

CONSERVING THE NORTHERN MURIQUI IN SANTA MARIA DE JETIBÁ, ESPÍRITO SANTO**Sérgio L. Mendes^{1,2}, Rogério R. Santos² and Luciano P. Carmo³**

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Abstract

The northern mureiqui is known to occur in only 12 localities, with small populations restricted to isolated forest fragments. In the state of Espírito Santo the species is currently confirmed in only three localities: in and around the Augusto Ruschi Biological Reserve; the Caparaó National Park (which extends into the state of Minas Gerais); and forests in the municipality of Santa Maria de Jetibá. We are studying the mureiquis in these last two areas. Both are in the central-southern montane region of the state. In the Caparaó National Park the aim is to census the population and to estimate its social and demographic composition. The mureiquis have been found in part of the 18,200 ha on the Espírito Santo side of the park, and we believe that this population is the largest in the state. In Santa Maria de Jetibá, we hope to improve the prospects for the survival of the mureiquis through the following activities: 1) monitoring and managing the populations; 2) studying genetic variability and endogamy; 3) developing a conservation education program, 4) testing the potential for ecotourism; and 5) promoting actions to improve the conservation and restoration of Atlantic Forest fragments. To date, we have found 84 individuals living in 13 fragments, with subpopulations varying from 1 to about 16 individuals. We have information on their presence in another 11 fragments. We have successfully translocated one young female and are monitoring its behavior. The current population and genetic data suggest that we need to improve the forest connectivity in order to reduce the fragmentation and isolation of the mureiqui groups. The combined efforts of scientists, government, and the local people will be fundamental to achieve this.

Key Words – primates, mureiqui, *Brachyteles*, Atelidae, conservation, Atlantic Forest, Espírito Santo

Introduction

The northern mureiqui, *Brachyteles hypoxanthus*, is listed as Critically Endangered on the IUCN Red List of Threatened Species, and by the Brazilian list of animals threatened with extinction (Brazil, MMA, 2003) and is considered to be among the world's 25 most endangered primates (Strier *et al.*, 2006). Until recently considered a monotypic genus, *Brachyteles* is treated now as having two species based on differences in the facial pigmentation (spotty and lacking pigmentation in *hypoxanthus* but darkly pigmented in *arachnoides*) and the presence (*hypoxanthus*) or absence (*arachnoides*) of a vestigial thumb (see Vieira, 1944; Lemos de Sá *et al.*, 1990, 1993; Leigh and Jungers, 1994). There may also be genetic differences (Pope, 1998).

Prior to the widespread destruction of the eastern Brazilian Atlantic forest that has taken place largely over the last century, the geographical distribution of mureiquis was almost continuous, from the state of Bahia to Paraná, including eastern Minas Gerais, Espírito Santo, Rio de Janeiro and São Paulo. It ranged from the coastal hills, to the western limits of the Atlantic forest where it is replaced by the Cerrado or bush savanna of central Brazil. The northern mureiqui's range extended from southern Bahia, near to

Salvador, to southern Minas Gerais, at least to the Serra da Mantiqueira that accompanies the state border with Rio de Janeiro and São Paulo. It seems that it never occurred in the lowland forests of extreme southern Bahia and northern Espírito Santo (Aguirre, 1971). In Espírito Santo, the historical and current records restrict it to the southern montane forests (Fig. 1).

Hunting and deforestation mean that today the species is known to occur in only 12 localities, with a total population minimum of about 855 individuals. Many of these mureiquis are restricted to small isolated forest fragments (Mendes *et al.*, 2005). The largest known population has about 200 individuals, and even in the larger fragments, the populations are small. In this paper we present a strategy to conserve the mureiqui in the forest fragments of Santa Maria de Jetibá, Espírito Santo, where mureiquis can be found in very small fragments. Their survival depends on the cooperation of scientists, government and the local people.

Mureiquis in the State of Espírito Santo

We are studying the mureiquis in two places in the state of Espírito Santo: the Caparaó National Park and in

the municipality of Santa Maria de Jetibá, both in the central-southern mountainous region. Besides these areas, the mureiquis occur also in the Augusto Ruschi Biological Reserve and surrounding forests (Fig. 1; Vieira and Mendes, 2005), and have been reported for a number of other localities that have yet to be confirmed (Mendes and Chiarello, 1993). This mountainous region is characterized by an enormous number of small forest fragments, more or less connected to each other, and surrounded by different forms of land use, creating as such a complex landscape. The project in the Caparaó National Park is just beginning. The aim is to census the population and to estimate its social and demographic composition. The Park encompasses 31,853 ha, straddling the state border with Minas Gerais. The mureiquis have been found in part of the 18,200 ha of the park on the Espírito Santo side. The mureiqui population there is certainly the largest in the state and is, consequently, the least threatened.

