Tamarin Tales

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Golden-headed lion tamarins in cabruca agroforest

- what we know and what we still need to know...

Leonardo C. Oliveira

Understanding how the golden-headed lion tamarin (GHLT - *Leontopithecus chrysomelas*) uses the matrix of habitat that surrounds forest fragments can contribute to formulating conservation strategies in fragmented landscapes.

The dominant vegetation type or habitat within the range of GHLTs is shaded cacao agroforest or cabruca (figure 1), as it is called locally in the State of Bahia. In the 1990's cabruca dominated the geographical range of GHLTs with around 40% of the landscape compared to 30% of forests areas within the landscape. However, a long-term economic crisis due to a decrease in the price of cocoa and the emergence of witches' broom (Moniliophthora perniciosa), a fungal disease that has been devastating Bahia's cocoa crops since 1989 and decreasing cacao production, was forcing landowners in southern Bahia to transform cabruca into other types of crops to increase their revenue.

Figure 1. Cabruca agroforest

Furthermore, the long-term survival of native forest trees found in *cabruca* is at risk due to current management practices and the natural death of forest trees. Given the rapid degradation of Atlantic Forest in Bahia, the endangered status of the golden-headed lion tamarin and the rapid changes in *cabruca* management, a better understanding of the relationship between agroforest

management and key resources found in *cabruca* emerged as an important conservation objective and a priority for the species (Holst et al. 2006).

This scenario motivated the initiation of *Cabruca* project which aims to address if and how GHLTs use or live in *cabrucas*. The project started officially in 2007. In the six years since field work started we have some important discoveries about the relationship of GHLTs with *cabrucas* and how this knowledge may help the conservation of the tamarins. Based on the results the project produced, we have good information on tree species that can be used in habitat restoration or cabruca management.

There are at least 55 species, which are used as food source or sleeping site, and thus can be considered

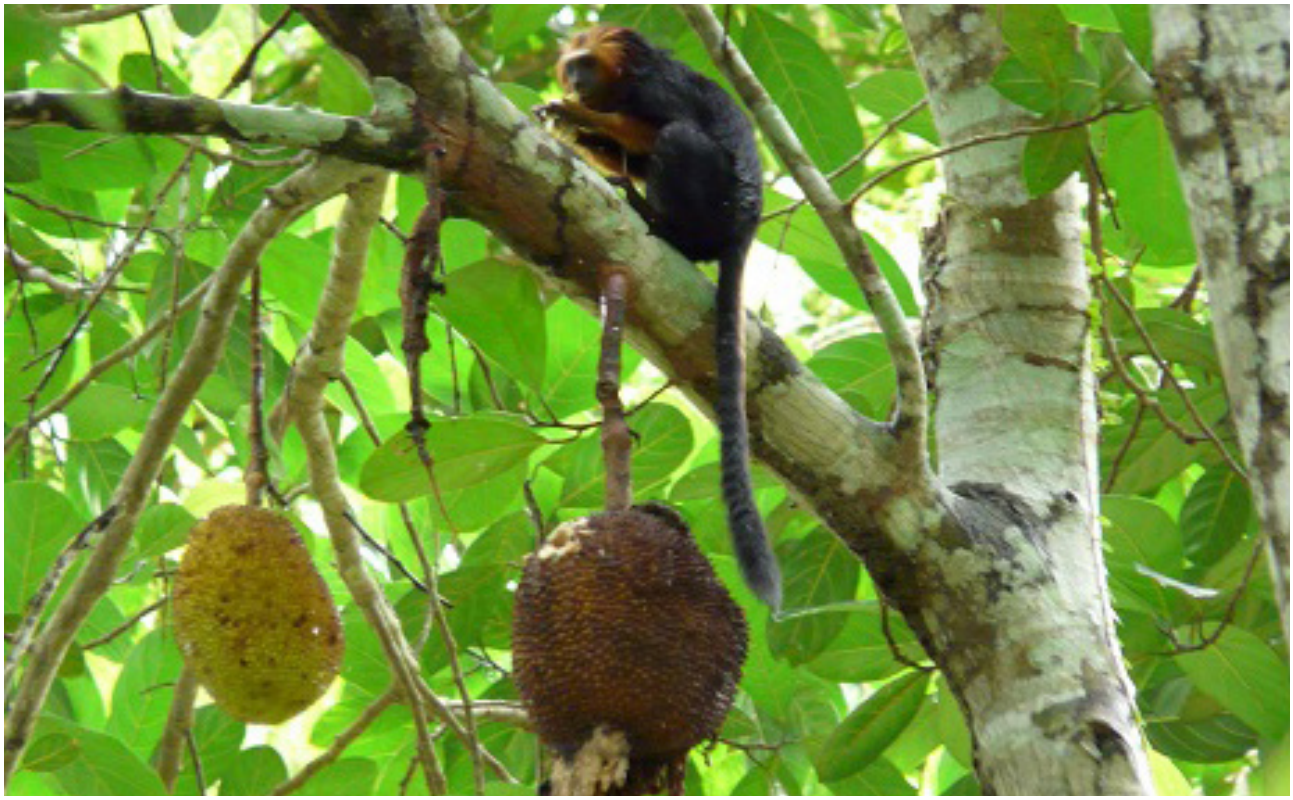


Figure 2.

Extremely Valuable for GHLTs and could be used for the purpose mentioned above. We also discovered that GHLTs do not only use *cabrucas* as part of their home range, as suggested by other authors in 1990's and confirmed in 2000's, but they can reproduce very well in this agroforest, with twins in every reproductive season.

