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**CALLITHRIX GEOFFROYI (PRIMATES: CALLITRICHIDAE)
AND ALOUATTA CARAYA (PRIMATES: ATELIDAE)
IN THE SERRA DO CIPÓ NATIONAL PARK, MINAS
GERAIS, BRAZIL**

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Introduction

The Serra do Cipó National Park is 90 km north of Belo Horizonte, Minas Gerais, and part of the southern section of the Serra do Espinhaço (19°12' to 19°34'S, 43°27' to 43°38'W). It is 33,800 ha in size, covering altitudes ranging from 800 to 1600 m. The vegetation is a mix of *cerrado* (bush savanna), *campo rupestre* (rocky moorland), open pasture and gallery forests, with some forest patches on the eastern ridge. Here we report unusual high-altitude sightings, made as part of an ongoing project, of two eastern Brazilian primate species: *Callithrix geoffroyi* and *Alouatta caraya*.

Geoffroy's marmoset, *Callithrix geoffroyi* (É. Geoffroy in Humboldt, 1812), is endemic to the Atlantic forest of Brazil (Rylands *et al.*, 1993; Fonseca *et al.*, 1996). It is found in secondary forests in lowlands, semi-deciduous forests, gallery forest and forest borders, with a preference for disturbed rather than mature areas (Passamani and Rylands, 2000a, 2000b). It is diurnal, and its diet is composed largely of fruits, exudates and small animal prey. Populations of Geoffroy's marmoset are declining over large parts of its relatively restricted range due to habitat loss and fragmentation, hunting and capture for pets. Its distribution appears to be further limited by its restriction, in many parts of its range, to altitudes between sea level and 600-800 m (Mendes, 1997).

The black howler monkey, *Alouatta caraya* (Humboldt, 1812) is typical of the Cerrado biome, but may also be found in forests along the Paraná/Paranaíba rivers, in deciduous forests in Caatinga regions of north-east Brazil, semi-deciduous forests of the Pantanal, the humid Chaco of Argentina, and in "capões" – forest patches – of Rio Grande do Sul and extreme northwestern Uruguay (Hirsch *et al.*, 2002). This species thus has a wide geographic range, from northern Argentina to the northeast of Brazil. *A. caraya* is usually to be found in low altitudes up to approximately

1000 m. It is diurnal and lives in groups of seven to nine individuals, although group sizes of up to 17 have been reported (Bicca-Marques, 1992). Leaves and fruits comprise the majority of its diet. Although not directly threatened, *A. caraya* suffers from the severe and ongoing fragmentation of its habitat in the Cerrado. In this context it is critical to identify new sites where it may occur, each of which will be important to the long-term survival of this species.

In this report, we register the occurrence of *Callithrix geoffroyi* and *Alouatta caraya* in a small fragment of Atlantic forest on the eastern border of the Serra do Cipó National Park, Minas Gerais, Brazil. This new locality is at one of the highest elevations (1274 and 1254 m, respectively) yet recorded for these species (Carlos E. V. Grelle, pers. comm.; Maycon G. Belarmino, unpubl. data, respectively), at the westernmost limits of the Rio Doce basin, headwaters of the Rio Santo Antônio (Hirsch *et al.*, 2002; see Fig. 1).

Methods and Results

The study was carried out in a forest fragment with an approximate area of 34.3 ha and a perimeter of approximately 3.22 km, in the municipality of Morro do Pilar, near the neighboring municipality of Santana do Riacho (see Fig. 1). Geographic coordinates and altitude were taken with a GPS device. We used a Landsat 5 TM satellite image (p218/r73, 01/nov/1997; Minas Gerais, DMC/IEF, 2001) to identify the vegetation in the surrounding areas, and ArcGIS 8.2 software (ESRI, 2001) for calculating the forest fragment's contour, area and perimeter. From the examination of the satellite image done by Hirsch (2003), the study site may be characterized as a small semi-isolated fragment, linked on only one side with a gallery forest that follows a small watercourse downstream. The surroundings are occupied with rocky moorland and open pasture (Fig. 1).