The project in Santa Maria de Jetibá began in 2001 with a preliminary survey that revealed a peculiar situation in which several small mureiqui populations live in almost isolated forest patches, relatively close to each other. Considering that all the forest fragments are in a mosaic of private properties, it was evident that the conservation of their mureiquis would require a more complex strategy than one of just creating and managing a protected area.

Conserving the Mureiquis in Santa Maria de Jetibá

We are carrying out a plan to improve the prospects for the survival of the mureiqui that involves five distinct but integrated activities: 1) Monitoring and managing the mureiqui

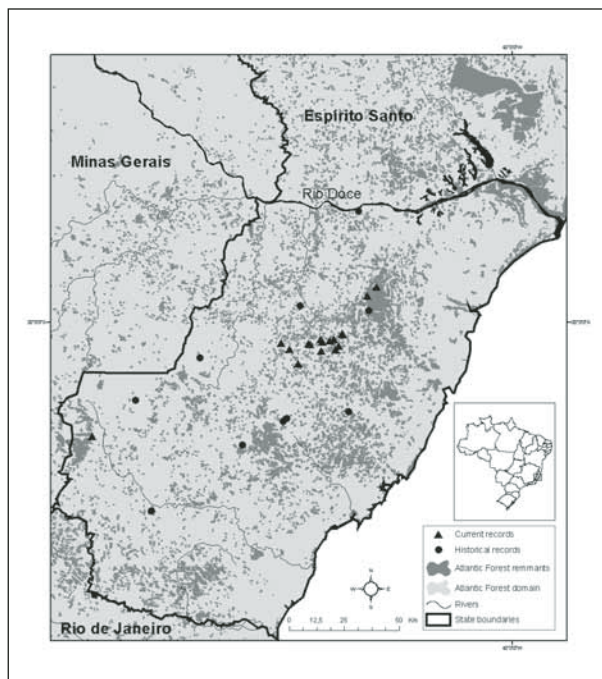


Figure 1. Historical and current records of mureiquis in Espírito Santo State.

populations; 2) studying genetic variability and endogamy; 3) developing a conservation education program; 4) testing the potential for ecotourism; and 5) promoting actions to improve the conservation and restoration of Atlantic Forest.

In our efforts to census and monitor the population, we found 84 individuals, living in 13 fragments, with subpopulations varying from 1 to about 16 individuals (Table 1; Fig. 2). These numbers will tend to increase, not only as we get more information about the presence (or otherwise) of mureiquis in 11 other fragments, but also because more intensive censuses are necessary in a number of areas. In general, there is only one social group in each forest fragment, and, sometimes, only a solitary individual. Strier (1996) and Printes and Strier (1999) found that young female mureiquis disperse from their natal group to another group where they reproduce. We have observed that although in Santa Maria de Jetibá females leave their natal groups, they become solitary when they reach adulthood, probably because of the lack of opportunities to disperse to other social groups. For this reason, we plan to translocate solitary females to forest fragments where other mureiqui groups

Table 1. The mureiqui population in Santa Maria de Jetibá, Espírito Santo. The estimated population is based largely on information from local people. The numbers correspond to the localities shown in Figure 2.

| # | Locality | Confirmed population | Estimated population |
|----|------------------------------|----------------------|----------------------|
| 1 | Rio Plantoja | 05 | 13 |
| 2 | Córrego Simão | 05 | 06 |
| 3 | Rio Lamego | 01 | 01 |
| 4 | Alto Santa Maria | 10 | 11 |
| 5 | Alto Rio Posmousser | 05 | 05 |
| 6 | Córrego do Ouro 1 | 11 | 12 |
| 7 | Córrego do Ouro 2 | 05 | 07 |
| 8 | Rio Claro / Rio Triunfo | 03 | 03 |
| 9 | Rio das Pedras 2 | 09 | 09 |
| 10 | Rio das Pedras 1 | 11 | 11 |
| 11 | Rio das Pedras / Jequitibá | 02 | 02 |
| 12 | Jequitibá | 01 | 01 |
| 13 | São Sebastião de Belém | 16 | 16 |
| - | Rio Sabino | 0 | 01 |
| - | Rio das Pedras / Rio Triunfo | 0 | 01 |
| - | Rio das Pedras 3 | 0 | 01 |
| - | Alto Rio Lamego | 0 | ? |
| - | Rio Claro | 0 | ? |
| - | Alto Jequitibá | 0 | ? |
| - | Garrafão | 0 | ? |
| - | Alto São Sebastião | 0 | ? |
| - | Rio das Pedras 4 | 0 | ? |
| - | Rio das Pedras 5 | 0 | ? |
| - | Rio das Pedras 6 | 0 | ? |
| | Total | 84 | 100 |