The density of GHLTs is also very high in cabruca reaching up to 2 individuals per 10 hectares, although group size averaged 7.4 individuals, and was not significantly different between vegetation types. Home ranges in *cabrucas* were smaller than compared to other vegetation types and GHLTs were also larger and heavier in cabruca than in other vegetation types. These results can probably be explained by the abundance, both spatially and temporally, of jackfruit, *Artocarpus heterophyllus* (Figure 2) an exotic invasive species in *cabrucas*.

Despite this apparent good adaptability to *cabrucas*, our research did show that GHLTs are much more at risk of predation in cabruca compared to other types of forest. The number of encounters between GHLTs and potential predators, mainly raptors, is almost four times higher in cabruca than in other forests.
In order to avoid predation GHLTs associate with Wied's marmosets (Figure 3). However, structural limitations

of cabruca lead to groups in cabruca being forced to use the higher levels of the forest compared to mosaic forest, exposing themselves more to aerial predators as highlighted by Almeida-Rocha (2012).

As part of a behavioral study, we discovered that the activity patterns of GHLTs in cabruca is similar to that found for other populations in different habitats, although the daily travel distance is lower in *cabruca*, probably due to the abundance of jackfruit, a highly energetic food source.

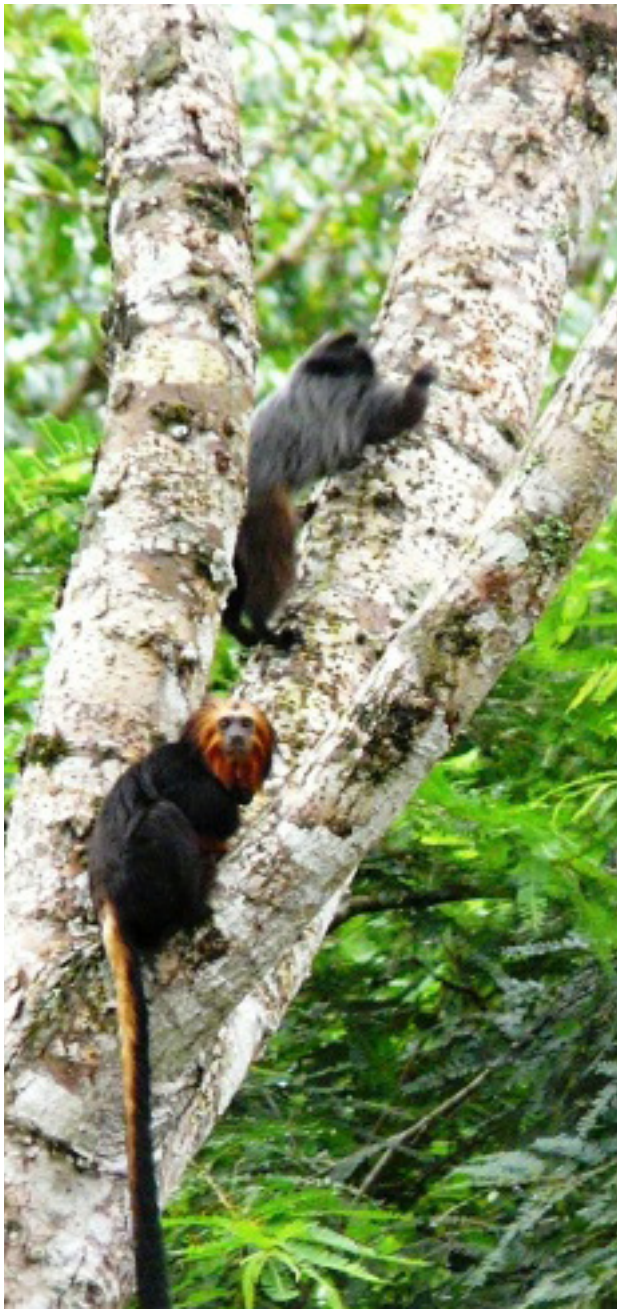


Figure 3.

Thus, our research results to date show that lion tamarins can live and reproduce in some types of cabruca agroforest, with demographic and ecological and behavioral aspects apparently similar to groups that live in native forest habitats, despite the higher predation risk they are exposed to in *cabrucas*. However, cabruca areas, even those in close proximity to each other, vary in richness and density of overstory trees and consequently in forest structure. Understanding whether and how GHLTS use the range of different cabruca types will help, for example, in refining estimates of the number of lion tamarins in the wild.

Also, studying how GHLTs use the resources (fruits and animal prey) in different types of *cabrucas* may help to understand their success and constraints in such habitats. Identify structural and floristic characteristics of *cabrucas* that can be used to predict the presence or absence of GHLTs in this agroforest or the type of use is also crucial since it can be the basis for strategies aiming at incorporate value to cacao (or rather cabruca plantations) by creating a certification for those farms that produce such GHLT's friendly cacao.

This action may be instrumental for halting cabruca conversion by increasing the price of the cacao while reducing the pressure to increase overall production (which is generally done by intensifying production and may require a decrease in the number of shade trees on cacao plantations and hence a decrease in available GHLT resources).

The next steps in cabruca studies are likely to provide even more crucial information for shaping GHLT's conservation.