Two marmosets, *Callithrix geoffroyi*, were heard and seen in the forest fragment in August 2002. We later observed 10 individuals there during a return visit in March 2003. The GPS coordinates taken in the field were 19°15'28"S and 43°31'01"W, and the altitude was 1274 m. On 15 March 2003, two members of the field team observed one individual of *Alouatta caraya* in the same forest fragment, at approximately the same coordinates and at an altitude of 1254 m. All the records were taken *ad libitum* (Altmann, 1974).

Discussion

Callithrix geoffroyi

Although little studied, the home range of *C. geoffroyi* is believed to vary from 20 to 30 ha (Rylands and Faria, 1993). Passamani and Rylands (2000a, 2000b) estimated a home range of 23.3 ha for a group of 3-5 individuals in a forest fragment of 110 ha in the state of Espírito Santo. The record from this study was made in a fragment of approximately 34 ha, which suggests that its area is insufficient to support more than one group. Considering a circle as the best shape, the ideal perimeter calculated with the formula

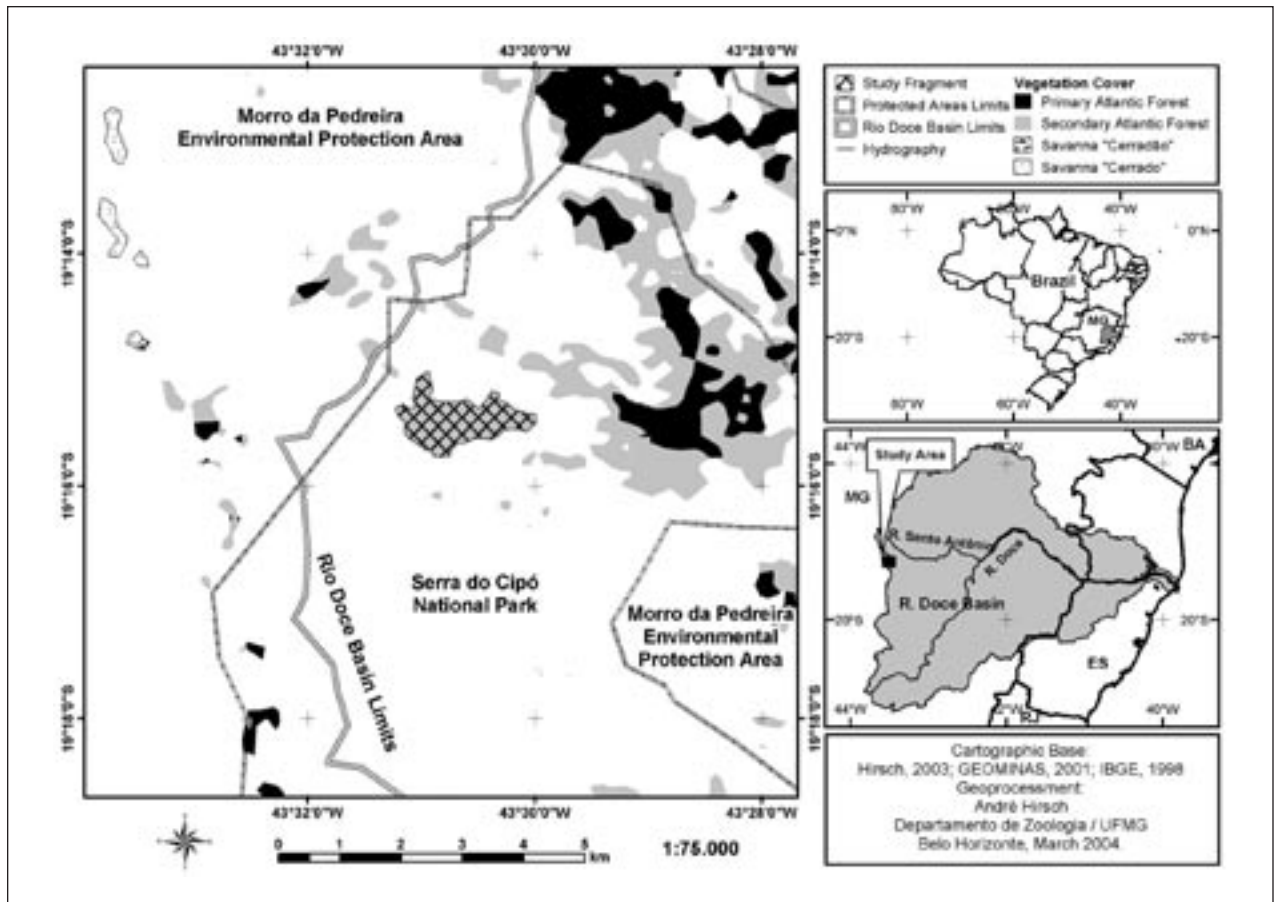


Figure 1. Location of the forest fragment where *Callithrix geoffroyi* and *Alouatta caraya* were recorded at the Serra do Cipó National Park, Minas Gerais, Brazil.