live. If this works well, then we can predict that this will be beneficial to the metapopulation as a whole, increasing the reproductive component of the population and promoting gene flow. Our first attempt to capture a solitary female, using darts delivered by an air rifle, has indicated that the task is not easy, however. Having dispersed, the then solitary female was more secretive and shy than when she was a part of our study group, and she avoided the capture team. We reasoned that it might be easier to capture and translocate a female just before her dispersal. In our second attempt, we chose a young female from our study group, estimated to be 6 years old, and in this case we were successful. The female was fitted with a radio collar, and taken to another forest fragment about 10 km away, where there was another mურიკი group with only two adult females and four adult males. We are presently monitoring the female to evaluate the effectiveness of this management procedure.

Analyzing the distribution of the mურიკი groups in the landscape (Fig. 2), we concluded that we needed a better knowledge of the sizes and shapes and the connectivity of the forest patches, as well as a better understanding of the use of the land surrounding them. We, therefore, selected a core area to take aerial photographs and classify the land use. The analyses demonstrated the complexity of the landscape and showed that the forest fragments remained

mainly on the middle-sized hills and higher, while crops and roads dominated the foothills and valleys. We estimated that 36% of the forest fragments in this core study area were surrounded mainly by coffee plantations, followed by pasture, and other crops. There is some connectivity between the fragments where mურიკი live, but in some cases the groups are isolated, not only by non-forested areas, but also because the distance is too far to disperse.

Simulating the viability of the populations in nine forest fragments using Vortex (Lacy *et al.*, 1995), we found that that the probability of extinction over the next 100 years was high for the smaller fragments (less 150 ha), but low in the larger ones. The simulation used somewhat optimistic demographic data based on Strier (1994/1995), however, and did not take into account the effects of endogamy and the loss of young females that disperse from their groups. The results did show that the species persistence in such a landscape is mainly determined by the fragment size and connectivity, emphasizing the importance of maintaining a metapopulation system.

To analyze the genetic traits of the mურიკი populations we are extracting DNA from their feces. The work is co-ordinated by V. Fagundes, from the Federal University of Espírito Santo, in collaboration with A. Di Fiori, from