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

Juliana M. de Almeida Rocha, Paula Pedreira dos Reis, Kristel De Vleeschouwer & Leonardo C. Oliveira

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,

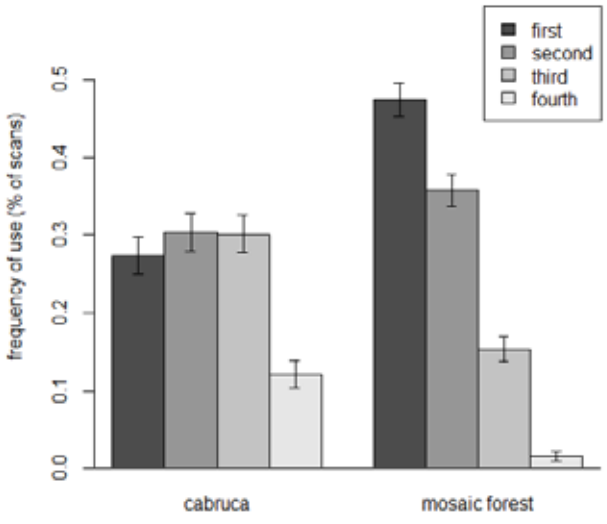


Figure 1. Use of vertical stratum levels by GHLTs living in *cabruca* and mosaic forest.

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.

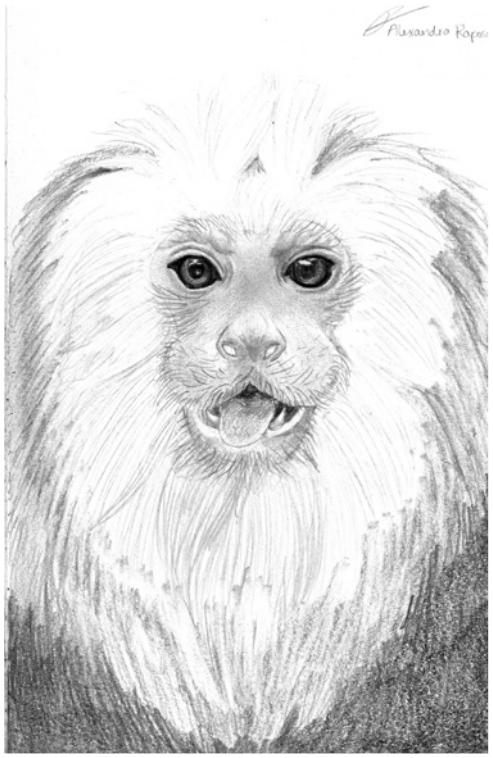
Genetic analysis applied to the conservation of golden-headed lion tamarin from bahia south.

Andreia Magro Moraes, Adriana D. Grativol, Kristel Vleeschouwer & Carlos R. Ruiz-Miranda

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

in other species to loss of genetic diversity, and consequently, loss of population viability. These human induced changes are not spread evenly over the whole species range, some areas are more affected than others. In the western Bahia state part of the GHLT distribution, it is estimated that the habitats are so small that the populations in them no longer are able to sustain genetic heterozygozity.



These observations raised enough issues to make us question the assumption that the GHLT have a healthy genetic diversity. The principal goal of our research was to evaluate the genetic structure of GHLT populations. Genetic analyzes can help us understand what is happening with wild populations that inhabit the different types of habitats present in the Bahia state, and that information can be used to support conservation planning.

We analyzed 153 samples of GHLT individuals from eastern and western Bahia provided by the “Consortium Golden-Headed Lion Tamarin”. The samples came from populations in different types of forest (semi-deciduous and evergreen) at different successional stages and with different influences of shade-cacao agro-forests. We used seven microsatellite genetic markers developed specifically for the genus *Leontopithecus*.

Even though number of animals sampled should be larger, these initial statistical analyses of the genetic structure revealed that the initial assumption was probably incorrect. First, the overall measures of genetic diversity are similar to the measures obtained from the other species of lion tamarins, which have much smaller populations and distribution ranges. Second, the social groups from different regions of eastern Bahia show significant genetic differences.

This was unexpected because this region shows substantial structural landscape continuity provided by the presence of shade-cacao plantations interspersed with native forests. Researchers believed that the continuity within their habitat mosaics, provided by the cacao agro-forest, was sufficient to maintain gene flow among the populations. The continuity of the landscape is relative probably because there are "gaps" in the forests, which are filled by pastures or other types of non-forested plantations.

These deforestation gaps may be playing an important role in animal movements and consequently in the genetic structure of the populations. This means that for the conservation planning for GHLTs, and all other lion tamarins as well, some hot research topics would be linking landscape connectivity measures to actual animal movements, and influence those movements would have on population genetics and the probability of survival for each population.

Trends in dispersal behavior in wild GHLTs

Lily Hu

Living in a group has its advantages: access to high quality resources, improved offspring survival, and increased predator avoidance. Territorial, cooperatively breeding lion tamarins live in fairly stable groups of 5-7 individuals on average and individuals obtain the aforementioned benefits of group living. Despite the advantages of group-living, many individual GHLTs disperse at some point to join or form new groups. However, dispersal is dangerous and the outcome is not definitive. Dispersers not only leave familiar territory, but also leave alone (or less commonly with a partner), losing group benefits and risking inefficient foraging and predation until they join a new group. Thus, we are interested in investigating what triggers the decision to disperse, why some GHLTs prefer to disperse in multiples, and how age and sex are related to this decision.

This past year we began characterizing dispersal behaviour in wild GHLTs using previously collected observational and demographic data collected in Eastern Una Biological Reserve (from the PMLCD project, 1993-2007). The goal of our project was to generate an overall description of the dispersal process and to investigate dispersal motivations, dispersal strategies, and benefits of dispersing with others (co-dispersal). From a sample of 170 study animals and 11 groups, we noted 21 transfers between known groups and 44 dispersals where group of departure or settlement was unknown, with some individuals dispersing more than once.