provided by Hirsch (2003) for this forest fragment is only 2.08 km. The actual contour (3.22 km) is larger and somewhat irregular, with a considerable edge effect acting on the interior forest area.

One of the causes of the threatened status of *C. geoffroyi* is its relatively restricted distribution in a highly fragmented environment. Our record of this species at an altitude of 1274 m extends its vertical range by almost 500 m, thereby indicating that it may be more wide-ranging than previously thought. This is also the westernmost record of the species in the Rio Doce basin (Hirsch *et al.*, 2002). The nearest record on the western slopes of the Serra do Cipó National Park is of *Callithrix penicillata*, near the park's administrative headquarters. Thus, the Serra do Cipó may be considered a biogeographic divide between these two marmoset species (Hirsch *et al.*, 2002).

Alouatta caraya

Home range size for the genus *Alouatta* is reported to vary from 4.1 to 182 ha (Chiarello, 1993; Palacios and Rodriguez, 2001). In fragmented landscapes, *A. caraya* has been registered in patches of 2 ha (Bicca-Marques, 1992; Bicca-Marques and Calegario-Marques, 1995). Their ability to incorporate secondary vegetation in their diet may explain their capacity to survive in small and degraded areas (Chiarello, 1994). This observation is one of the highest

altitudes (1254 m) recorded for the species (Maycon G. Belarmino, pers. obs.), which extends its potential geographical distribution and suggests that new proposals for population management might be implemented in areas previously considered unsuitable for the species.

Small and isolated fragments such as this one may not have sufficient core area to support viable populations of many species (Zudeima *et al.*, 1996). They may function, however, as an ultimate refuge for many species (Shafer, 1995). Small populations found in such small refuges may be subject to a series of stochastic processes of demographic, genetic and environmental origin that may lead them to extinction, despite measures taken for their conservation (Gilpin and Soulé, 1986; Brito and Fernandez, 2000). The negative effects of population isolation, especially on small populations, have already been well-demonstrated in the conservation literature (see, for example, Meffe and Carol, 1997).

Although small forest fragments cannot support marmoset or howler populations which are viable in the long-term, they may serve as "stepping stones" between larger forests, thereby facilitating gene flow and recolonization through dispersal and migration. These new records are in a large protected area, the Serra do Cipó National Park, surrounded by the buffer zone of the Morro da Pedreira Environmental Protection Area. This allows for some hope for the

long-term persistence of these populations. Future research may reveal the conservation relevance of such small fragments and their apparently isolated populations.

Acknowledgements: This study is part of a larger project assessing mammal communities in the various vegetation formations in the Serra do Cipó National Park. We thank the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) for permission to work in the Serra do Cipó National Park, and for providing facilities. We also thank our colleagues from the Laboratory of Mammalogy, Museum of Natural Sciences of the Pontifícia Universidade Católica de Minas Gerais for their help with fieldwork. Robert Young kindly helped with the English version of the text and provided most useful suggestions. Carlos Eduardo de Viveiros Grelle provided unpublished data on *Callithrix geoffroyi*. The Fundo de Incentivo a Pesquisa (Research Fund) of the Pontifícia Universidade Católica de Minas Gerais (FIP/PUC-Minas) funded this study.

