

Population Structure and Territory Size in Golden-Headed Lion Tamarins, *Leontopithecus chrysomelas*

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Introduction

With the exception of studies by Rylands (1982, 1983, 1989) conducted for three months on one group at Lemos Maia Experimental Station, Bahia, very little quantitative information has been published on the reproductive success, and population density and structure of free-ranging golden-headed lion tamarins (GHLTs). In addition to intrinsic scientific value, this kind of data is essential to the formulation of an effective conservation strategy for any *Leontopithecus* species (Seal *et al.*, 1990). We have been conducting continuous field observations on GHLTs in Una Biological Reserve, Bahia, since July 1991. The general objectives of our research include a quantitative assessment of the viability of the Una population of GHLTs and a comparison of behavioral and ecological data with that collected on golden lion tamarins (GLT) in the Poço das Antas Biological Reserve, Rio de Janeiro. The results of the first objective have and will continue to generate suggestions about the appropriate size and habitat composition for the Una Reserve (Coimbra-Filho *et al.*, 1993). The comparative approach used in the second objective will allow us to understand better the adaptive significance of behaviors common to both species, for example, the maintenance of territories that are large relative to those of other Neotropical forest primates. Here we report on selected preliminary findings for both objectives.

Study Area

The study area covers approximately 400 ha along the northern and northeastern borders of the 7000 ha Una Reserve. The forest in this portion of the Reserve is characterized by emergent trees about 30 m in height, covered with bromeliads and vines and with a well-developed understorey comprised of small trees, shrubs and bamboos. Although it is likely that selective cutting of economically valuable trees took place prior

to the creation of the Reserve, we have no evidence that clear cutting took place in this locale.

Methods

The lion tamarins in the study area were captured using modified Tomahawk live-traps baited with grapes. All individuals were tattooed and fur-dyed for identification. Radio transmitter collars were put on two individuals in each group. The groups were followed until they became habituated to the presence of human observers, at which time systematic focal observations were initiated. The location of the focal group was plotted at intervals of 30 min. Group compositions were monitored at intervals no greater than one week (see methods in Kleiman *et al.*, 1986; Dietz and Baker, 1993). The results presented here are based on at least one year of data for each study group.

Results

Our study included 34 GHLTs in seven groups, presumably all the lion tamarins in the study area (Table 1.). The composition of the study groups was similar to that reported for golden lion tamarins (GLT): a single reproductive (parous) female, 1-3 adult males plus the offspring of 2-3 litters. The mean size

Table 1. Composition of Study Groups

Group	Composition at First Capture
GHLT 8	1RF
VIV	1RF, 2AM
PRI	1RF, 2AM, 2SaF
PIA	1RF, 1AF, 3AM, 2SaM, 1JF, 1JM
FRU	1RF, 2AM
GHLT 10	1RF
JER	1RF, 1AF, 1AM?, 1SaM, 1JF, 1JM

RF = parous female, F = female, M = male, A = adult
Sa = subadult, J = juvenile.

for reproductive groups was 5.2 for GHLTs and 5.4 for GLTs. The number of offspring surviving to six months of age/reproductive female/year was 1.1 for GHLTs (estimated from group compositions and birth data) and 1.7 for GLTs (monogynous groups only). Results on GLTs are taken from Dietz and Baker (1993).

With the exception of GHLTs 8 and 10, which were dispersing individuals, all the study groups maintained relatively stable territories defended against all other adult tamarins (Fig. 1). The mean territory area was 75 ha for GHLTs ($n=4$) and 42 ha for GLTs ($n=47$). The Concave polygon model in MCPAAL software (Conservation and Research Center, Smithsonian Institution) was used to calculate territory areas in both studies. To calculate the density of GHLTs in the Una Reserve we merged the datafiles from the study groups and calculated the total area occupied by the four groups. Based on these calculations, the maximum density of GHLTs in the Reserve is one per 12 hectares. If 5,000 ha of the Una Reserve contain suitable habitat for GHLTs, and our data are representative for the entire area, the estimated population size would be 416 animals in 80 groups. Under these assumptions the effective population size for the Reserve would be about 160, a number far smaller than the minimum theoretically necessary for longterm conservation of genetic diversity in isolated populations (Soulé, 1980). However, both of these assumptions need to be examined carefully before accepting this population estimate as the basis of management recommendations.

Although the social organization and mating system of GHLTs appear to be similar to that of GLTs, group size is apparently smaller and territory size larger. We speculate that the smaller group sizes in the Una Reserve may reflect higher mortality, perhaps as a result of higher predation pressure in this relatively undisturbed forest than in the secondary forests of the Poço das Antas Reserve. Larger territories in Una may be the result of interspecific differences in habitat use, or, may result from a greater resource availability in the forests of Poço das Antas. If the latter explanation is correct, we would predict a decrease in lion tamarin density in Poço das Antas as the degraded forests in that reserve mature.

In conclusion, large patches of relatively undisturbed forest adjacent to the Una Reserve presently contribute to much larger effective population sizes for GHLT's and most forest vertebrates, than would be the case in the Reserve

alone. Given the rapid rates of deforestation in the region, we suggest that every effort be made to annex these remaining large forests to the Reserve. Where land acquisition is impossible we suggest intensive work with landowners to encourage the development of private forest reserves. In a few years we will no longer have these options.

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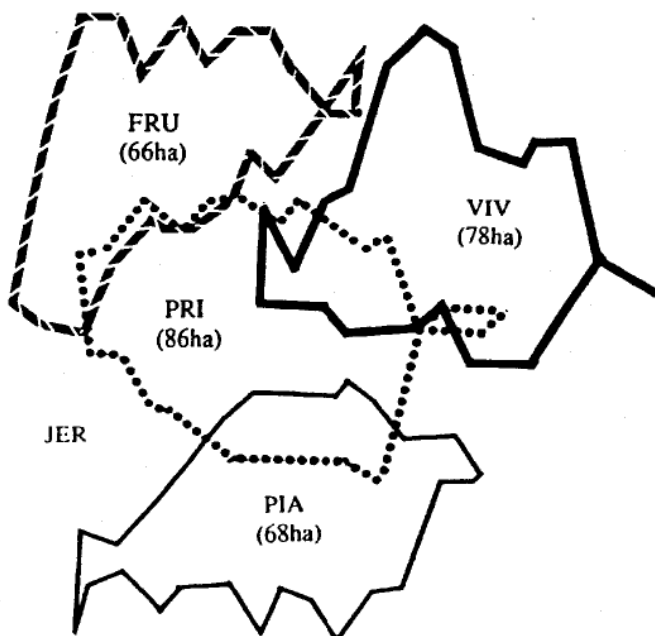


Figure 1. Territory perimeters for four groups of golden-headed lion tamarins in the Una Biological Reserve.

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