We found that, on average, 16% of the study population was documented to have changed groups per year. While most GHLTs dispersed alone, dispersal dyads and triads were also seen (Fig. 1a). Dispersing individuals generally spent 1-2 weeks alone before settling in a new group. Interestingly, most documented dispersal events were by adult (i.e. biologically reproductive) males during the mating season (June to December) (Fig. 1b-c). We looked at 40 documented emigration events and found that 18 were natal dispersals, 13 secondary, and 9 of unknown dispersal type (Fig. 1d).

We looked into "information prospecting" as a possible strategy to improve the likelihood of joining a new group. During territorial group encounters, engaging in aggression or even observing as a bystander (i.e. "prospecting") may inform individuals about the status

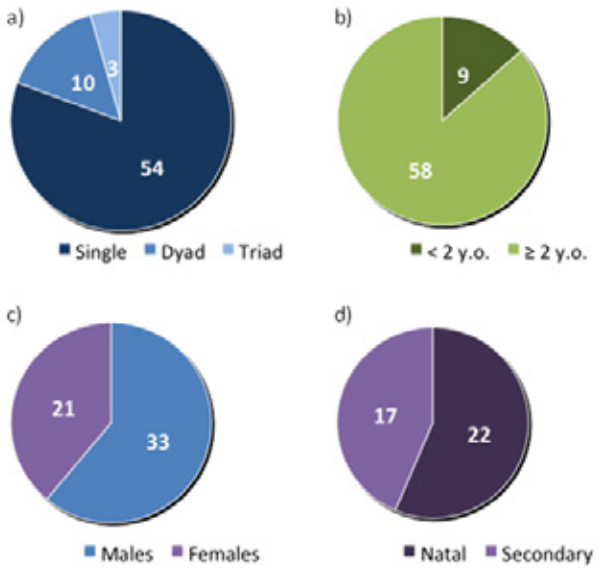


Figure 1. a) Proportion of disperser types; b) Proportion of biologically reproductive adult dispersers (age 2 years or older); c) Sex ratio of dispersers; d) Proportion of dispersal types. Events of unknown dispersal type were excluded from figure.

of the opposing group and its members – namely, if there are vacancies. Individuals from opposite groups may even play or groom each other during encounters, building affiliative bonds, which could allow for the acceptance of one into the other's group. While we could not identify specific behaviours during encounters that aided in an individual's successful dispersal, we found that 60% of male dispersers who successfully transferred groups did participate in encounters prior to leaving. Fewer female dispersers (38%) engaged in encounters, leading us to consider whether GHLTs utilize different sex-specific strategies to improve the success of transferring groups. The greater involvement of male dispersers in encounters may indicate information prospecting as a male-biased strategy to learn about opportunities to join neighbouring groups.

Another important topic based on current observations on GHLT dispersal was why some individuals dispersed together, rather than alone and how dispersal sets (dispersal with partners) were decided. We confirmed 52 dispersal events by lone individuals, and 13 by dispersal sets (10 dyads, 3 triads). We found that dispersal sets consisted of close relatives, which may confer benefits to reproductive success. If one dispersal partner mates in the new group, the other partner acts as a helper, which is critical to reproductive success in GHLTs as cooperative breeders. Given that dispersal sets consisted of relatives, the helper gains inclusive fitness benefits by helping raise its dispersal partner's offspring, which could explain the pairing of close relatives as dispersal partners. We did observe a trend in our data supporting improved reproductive success of dispersers in the presence of a dispersal partner (Fig. 2). However, set dispersals were not common. There may be circumstances in which disperser sets are disadvantageous, such as a decreased likelihood of being accepted into a group or mating competition.

In conclusion, our results so far indicate that GHLTs are likely driven to incur the costs of dispersal to seek mating opportunities. They may use information prospecting as a male-biased strategy to identify the status of neighbouring groups, either to determine if vacancies exist, or assess the condition of competitors. Finally, if transferring groups increases the likelihood of mating success as we suspect, GHLTs may choose to disperse as a set when conditions allow, ensuring there is a receptive helper immediately present to raise the future offspring. Possible studies further strengthening our understanding of dispersal in GHLTs include quantifying distance traveled as a proxy for determining dispersal costs, comparing reproductive success of dispersers to those same age individuals choosing not to disperse, exploring female-biased dispersal strategies, and better characterizing the formation of disperser sets.

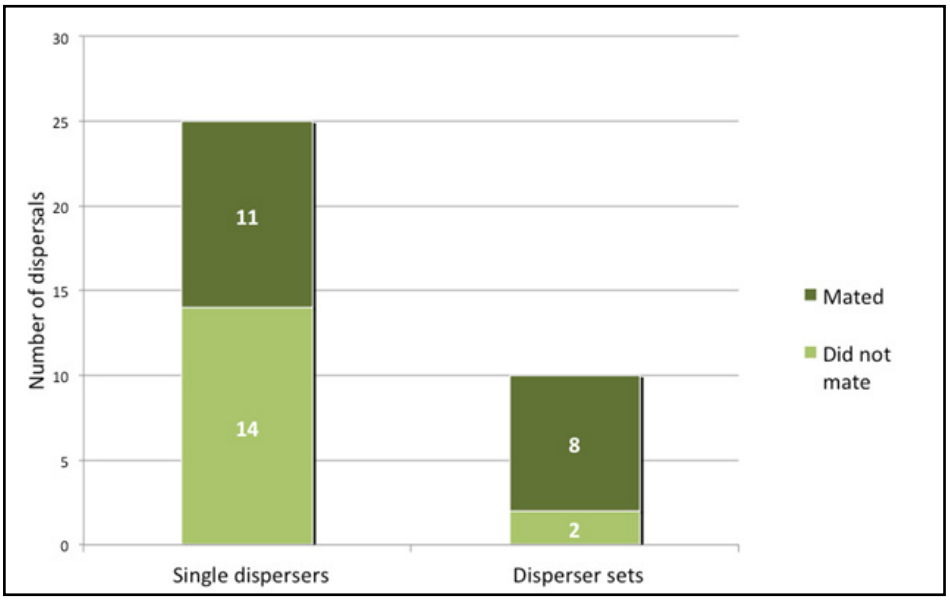


Figure 2. Comparison of mating success of single and set dispersers after settling in a new group. Mating success was determined by whether individuals conceived offspring (i.e. mated) in their new group

Should I stay or should I go now?

