Behavior of the Black Lion Tamarin, *Leontopithecus chrysopygus*, in Different Forest Levels in the Caetetus Ecological Station, São Paulo, Brazil

Fernando de Camargo Passos, Programa de Pós-Graduação em Ecologia e Recursos Naturais, Universidade Federal de São Carlos, Caixa Postal 676, 13565-905 São Carlos, São Paulo, Brazil.

Introduction

This paper reports on one of the aspects under study in a project underway examining the ecology and behavior of the black lion tamarin, *Leontopithecus chrysopygus*, in the Caetetus Ecological Station. Little is known of the behavior of lion tamarins concerning their use of different vegetation levels in the forest. It is emphasized, however, that further data are being collected, and the results reported here are preliminary.

Material and Methods

The Caetetus Ecological Station (22° 23'S, 49° 41'W) is a small forest reserve of 2,179 ha, administered by the São Paulo Forestry Institute. The study group, of six individuals in December 1993, was by March 1994 composed of just four: an adult female, two adult males, and an infant female. The group has been accompanied since December 1993, using radiotelemetry. Basic data is obtained using scan-sampling (Altmann, 1974), recording the following four activities: feeding, moving, resting and foraging, each of which are divided into descriptive subcategories. Feeding includes the manipulation and ingestion of foods, whereas foraging is recorded when the tamarins are evidently searching for animal prey. The forest height is recorded for each behavioral record: understorey 0-8 m, middle layers 8-16 m, and canopy above 16 m, in order to obtain a picture of the association between their behaviors and the forest layers.

Results

To date, 1,410 behavior records have been obtained during 119 hours of direct observation: feeding N=505 (35.8%), moving N=465 (33.0%), foraging N=237 (16.8%), and resting N=203 (14.4%). All four of these behaviors were carried out mainly in the middle layers of the forest (8-16 m) (Fig.1).

A little more than half (51.5%) of the feeding records were in the middle layers, largely due to fruit-feeding (N=242). Feeding on fruits in the canopy was registered for a further 36.6% (N=184) of the feeding records, due to such important trees as *Celtis pubescens*, *Cordia superba*, *Rhamnidium elaeocarpum* and *Ficus* sp. Feeding in the understorey (11.6%, N=60) was restricted to animal prey and exudate feeding. With regard to locomotion, again a little more than half of the records for moving were in the middle layers (55.5%, N=258). However, different from the pattern seen for feeding, 34.0% (N=158) were in the understorey, and only 10.5% (N=49) were in the canopy. The use of the middle layers was most accentuated for resting. 72.9% of the resting records were in the middle layer, 19.7% (N=40) in the understorey, and 7.4% (N=15) in the canopy. Foraging showed a similar pattern to that observed for locomotion: 57.0% (N=135) in the middle layers, 29.9% (N=71) in the understorey, and 13.1% (N=31) in the canopy.

Discussion

A preference for the middle layers of the forest was marked for all of the behavior categories sampled.

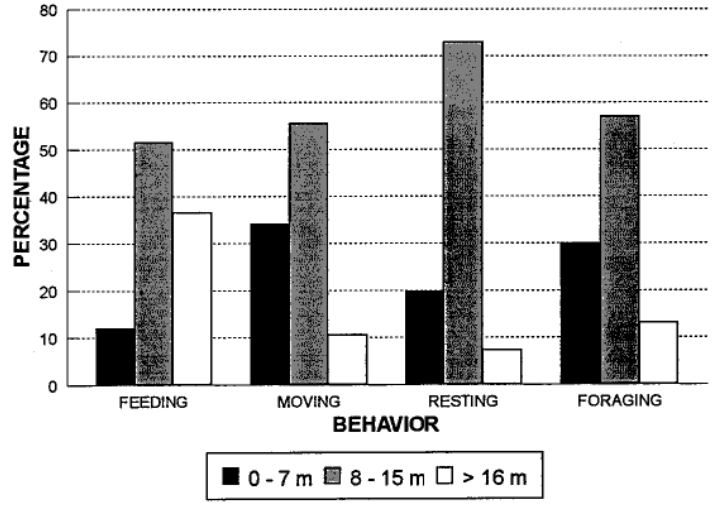

Figure 1. Behavior of black lion tamarins in different forest levels in the Caetetus Ecological Station, Gália, São Paulo.

