Project Update: March 2020

After the experimental study was done, the data collection was started in the second semester of 2019. Three black lion tamarin groups have been followed in Atlantic Rainforest areas (a control group and a border group in the Morro do Diabo State Park, and a group of riparian forest in the Rio Claro Farm). The end of the fieldwork will be in September 2020.

In the experimental study, besides testing methodologies and recognising the areas, the habituation of the groups was realised. At this step, there were approximately 432 hours of follow-up in 54 field days. To collect behavioural and ecological data, the three groups were followed from the start of their daily activities until their return to the sleeping tree. Each group was followed for at least three consecutive days of sampling, once per month. At this stage there are 108 monitoring days and 1296 hours of sampling effort. To find the group with edge effect in the Morro do Diabo, I used telemetry, since two individuals have VHF collars (Figure 1). To find the group without edge effect and the group of the riparian forest, I used the playback method, executing long-call vocalisations for 2 minutes, every 5 minutes.

Figure 1. Individuals of the monitored groups. On the right, there is an individual with a radio collar

The behavioural record has been done following the scan sampling method every 5 minutes, so that all behaviour is registered. When there is feeding record, the plant species are identified, and in the case of defecation, the seeds are identified and their size measured in the field. To obtain the passage time through the digestive tract, behaviour and movements of the tamarins have been monitored continuously. The coordinates of the feeding place, defecation, resting trees and sleeping trees are obtained and plotted on satellite images using GPS, in order to obtain the spatial distribution of the trees used as feeding resources, to evaluate defecation patterns and to test proximity in relation to resting trees and sleeping trees.

Besides that, I am carrying out experiments on germination and recruitment in the home range of the three groups in order to test whether the dispersal performed by BLT is more advantageous to the plant species (better success of recruitment) than the random dispersal and the non-dispersal. As for the experiments of germination

and recruitment, I consider three main treatments: (1) seeds dispersed by BLT; (2) randomly dispersed seeds; (3) non-dispersed seeds. In January 2020, I started the first part of the experiments (rainy season), using 540 seeds of *Inga marginata* (Ingá-feijão), all collected in the field (Figure 2). In the treatments (1) and (2), three seeds of each plant species were placed at 20 points inside the home range of each tamarin group. What will differ between treatments (1) and (2) is that, in treatment (1), the seeds were put in places where the geographical coordinates were previously obtained and marked as defecation places, and in treatment (2), the seeds were put at random. In treatment (3), I put 20 seeds under three trees of the same plant species, inside the home range of each tamarin group. In every point, the seeds were protected by exclusion cages of vertebrates.

Figure 2. Detail of Ingá fruit to the left, and one of the experiments set up to the right

Partial results show that there was dispersal for 34 of the consumed plant species, and no dispersal for Jerivá *Syagrus romanzoffiana* and Pitanga *Eugenia uniflora*. In relation to the 216 found feces (Figure 3), the number of seeds and the distance of dispersal for the control group, the border group and the group of riparian forest were, respectively, (Mean ± Standard Error): (10,29±1,30; 266,07±7,05 m); (7,52±0,55; 189,3±6,57 m) and (7,76±0,67; 225,49±11,14 m). The number of seeds per feces ranged from 2 to more than 100 (*Miconia latecrenata*), containing 1 to 4 species per feces. The size of the seeds ranged from 0,1 to 1,8 cm.

Until now, consumption of fruits corresponded to more than 70% of the group's diet, and these groups dispersed most of the consumed species (34 of 36) (Figure 4). Besides that, an average number of 7 to 10 seeds in each feces were dispersed, and the average distance of dispersion ranged from 189 to 286 m. It is observed that the obtained dispersion distances are enough, so that the seeds escape the density dependent effects, but are not so distant to involve deposition in inappropriate habitats. These results strengthen the idea that tamarins may be potential dispersers, especially for species of the Myrtaceae and Moraceae families.

Figure 3. Black-lion-tamarin feces. To the left, there is predominance of Jambolão (*Syzygium cumini*) seeds. On the right is the detail of secondary dispersion by coprophagous beetle

Figure 4. To the left, detail of Jerivá fruit consumed. On the right, identification of fruit consumed by the groups (Peito-de-pombo; *Tapirira guianensis*)

Until now, training (location of the groups and data collection) has been carried out for scientific initiation and master's degree students. The first results were presented in two congresses, the XIV Brazilian Congress of Ecology and the XVIII Brazilian Congress of Primatology (Figure 5). In December 2019, the first report was submitted to the state park manager. In March 2020, the first results will be presented to the employees of the company that owns the Rio Claro Farm, and in April 2020, two lectures are planned at the University in São Paulo State to publicise the work.

Figure 5. Above, participation in National Congress with presentation of first results. Below, details of initial and final slide presented