- report of dispersal in reintroduced and wild-born GLT

Valéria R. de Paula & Carlos R. Ruiz-Miranda

Animal dispersal refers to the movement of one or more individuals from their habitat patch or natal group to another area. This behavior is important to conservation programs because it directly influences the genetic exchange between populations and ultimately, the survival of populations. Thus, six aspects of dispersal behavior are extensively considered by the GLT conservation program: who, why, when, how often, how far and through where.

Investigating the dispersal motivations of tamarins will provide key information for conservation decisions regarding forest connectivity and even translocation. One question that we had was if dispersal behavior in a population of reintroduced tamarins would follow rules similar to those of wild populations. Here we will consider the main findings of Valéria de Paula's Master's research under the supervision of Dr. Carlos Ruiz-Miranda of the UENF – Brazil.

This study received direct support from the AMLD field team, which were responsible for collecting behavioral and demographic data on the reintroduced zoo tamarins.

Why do golden lion tamarins disperse?

Leaving home is not an easy decision at all, and although there are many benefits in forming a new family, the dispersers need to out-weight the costs of such behavior. For example, a dispersing animal usually does not know the distribution of resources in the new area and is more vulnerable to predators. So, why disperse?

Previous studies showed that a GLT has two main breeding options: (1) staying in their groups and wait for a breeding opportunity in their natal group (e.g: a female waits for the immigration of a non-relative male) while provide care for their parents' new young offspring (called indirect fitness) or (2) leaving their natal groups in order to find new breeding opportunities. If they succeed, the costs of dispersal will be out-weighted by the benefits of producing their own young (acquiring direct fitness; Figure 1).

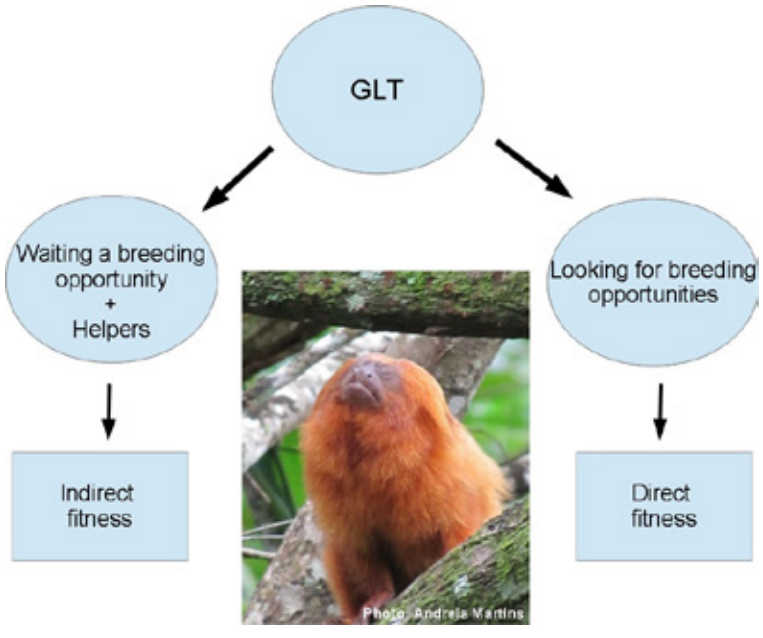


Figure 1: Golden lion tamarins main breeding opportunities. Should they stay in their parents' home or should they go?

In general, the causes of dispersal can be understood from both an evolutionary and an immediate perspectives. Avoiding inbreeding and competition with relatives are the main ultimate factors highlighted in the literature. Immediate factors such as, aggressive eviction, co-especific attraction and low individual cohesion with its group, have been investigated mainly in Old Primates, but the immediate motivations of dispersal in New World Primates remains poorly understood.

Our purpose was to investigate the proximate factors driving natal emigration in zoo-born reintroduced golden lion tamarins and their wild-born offspring living in forest fragments of the Atlantic coast rainforest of Rio de Janeiro – Brazil.

Main results

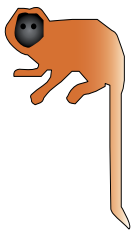
We identified 160 dispersers from the 68 monitored groups of the reintroduced tamarin population. The majority of them born in the wild. We found that the records indicate that tamarins tend to emigrate only one time in their lives. Males emigrated and immigrated more than females, and were also heavier than them. Both sexes emigrated after acquiring sexual maturity and during the mating season period. We did not find high levels of agonistic behaviour prior to dispersal, instead we found that dispersing males participated less in social activities than female dispersers or than non-dispersers. On the other hand, females disperse with no apparent behavior changes, suggesting that they leave their groups voluntarily. It thus seems that co-especific attraction is a factor driving natal emigration of both sexes, while weak social bonds also drives males emigration.

