

PRELIMINARY FIELD STUDY OF THE RED-HANDED TAMARIN, *SAGUINUS MIDAS*, IN FRENCH GUIANA

A six-month field study was carried out on the ecology and behaviour of free-ranging red-handed tamarins (*Saguinus midas midas*), concentrating on ranging behaviour and habitat use. The data were collected at the Station of Nouragues (CNRS) in French Guiana between July and December 1994, using a scan-sampling method (Altmann, 1974; Rylands, 1982). The home ranges of most callitrichids are characterised by a mix of habitats, usually including an abundance of forest edge (Sussman and Kinzey, 1984; Rylands, 1996). Seasonal availability, distribution, and habitat location of food resources are known to have a major impact on the feeding and ranging patterns of tamarins (Garber, 1993). Seasonal changes in climate and the distribution of different forest types had the effect that the *S. midas* in this study were confronted with both spatial and temporal variation in ecological conditions. The periods of data collection permitted assessment of behavioural changes resulting from seasonal changes, including those in food supply.

Four groups were identified in the study area, one of which, containing three individuals, was taken as the main focus of study. The groups contained three to seven individuals, and had home ranges of 34 to 39 ha. In the dry season (September to November), the tamarins spent more time foraging. Feeding on fruits increased at the beginning of the wet season. *Saguinus midas* was never observed feeding on exudates. During the dry season, insectivory appeared to influence how the tamarins moved about their home range. Movement during the dry season was less goal-directed, probably related to the fact that insects are a spatially and temporally fluctuating food resource. At the beginning of the wet season, the tamarins started to visit their feeding trees more systematically. Home range overlap between the range of the focal group and neighbouring home ranges amounted to at least 46%, but many confrontations were recorded. These aggressive encounters did not serve to defend the border of the home range. Instead, they were concentrated around the liana forest, which was located in the centre of the focal group's home range. The increase in confrontations during the dry season, which was accompanied by increased time spent foraging, would suggest that liana forests are an important potential foraging area and that their defence is therefore economical.

Saguinus midas was observed predominantly in the

lower and middle strata of the forest (10-30 m) and mainly used supports 1 to 5 cm in diameter. While the tamarins were mostly at heights of 20-30 m during feeding on fruits, they spent more time at heights between 10 and 20 m during foraging for insects on leaves and lianas, as is also shown by *S. imperator* and *S. mystax* (Terborgh, 1983; Garber, 1988). Different heights were preferred according to the forest type, which might reflect either convenient travel paths or anti-predator behaviour. *S. midas* showed a distinct preference for edge habitats and was more frequently observed in liana forests than expected by chance. In addition to their apparent importance as foraging sites, the liana forests afford protection against predators of small-bodied primates. Raptors are the main threat for callitrichids (Ferrari and Lopes Ferrari, 1990; Heymann, 1990), so that predator pressure is probably stronger in open vegetation. This was confirmed by one observed attack on an individual tamarin made by a crested eagle (*Morphnus guianensis*) in an open forest. Anti-predator behaviour appeared to have consequences for group cohesion. In the open forest, the tamarins travelled in close-knit groups, because co-ordination was favoured not only for visiting patchily distributed food sources such as fruits but also for early detection of predators (see Caine, 1993). In the cover of the dense liana forest, the tamarins searched individually for the dispersed animal prey.

This text is a summary of a Master's thesis supervised by Prof. Dr. R. D. Martin and Dr. P. Charles-Dominique. The thesis (in German) may be requested from Philip Kessler at the address below. A full publication in English is in preparation.

Philip Kessler, Anthropologisches Institut, Universität Zürich-Irchel, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland.

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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.

André Hirsch, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Minas Gerais, Brazil.

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