Feeding on fruits was the principle reason for their use of the canopy, and moving and foraging for their use of the understorey. Information on the use of different forest levels has also been obtained for four groups studied by Valladares-Padua (1993) and his colleagues in the Morro do Diabo State Park. The height at which they recorded the lion tamarins was most frequently between 7 and 8,5 m, and on occasion they were observed going to the ground to obtain food, also seen at Caetetus (Keuroghlian, 1990; Passos, 1992). No studies on the vertical use of space have been published for the golden lion tamarin, *L.rosalia*. However, observations by Coimbra-Filho and Mittermeier (1973) suggested that they spend much of their time between three and 10 m. Rylands (1989) observed *L.chrysomelas* spending more of their time higher in the forest, above 12 m in the majority of records (80%), with foraging occurring generally between 13 and 19 m. The foraging level corresponded to that containing the highest abundance of large bromeliads, one of their preferred foraging sites, but non-bromeliad foraging was also largely restricted to these levels. Rylands (1989) also obtained data on the syntopic marmoset, *Callithrix kuhli*, which foraged at lower levels than *L.chrysomelas*. The majority of sightings (78%) were below 15 m, and slightly more than half of all the records (53%) were between 8 and 15 m (Rylands, 1989).

A number of factors determine the use of different levels of the forest in these animals, which undoubtedly differ between sites and most particularly for the different populations of each species. They include the relative importance of aerial and terrestrial predators, the vertical distribution of fruit and animal prey, and the forest structure, notably the height, degree of stratification and the vegetation density at each level. Sympatric primate species can also be expected to influence the use of different levels, and the presence of *C.kuhli* at Rylands'(1989) study site may well be contributing to a greater use of higher levels than has been found for other species. The lion tamarins at Caetetus are probably suffering competition from the high density of capuchin monkeys, *Cebus apella* (see Coimbra-Filho, 1976). A comparison of the vertical use of the forest in the four lion tamarin species along with an understanding of the habitat differences for each population would be of great interest to understand better the factors influencing the relative use of the different heights of the forest, and hence to understand better the adaptive behavior of these species.

Acknowledgements

I am grateful to the São Paulo Forestry Institute (IF-SP), and the Brazilian Institute for the Environment (Ibama) for permission to carry out this study. Dr Cleber J.R.Alho, Dr Claudio Valladares-Padua, Dr Faiçal Simon, and Dr Cory Teixeira de Carvalho provided valuable support and advice. My thanks to Dr Anthony B.Rylands for his suggestions and translation of the manuscript. The research is being financed by the Brazilian Higher Education Authority (CAPES), the World Wide Fund for Nature (WWF), the Fundação o Boticário de Proteção à Natureza, the Jersey Wildlife Preservation Trust, and the Lincoln Park Zoo Scott Neotropic Fund, and is part of a doctoral degree for the Federal University of São Carlos, São Paulo, Brazil.

References

Altmann, J. 1974. Observational study of behavior: sampling methods. *Behaviour*, 49:227-267.

Coimbra-Filho, A.F. 1976. *Leontopithecus rosalia chrysopygus* (Mikan, 1823), o mico-leão do estado de São Paulo (Callitrichidae, Primates). *Silvic. São Paulo*, 10:1-36.

Coimbra-Filho, A.F. and Mittermeier, R.A. 1973. Distribution and ecology of the genus *Leontopithecus* Lesson, 1840 in Brazil. *Primates*, 14(1): 47-66.

Keuroghlian, A. 1990. Observations on the Behavioral Ecology of the Black Lion Tamarin (*Leontopithecus chrysopygus*) at Caetetus Reserve, São Paulo, Brazil. Unpublished Master's thesis, West Virginia University, Morgantown. 76pp.

Passos, F.C. 1992. Hábito Alimentar do Mico-Leão-Preto, *Leontopithecus chrysopygus* (Mikan, 1823) (Callitrichidae, Primates) na Estação Ecológica dos Caetetus, Município de Gália, SP. Unpublished Master's thesis, State University of Campinas, Campinas.

Rylands, A.B. 1989. Sympatric brazilian callitrichids: the black-tufted-ear marmoset, *Callithrix kuhli*, and the golden-headed lion tamarin, *Leontopithecus chrysomelas*. *J.Hum.Evol.*, 18:679-695.

Valladares-Padua, C. 1993. The Ecology, Behavior and Conservation of the Black Lion Tamarin (*Leontopithecus chrysopygus*, Mikan, 1823). Unpublished PhD dissertation. University of Florida, Gainesville.