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Census of *Alouatta fusca* and Habitat Quality in Two Areas of Atlantic Forest in Minas Gerais, Brazil

In September 1995, André Hirsch defended his thesis on a census of *Alouatta fusca* in relation to habitat quality in two protected areas of Atlantic Forest in the state of Minas Gerais, Brazil. The thesis formed part of the requirements for the Master's course in Ecology, Conservation and Wildlife Management, Institute of Biological Sciences, Federal University of Minas Gerais, Belo Horizonte, Brazil. His supervisor was Dr. Anthony B. Rylands, and the study was supported by the World Wide Fund for Nature (WWF/Brazil), the Brazil Science Council (CNPq) and the PADCT/ CIAMB Interdisciplinary Program - Biodiversity, Population and Economy of the Federal University of Minas Gerais. The following is a summary of the thesis.

The study was carried out in the Estação Biológica de Caratinga - EBC (860 ha) and the Parque Estadual do Rio Doce - PERD (36.113.6 ha), two protected areas of Atlantic Forest in the state of Minas Gerais. The aim was to evaluate habitat quality in both areas and correlate this with the density of *A. fusca*. Data on habitat quality was obtained using a Point Sampling Method (MTAP): sample points (300 m between each) were placed along the same transects as those used for censusing *A. fusca*. Ninety-nine points were sampled at EBC and 67 at PERD. Thirty-six environmental variables were recorded. The habitat data were analysed using multivariate techniques, including Cluster Analysis, Principal Co-ordinate Analysis and Discriminant Analysis (MULVA-5 Program). The Cluster Analysis produced four consistent groups of sampling points, making it possible to order them in a gradient of habitat quality. Discriminant Analysis allowed for the selection of 14 variables at EBC and 13 at PERD, all with a strong relation to habitat structure and the floristic composition of the forest. Census data were obtained using the Linear Transect Method adapted for two simultaneous observers. Fifty-two transects at EBC and 18 at PERD were surveyed three times by each observer, resulting in 157.8 km and 112.5 km of census, respectively. The time spent censusing was 234.7 h at EBC and 140.8 h at PERD. Average density estimates for *A. fusca* at EBC were 1.493 indiv./ha for the first observer, and 0.922 indiv./ ha for the second observer. Likewise, for PERD the estimates were of 0.495 indiv./ha and 0.018 indiv./ha, respectively.

The relation between howler density and habitat for each the specific regions identified in the study areas was clearer at EBC, where a closer relation was found between the complexity of the habitat structure, floristic diversity and *A. fusca* density. At the PERD, few records were obtained due to the low density of *A. fusca,* despite the very similar habitat structure and floristic composition of this, the larger, area. The reason for the density difference remains unclear, but such possibilities as habitat structure, size of the area, forest fires, disease epidemics (yellow fever, simian malaria and leishmaniosis), predation and hunting are possibly involved. The most important problems arising are related to the limited carrying capacity of the habitat in the case of EBC, and the increase of inbreeding depression between the howlers, related to their high density, the relatively small area, and the degree of isolation of the area. Future management and translocation programs must take these factors into account, and it will be necessary to involve the owners of private areas for protecting the forest fragments still remaining and encourage the regeneration of degraded areas, that can serve as forest "corridors" between fragments.

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Molecular Phylogeny of the Callitrichinae

In September 1995, Carmem Barroso defended her doctoral thesis on the molecular phylogeny of the subfamily Callitrichinae (*sensu* Rosenberger, 1981) for the postgraduate course in Biological Sciences (specialization in Genetics and Molecular Biology) of the Federal University of Pará, Belém. The study was supported by the Federal University of Pará, Belém, the Brazil Science Council (CNPq), and Wayne State University, Detroit, Michigan. The thesis was supervised by Dr. Horacio Schneider. The following is a summary.

DNA sequences encompassing the intron 1 of the IRBP gene, with approximately 1800 base pairs, were obtained for the following species: *Saguinus midas*, *S. bicolor*, *Leontopithecus rosalia*, *Callimico goeldii*, *Callithrix jacchus*, *C. geoffroyi*, *C. argentata*, *C. humeralifera* and *Cebuella pygmaea*. The sequences were added to the IRBP data base created for the remaining ceboid genera by Harada *et al.* (1995). An in-tandem alignment was constructed with this data along with the epsilon-globin data of Schneider *et al.* (1993). The arrangements observed confirm the monophyly of the family Cebidae; demonstrate that *Saguinus* is the most primitive of the Callitrichinae; and place *Cebuella* unequivocally as a member of the genus *Callithrix*, in the group "pygmaea", equivalent to the "argentata" and "jacchus" groups. A model of callitrichine evolution is proposed based on the phylogenetic evidence from this study. According to this model, the ancestral population of *Leontopithecus* and *Callimico-Callithrix* (or *Leontopithecus-Callimico* and *Callithrix*) would have arisen from proto-*Saguinus* stock. The proto-lion tamarins would have migrated eastwards, where they were isolated in refugia, becoming the genus *Leontopithecus*. The stock remaining in Amazonia gave rise to present-day *Callimico* and *Callithrix*. The latter genus occupied a vast geographic area, giving rise to the "argentata" and "pygmaea" groups in Amazonia, and the "jacchus" group in central and eastern Brazil.

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Vocal Communication Studies at the University of São Paulo

A doctoral thesis "Vocal Interactions in the Muriqui (*Brachyteles arachnoides*)" was defended in April 1995, at the Department of Experimental Psychology of the University of São Paulo (USP), by Francisco Dyonísio Cardoso Mendes, under the supervision of Dr. César Ades (USP), and with the collaboration of Dr. Charles Snowdon and Dr. Karen Strier (University of Wisconsin, Madison). It represented the first systematic study on the vocal communication of the muriqui, and the first thesis on primate vocalizations produced in Brazil. As a result, Dr. Ades and and Dr. Mendes have established the "Laboratório de Comunicação Acústica" at USP, with the acquisition of digital equipment for acoustic analysis of animal sounds. The laboratory will allow further analyses of muriqui vocalizations, as well as other studies on the vocal communication of different neotropical species.

Vocal interactions in the muriqui (*Brachyteles arachnoides*)

The major interest of the thesis was the interactional aspect of vocal signals. Observations and recordings of spontaneous vocalizations were carried out at the Biological Station of Caratinga, Minas Gerais. Vocal and contextual data were obtained through focal animal samplings and *ad libitum*. Contextual data included information on the identity of the caller, its behavior, social referents, and vocal and non-vocal