General Comments

The pattern of dispersal observed in the reintroduced and wild-born tamarins was similar to that described in the wild population living in Poço das Antas Biological Reserve (studies by Drs Andrew Baker and James Dietz). It seems then that the reintroduction program resulted in a population of captive-born animals and their wild-born descendants that show natural behavioural mechanisms of dispersal. Future conservation research can now focus in the other questions related to dispersal (how often, how far and through where). Probably, the most important future conservation actions have to do with increasing the connections between fragments and populations of the meta-population. Other recent studies by Andressa Coelho from the UENF and Jeniffer Mickelberg from George Mason University have shown that the isolation of fragments directly limits GLT inter-patch movement as well as influence the genetic exchange between populations.

“tamarins tend to emigrate only one time in their lives”

Resource: **de Paula, V.R. 2013.** *O comportamento de dispersão dos micos-leões-dourados (Leontopithecus rosalia, Linnaeus, 1766) reintroduzidos e seus descendentes nascidos em vida livre.* Dissertação (Mestrado em Ecologia e Recursos Naturais). Campos dos Goytacazes – RJ. Universidade Estadual do Norte Fluminense – UENF. 56p.



A way to estimate tamarin abundance

- responses of golden lion tamarins to playbacks of long-calls

Márcio M. de Morais Jr., Carlos R Ruiz-Miranda, James Dietz & Andréia Martins

Accurately assessing primate population abundance is challenging, but critical for species conservation initiatives. Cost-effective methods are needed to provide robust abundance or density estimates. Although no method for estimating primate abundance is bias free, the most reliable abundance estimates are obtained from complete counts or long-term monitoring of home range size and overlap in conjunction with group size data. These were the methods used to monitoring Golden Lion Tamarins (GLTs) abundance for more than 20 years.

However, these methods require sampling effort that is time and cost intensive. Currently, the monitoring program of this endangered primate species cannot afford to use such methods, especially envisioning to extend the geographical area monitored.

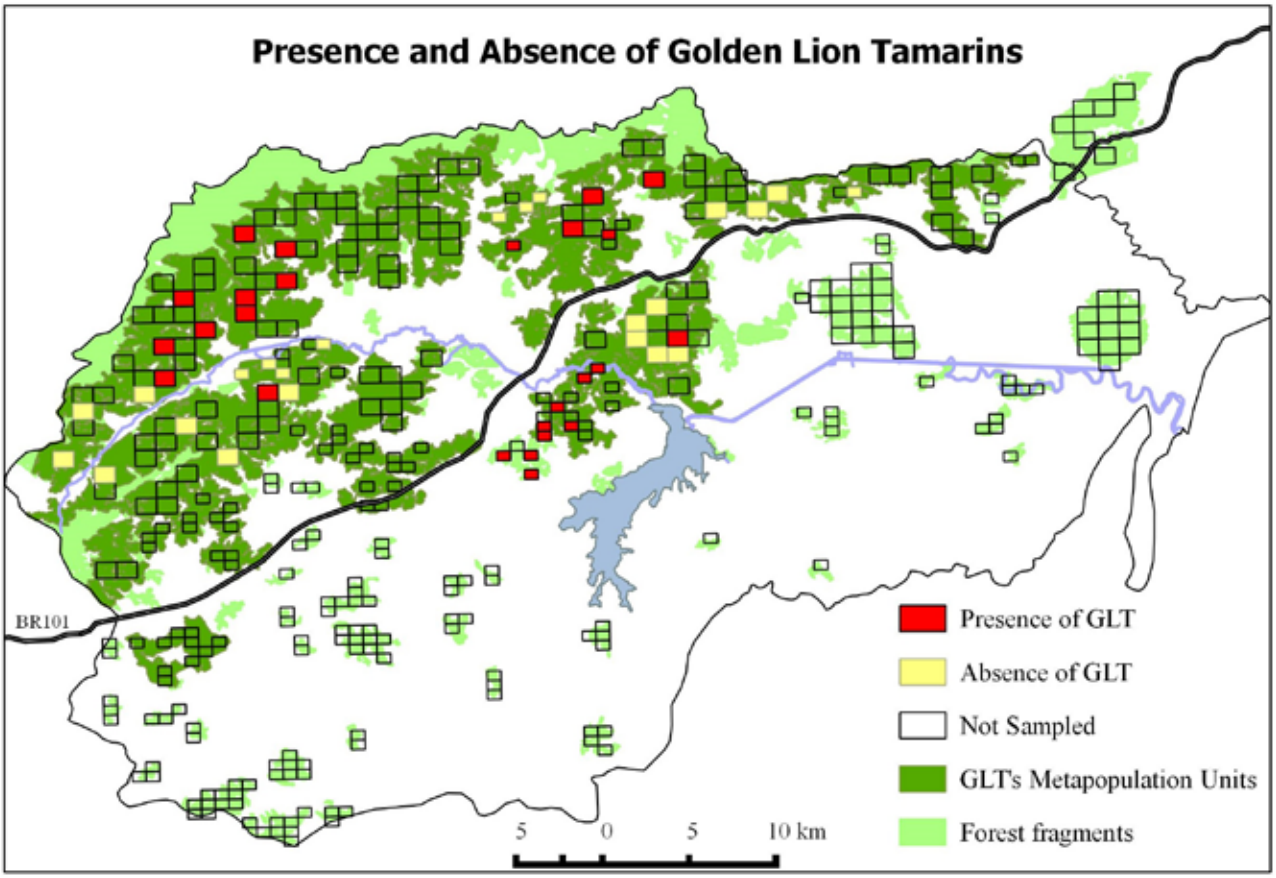


Figure 1: Presence and absence of golden lion tamarins surveyed in grids at the GLT's Metapopulation Management Units.

Line transect distance sampling is an alternative method widely used for estimating abundance of primate populations, considered more practical and efficient in terms of time and finances. In forest habitats, however, where visibility is limited, the abundance of species might be underestimated.

