP	662.50	0.0377
Juréia State Park	SP	200.00	0.0400
Rio Doce State Park	MG	360.00	0.0583
Caparão National Park	ES	260.00	0.0731
Ibitipoca State Park	MG	14.88	0.1344
Fazenda São Sebastião do Rio Grande	SP	107.00	0.2056
Serra do Brigadeiro State Park	MG	200.00	0.2500
Augusto Ruschi Biological Reserve	ES	40.00	0.2750
São Francisco Xavier	SP	40.00	0.3750
Parque Nacional da Serra dos Órgãos	**RJ**	**118.00**	**0.474**
Intervales State Park	SP	380.00	0.6316
Carlos Botelho State Park	SP	376.44	1.3282
Mata do Sossego Biological Station	MG	8.00	2.6250
Fazenda Barreiro Rico	SP	32.59	2.9150
Caratinga Biological Station	MG	8.60	10.4651
Fazenda Córrego de Areia	MG	0.60	13.3333
Fazenda Esmeralda	MG	0.44	27.2727

Source: Strier & Fonseca, 1996/1997.

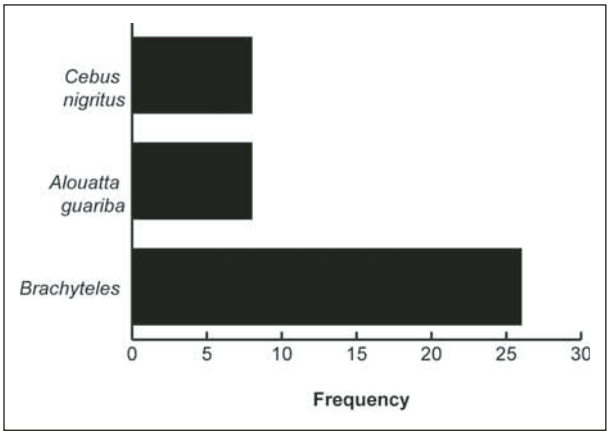

Figure 6. Numbers of sightings for three primates in the Serra dos Órgãos National Park, Rio de Janeiro.

Discussion

Dividing the estimated minimum number of muriquis (56) by the area of the park gives a density of a little less than 0.5 muriquis per km^2 (Table 3). Although not very different from estimates of populations elsewhere, it would still seem very low, and is certainly lower than any population which would be considered viable in the long-term (Lande, 1988). It is quite possible that the overall density is low because not all parts of the Serra dos Órgãos National Park provide suitable habitat in terms of the abundance and dispersion of food resources. Equally it may be that in these montane habitats home ranges are naturally larger for the same reason. Prolonged field research would be required to test this and, considering the difficulties of working in such terrain, the chances of such studies being carried out would seem to be slim.

While hunting is obviously taking its toll, the muriquis are extremely shy and the terrain so difficult for any realistic estimate. The growth of the population at the Caratinga Biological Station in Minas Gerais, would, however, be reason for hope that, with due protection and time, the population would increase considerably (Strier, 2000). Under any circumstances there are no doubts this is a most significant population, both genetically and in terms of numbers.

We presume that the observations of muriquis in the four areas were of different groups. Strier (1987) in her study of *B. hypoxanthus* in the Caratinga Biological Station recorded that muriquis can travel up to 3,400 in a single day, and it is possible in this case that the Rio Soberbo, Dedo de Deus and Rio Paquequer were of the same group or just two groups, rather than three. We have no doubts that the Santo Aleixo group at least was not confused with any of the others because of the distance separating them. If there were in fact only two groups, the minimum number would be 32 (20 for Soberbo and 12 at Santo Aleixo). If three groups, the number would perhaps be 49 (Soberbo with 20, Paquequer with 17, and Santo Aleixo with 12). Further studies, including the use of radio-collars perhaps, would be needed to understand better the ranges of these muriqui groups and provide more accurate counts.

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