Use of vertical stratum by golden-headed lion tamarins under different predator pressures

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The golden-headed lion tamarin (GHLT), *Leontopithecus chrysomelas*, is endemic to the Brazilian Atlantic Forest. Currently, its distribution is dominated by shade cacao agroforest, locally known as *cabruca*, where groups are able to live successfully. *Cabruca* agroforest is different from primary forest because the vertical stratum is simplified. The canopy discontinuity makes GHLTs more exposed to aerial predators. Previous research conducted in *cabruca* has shown that encounter rates of GHLTs with predators are higher in this habitat compared to forested habitat types.

> **"GHLTs avoid the higher levels of vertical stratum in the two study sites"**

We investigated how the GHLTs can lead with this high risk in *cabruca*, specifically, if groups avoid exposition in higher levels of vertical stratum due to the high risk of predation by raptors. To do this, we compared data on use of vertical stratum between groups living in *cabruca* and groups living in mosaic forests (mix of *cabruca*, primary and secondary forest), where there is a reduced risk of predation.We expected that: 1) since raptors are the principal predators of small primates, GHLTs will avoid to use the higher levels of vertical stratum, and 2) since predation risk by raptors is higher in *cabruca*, GHLTs will avoid these levels more in this habitat than in mosaic forest.

This study was carried out in the cacao-growing region of southern Bahia, northeastern Brazil, in the municipality of Ilhéus (14°39'S, 39°11'W), where three groups (Almada, Bomfim and Santa Rita) were monitored during 2010 and 2011 in areas composed exclusively of *cabruca*. Data from mosaic forests were obtained from Project BioBrasil, which was carried out in the Una Biological Reserve, located in the municipality of Una(15°10'S,

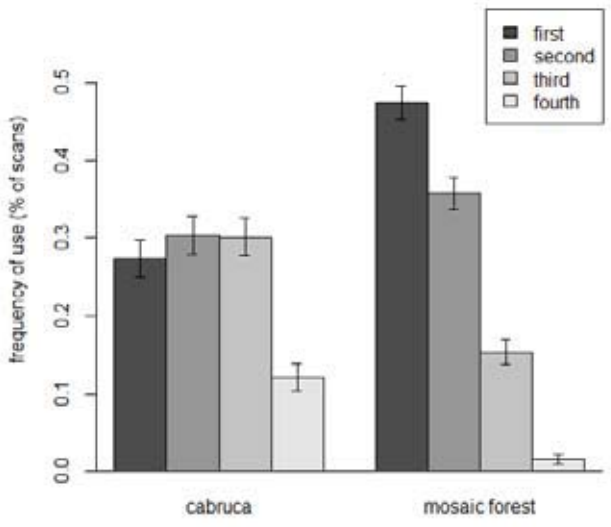

Figure 1. Use of vertical stratum levels by GHLTs living in *cabruca* and mosaic forest.

39°03'W), where three other groups (Flamengo, Rabito and Palmeiras) were monitored during 2007 and 2008. The same methods of data collection were applied in the two areas. We used scan sampling to collect information about the use of vertical stratumby dividing it in four levels and determining the median height of the entire group.

Our results show that GHLTs avoid the higher levels of vertical stratum in the two study sites (Figure 1). This is in agreement with our first hypothesis of reducing exposure to aerial predators. However, groups use the higher levels (third and fourth) in *cabruca* more than in mosaic forest (Figure 1), which is contrary to our second hypothesis. This may be due to the low level of structural complexity of *cabruca* which may lead individuals to use the levels that are available. Thus, we conclude that, in addition to the higher predation risk GHLTs experience in *cabruca*, the groups are particularly more vulnerable to aerial predators in this habitat since they expose themselves more. This highlights the importance of investigating other variables and possible antipredator behaviors used by this species to understand how groups are managing to survive in this risky scenario.

Genetic analysis applied to the conservation of golden-headed lion tamarin from bahia south.

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Out of the four species of lion tamarins, the golden-headed lion tamarins (*Leontopithecus chrysomelas,* GHLT) is the one species with the highest population size and largest habitat area. It would be reasonable to assume that this species would show the highest genetic health, that is, that most genetic diversity (largest number of alleles, lowest inbreeding, high heterozygozity). Nevertheless, the GHLT are threatened by loss of natural habitat, conversion of cocoa plantation agro-forests (shade-cacao) into other cultures or pastures for cattle grazing and increasing forest fragmentation.

All of these are problems that have been associated