What if we could get the animals to give clear and reliable sound cues? Would it work if the observers were to play samples of the species' calls to elicit a vocal response from animals? If it work it would increase the detection chances and we would not rely only on the direct vision of the observer.

Playbacks have often been used to evaluate species presence/absence and relative abundance (particularly for birds), but they have seldom been accounted to detectability variation and used for estimating population densities. Given that GLTs display territorial vocal behavior, and respond vocally to playbacks performed within their home ranges, playbacks could be used to increase encounter rates during surveys.

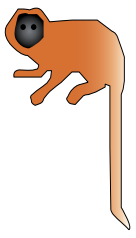
"this cost-effective survey method will provide greater viability to the long-term monitoring program of golden lion tamarin"

In 2013, with support from a LTBF grant, we began the GLT Playback surveys. The main survey comprises a systematic grid of points through the GLT's Metapopulation Management Units (Figure 1). Tamarins are lured to a playback point and the number of them at each point is recorded.

In a separate study, playback trials have been conducted on a subset of GLT groups with known location, and from which will be possible to estimate the probability of its responses to playbacks. This allows the counts from the main survey to be converted to an estimate of abundance. These experiments are the baseline to develop a cost-effective method to estimate GLT population size that potentially could be applied to any primate species displaying territorial vocal behaviour.

To date, we surveyed about 80% of the grids in the GLT's Metapopulation Management Units. New locations where golden lion tamarins are present were recorded and many others were confirmed (Figure 1). The playback trials have revealed wide variation in the response of tamarins groups. The probability of response seems to be influenced by group behavior, but also by individual traits. Most often the tamarins will call and approach the source of the sound (speakers), but sometimes they surprise us and run on an unforeseen direction, not away from the sound, but at an angle. Some times they would move fast toward a location where they often encounter their neighboring rivals, why? Did our call remind them of someone? Or of something to do?

Although a playback approach seems promising, several factors should be considered before choosing this method for survey GLTs. Our experiment is taking those factors into account and will help to develop not only a survey method, but also an analytical technique for estimating GLT abundance. We will assess the reliability of the playback method applying it on regions of known population density and making adjustments to achieve adequate accuracy and precision of abundance estimates. The development of this cost-effective survey method will provide greater viability to the long-term monitoring program of golden lion tamarin, and would help to overcome the challenge in abundance estimates of primates inhabiting fragmented landscapes, such as the others tamarins species.



Corridor Tales

Do GLTs move through corridors and cross open spaces?

Rafaela Screnci-Ribeiro & Carlos R. Ruiz-Miranda

An important conservation strategy for golden lion tamarins (GLTs) is the implementation of ecological corridors in their areas of occurrence. Since 2002, the Associação Mico Leão Dourado has been planting forest corridors in selected areas within the region of the meta-population of golden lion tamarins. The idea is that these corridors should enable the functional connectivity between fragments and facilitate the dispersal of GLTs. These corridors could also work for the dispersal of other animal and plant species. But planting corridors is very expensive and takes some years before the trees reach a size that is functional. Those concerns about costs have raised the need to know if tamaris use the corridors and how often, when compared to a similar stretch of open pasture.

Another concern we have is that the corridors may also be used by introduced hybrids of two species of marmosets which compete for resources and may be a health threat to the tamarins. These hybrid marmosets are present in many of the forest fragments that have tamarins. The marmoset population may benefit from these corridors. So we need to know if the marmosets also use the corridors. Monitoring corridor use is also time consuming and costly, so for now our objective is to test some automated telemetry methods to monitor use of the corridors and adjacent pastures, and compare these methods to our traditional monitoring with telemetry and direct observations.

Proposed Methodologies

Digital telemetry will be the methodology adopted to detect the presence and the use of corridors and pasture matrix by Golden lion tamarins and marmosets for 12 consecutive months. This system uses a digital telemetry transmission of 433.920 MHz and there is no variation in frequency between the collars of the GLTs: all convey the same frequency and each collar transmits a digital code that is identified by a micro-processor in manual or automated receivers. This automated monitoring aims to eliminate most of the disadvantages associated with direct-observation monitoring, as well as, reduce the costs associated with conventional monitoring.

An arrangement of three automated receiver stations was added in the corridors, and an arrangement of four of them was also added in the pasture matrix. The location of the individuals will be estimated through triangulation of the data. By grouping the data, the frequency of the

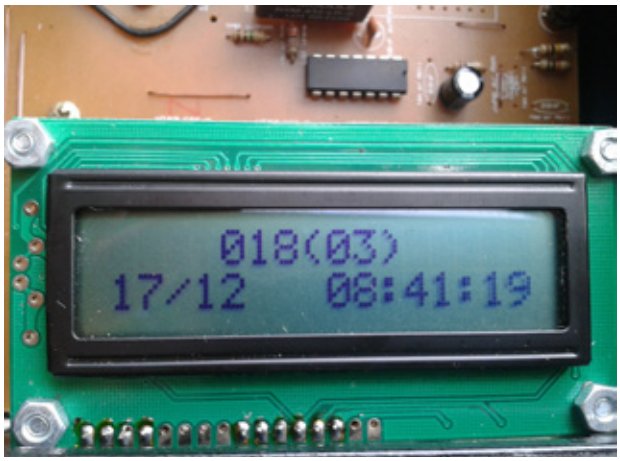
presence of individuals of GLTs and marmosets in the corridors and matrix will be obtained, as well as the frequency of crossing between the two environments.