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DISTRIBUIÇÃO DO GUIGÓ (*CALLICEBUS COIMBRAI*) NO ESTADO DE SERGIPE

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Sergipe é o menor estado brasileiro em extensão territorial. Possui cerca de 21.994 km² e localiza-se na região nordeste do Brasil, ao sul do Rio São Francisco. Seu relevo apresenta formas desgastadas, com altitudes pouco elevadas; cerca de 86% do território é abaixo de 300 m sobre o nível do mar. A baixada litorânea constitui uma extensa faixa de tabuleiros sedimentares, com cerca de 150 km de largura do litoral, em direção ao interior, cortada pelas várzeas dos rios (Vaza-Barris, Sergipe, Piauí, Real) que deságuam no Oceano Atlântico. No norte do estado, esses terrenos baixos se unem à planície aluvial do Rio São Francisco, o maior rio de Sergipe, o qual demarca a divisa com o estado de Alagoas. A baixada, por seus aspectos fisiográficos, corresponde em sua maior parte à Zona da Mata, cuja vegetação original era a floresta tropical, hoje em grande parte devastada pela exploração econômica predatória ou substituída por áreas agrícolas.

Em meio às áreas antrópicas, ainda existem remanescentes florestais, pequenas ilhas de vegetação secundária representadas por formações do tipo Floresta Ombrófila Densa e Floresta Estacional Semidecidual. Vários desses remanescentes florestais foram percorridos nos últimos anos com o propósito de se registrar a presença de *Calli- cebus coimbrai* e ampliar o conhecimento sobre as suas áreas de ocorrência. Apesar de incluída na nova lista da fauna brasileira ameaçada de extinção, *C. coimbrai* dispõe de pouquíssimos registros de campo, e sua distribuição e estado de conservação ainda não estão efetivamente bem definidos. As únicas informações sobre essa espécie foram fornecidas por Kobayashi e Langguth (1999) quando, no trabalho da descrição da espécie, indicaram duas áreas de ocorrência de *C. coimbrai*, além da sua localidade tipo no estado de Sergipe. Sousa (2000) acrescentou mais três localidades, uma delas situada no nordeste do estado da Bahia. Van Roosmalen *et al.* (2002) fizeram uma compilação das informações até então disponíveis e sugeriram os limites de sua distribuição entre o Rio Itapicuru (ao norte) e o Rio São Francisco.

Neste nota, reportamos novos registros da distribuição de *Calli- cebus coimbrai* baseados em observações realizadas no período de outubro de 2002 a setembro de 2003, durante nossos trabalhos de campo desenvolvidos no estado de Sergipe. Nesse período, tivemos a oportunidade de registrar a vocalização de *Calli- cebus* em 14 fragmentos florestais e obter imagens de alguns indivíduos em duas localidades.



Figure 1. Ocorrência do guigó *Calli- cebus coimbrai* no estado do Sergipe, Brasil. Escala 1:3.000.000. Projeção Área Igual Cilíndrica. Mapa gentilmente confeccionado por Mark Denil, GIS and Mapping Laboratory, Center for Applied Biodiversity Science, Conservation International, Washington, DC.

1. *Mata da Santana* (10°32'S, 36°44'W). Localizada entre os municípios de Pacatuba e Japoatã, nos arredores da localidade tipo de *Calli- cebus coimbrai*, a mata da Santana é um fragmento com cerca de 150 ha, isolada em meio a plantações de cana-de-açúcar. A maior parte da mata é constituída por vegetação secundária, entretanto, algumas árvores altas remanescentes com cerca de 20 m de altura ainda podem ser encontradas, principalmente, nas grotas e encostas de difícil acesso. A retirada seletiva de madeira é uma das principais ameaças à integridade da mata e à sobrevivência dos *Calli- cebus*. Outro fator de risco é a possibilidade de incêndios na floresta, uma vez que durante a colheita da cana-de-açúcar todo o canavial, inclusive próximo à borda da floresta, é incendiado para facilitar o manejo da safra. Observamos, ouvimos e obtivemos gravações de três indivíduos de *C. coimbrai* no dia 4 de julho de 2003.

2. *Mata do Serigy* (10°33'S, 36°42'W). No município de Pacatuba, próxima à mata da Santana, com aproximadamente 70 ha de área, a mata do Serigy encontra-se hoje bastante alterada. Destaca-se na área uma vegetação secundária, muitas clareiras em processo de sucessão ecológica e muitas espécies heliófitas, inclusive gramíneas e ciperáceas que dificultam o acesso ao seu interior. A fisionomia atual da mata do Serigy é consequência de um incêndio ocorrido há aproximadamente oito anos que destruiu boa parte da mata. Apesar do seu estado de perturbação, *Calli- cebus*