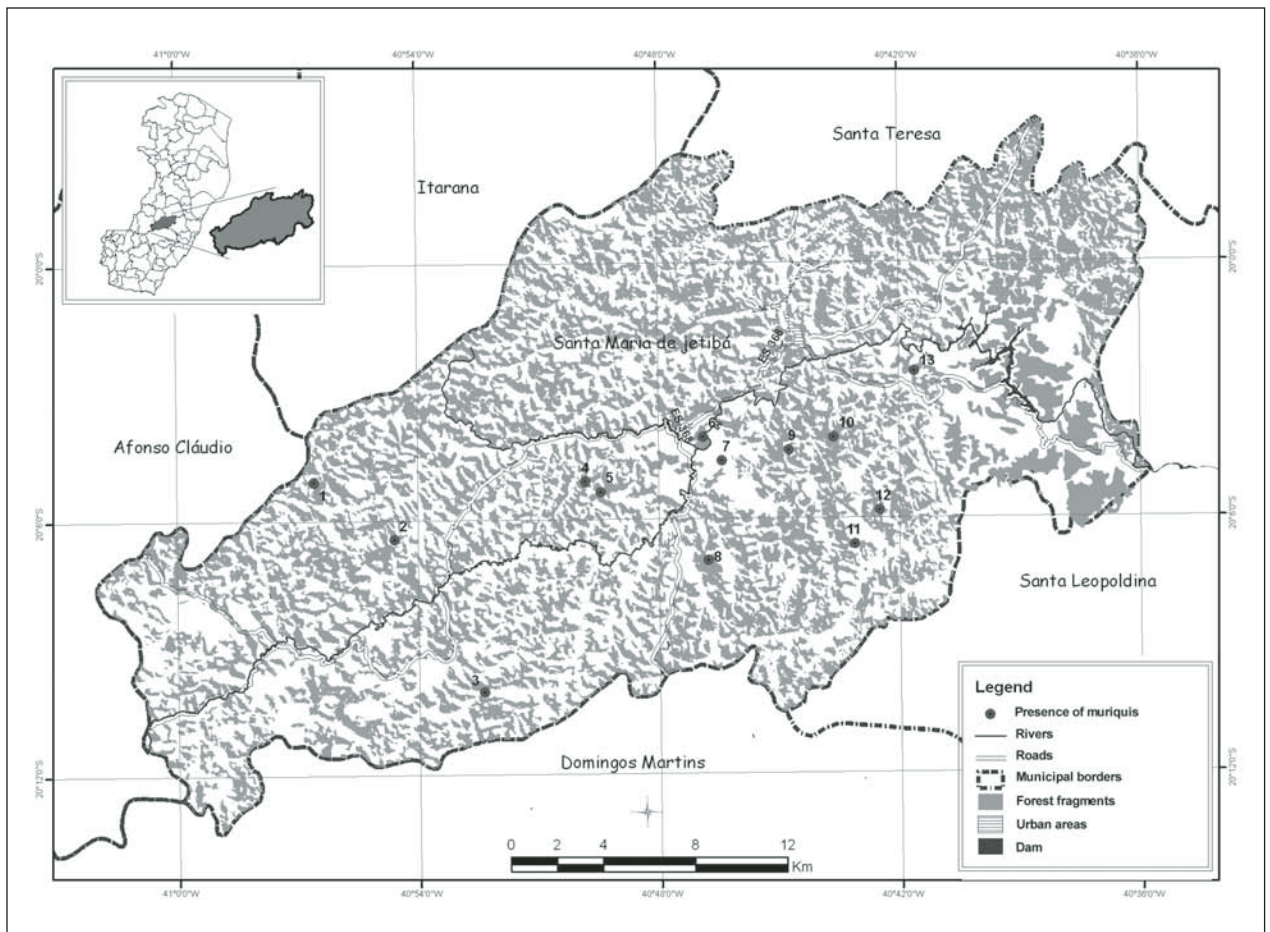


Figure 2. Current records of mურიკი in Santa Maria de Jetibá, Espírito Santo. The numbers correspond to the localities listed in Table 1.

New York University. To develop protocols and standardize techniques and make comparisons, we are using feces collected in Santa Maria de Jetibá, as well as feces from of the miquiqui population at the Feliciano Miguel Abdala Private Reserve (RPPN) in Caratinga, Minas Gerais, in collaboration with K. B. Strier, J. P. Boubli, and C. Possamai. To date, we have extracted and analyzed DNA from the feces of 20 individuals from Santa Maria and of 126 from Caratinga, and the first data, using mitochondrial DNA, indicates the presence of specific markers between the Santa Maria de Jetibá and Caratinga populations (Fagundes, 2005).

Our project is in a region where the human community is composed of Pomeranian descendants, which migrated from Europe to Brazil about 100 years ago. They usually have holdings farmed by the entire family. Because a single forest fragment is often shared among different farms, we have to deal with numerous people in order to work with miquiquis. Fortunately, Pomeranians in general do not have hunting traditions, which may explain the survival of miquiquis in such small fragments. We believe that conservation education will help us to study the miquiquis, and also to promote actions to conserve and restore the Atlantic Forest in this region.

In addition to working with schools, training teachers and young people, and cooperating with the local government, we are also trying to develop good relationships with the farmers. In order to reach a broader audience, we are using the local radio station to transmit information about miquiquis, producing and distributing t-shirts, posters and folders, and presenting the project to different kinds of local and national media. The experimental plan for ecotourism is focusing on the development of a low impact tourism, bringing small tourist groups to see the miquiquis and other threatened mammals of interest, such as the brown howler monkeys, titi monkeys, buffy-headed marmosets and maned sloths, which are also easy to see in these forest fragments. We plan to analyze whether this kind of tourism is viable, and whether it can bring advantages to the project and to the local communities. We have prepared a trail for tourists and a guide about the threatened birds and mammals in the region. We are testing an itinerary with volunteers and also establishing setting up a partnership with a travel agency.

The project's main challenge is to conserve and restore the remnant patches of Atlantic Forest, improving the connectivity between the fragments and reducing the risk of extinction. To promote forest conservation we have a middle to long-term goal, which involves actions including: 1) diagnosing the social-economic profile of the region; 2) identifying alternative forms of land use; 3) stimulating local youth to learn techniques to help in combating forest fires; 4) conducting a program of reforestation in public and private areas; 5) proposing the creation of protected areas; and 6) prioritizing partnerships with the local

society in the search for solutions. In summary, to conserve the miquiqui over the long term in such a fragmented landscape, we need a strategic plan that draws on scientific knowledge and community participation, and promotes the training of personnel, and institutional partnerships, aiming at a broader perspective for biodiversity conservation, that fully considers the socio-economic particularities of the region.

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