The other methodology in use will be the conventional radio telemetry. This monitoring technique locates the animals by means of a radio transmitter, a radio receiver and a directional antenna. Through the data it will be possible to calculate the total home range and the core areas, as well as, assess if the corridors are part of those core areas. One advantage of this method is that allows to get information on the behavior of the tamarins in the corridor.

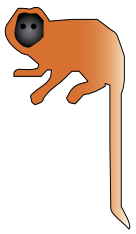
Preliminary Results

So far the automated stations have been working and have detected the tamarins in the corridor. We have also discovered a sleeping site right by a corridor, because in a week there were about 200 hits on the station during the night! Some tamarins have dispersed from their social groups and we were lucky to have collared them before they dispersed, so we may get data on how individuals use the corridors, not only groups.

There have been upsets. Any time you put electronic equipment in a tropical place, you have to deal with heat, rain and humidity, the two killers of batteries and sensitive boards and other micro-components. So, we



have had to replace some units, other give us non-sense results such as having days longer than 24 hours, or recording hours that do not exist. The data take a long time to be downloaded, because it is a manual download. So, the technology seems promising, but we are looking for a better system, a GPS system. This year, we will have to do with this system, so Rafaela will tighten her trousers and boots, wear her raincoat, and spend lots of time in the field. We will get good information for conservation, she will get a doctoral thesis out of it.



Lion Tamarins of Brazil Fund

- an update

Bengt Holst

From June 2012 to July 2014 the Lion Tamarins of Brazil Fund received a total of 47.592 US$. The money was received from 13 different donors from Europe and the United States. 10.000 US was earmarked to specific species in the framework of "adopt a group" arrangements – arrangements where each zoo contributes an amount of at least 5.000 US$ a year to a specific conservation programme and receives in exchange regular reports from the field that they can use in their conservation interpretation activities in the zoo. The reports are very popular with the zoo visitors and provide a good feeling of what is going on in the forest where the Lion Tamarins live. From the field project point of view the money is essential for their activities, and they can use the zoos as windows to the outer world – exactly in the same way that the zoos can use the field projects as a window to nature. We have thus created a win-win situation that we can all be proud of, and I can only as I did in the last volume of Tamarin Tales recommend our supporters to enter such arrangements. I will be happy to facilitate such a process if wanted.

During the same period an amount of 30.191 US$ has been awarded to five different Lion Tamarin field projects in Brazil in accordance with the decision made by the International Committee for Conservation and Management (ICCM) of the Lion Tamarin Species in 2005: "It is recommended that the present amount together with the current income is spent in support of the implementation of the new Conservation Action plan down to 50.000 US$ within the next 5 years. Integrated projects in support of all four species have priority. The remaining 50.000 US$ is to be kept as an "emergency fund" to be used in urgent matters only. In case an endowment fund can be established, the remaining amount after 5 years must be included in that fund.
Approved by the ICCM 14 June 2005"

As was stated in 2012 we had to stop awarding the large grants (up to 20.000 US$ per grant) from that year due to too low an income in the fund. Fortunately this has lead to an increase in the amount available from 73.000 to 89.000 US$ today which means that we will probably be able to open up for the large grants again in 2015 if this increase continues. This is really good news since the need for financial support is big. All four programmes have developed further and consequently need more money for the new activities that are added to the old ones – a very positive development, but also an expensive one. So, I sincerely hope that all our donors will continue their valuable support, and also that they will spread the word to other institutions and private persons that could become donors in the future!

In the last volume of Tamarin Tales we described the project of moving an invasive population of Golden-headed Lion Tamarins from the distribution area of the Golden Lion Tamarin (Niteroy). This project has progressed very well. But during the capture of the invasive groups it became clear that the problem was bigger than first anticipated. If the initial success of this important project is to continue it is essential that all groups of invasive Golden-headed Lion Tamarins are

removed from the Niteroy area. If this doesn't happen the population will start growing again, and the problem will continue. During the present report period the Lion Tamarins of Brazil Fund has supported the project by paying for radio collars needed for the translocated tamarins, and that was a big help. However, there are still groups to be captured and moved, and money is needed for radio collars as well as for capture hours and management of the captured tamarins. I therefore strongly ask for money ear-marked to that project too so that we can continue the important efforts to get everything back on track again.

The stories in this volume of Tamarin Tales is focusing on the projects that have received support from the fund during the past couple of years. I hope you will find the stories exciting and certainly worth supporting.

I would thus also use this opportunity to thank all contributors during the years to make these and other projects possible. Together the many donors not only constitute the financial basis of the Lion Tamarins of Brazil Fund, but they are also a standing proof of the dedication of zoos to conservation of the four Lion Tamarin species. It is my sincere hope that the support will continue in the coming years. Conservation is a question of long term commitment, and a loyal group of supporters is the best one can wish for serious conservation projects. I thus want to thank all institutions and single persons cordially who have contributed to the Lion Tamarins of Brazil Fund during the reporting period. A special thank to those who have indicated to continue their valuable support also in the years to come. All contributions, big and small, are most appreciated and are earmarked for field projects supporting Lion Tamarin conservation.

From June 2012 till July 2014 the following institutions have contributed to the Lion Tamarins of Brazil Fund:

Donations over $5,000 per year

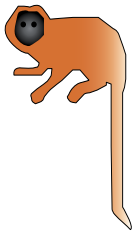
Copenhagen Zoo
Dublin Zoo
London Zoo

Donations $500 to $5,000 per year

Jeremy Mallinson
Brandywine Zoo
Baton Rouge Zoo
Zoo la Palmyre
Freunde und Förderer der Wilhelma e.V.
Basel Zoo
La Vallée des Singes
Rio Grande Zoo

Donations Less than $500 per year

Buffalo Zoological Gardens
Plock Zoo



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