

Table 1. Details of the capture, treatment, and release of *Callicebus personatus melanochir*.

No.	Date	Dosage (ml)		Locality of hit	Introduction period of anesthesia (min.)	Antidote (min.)	Reappearance of palpebral reflex (min.)	Time of first movement (min.)	Released after (min.)	Behavior after release	Reintegration in the group
		Ketavet	Rompun								
1	09.VII.92	0.9	0.45	paravertebral muscles	<1	63	104	120	220	fled on the ground vocalization	group nearby integrated after 45 min.
2	26.VIII.92	0.6	0.3	femoral muscle	<1	25	44	65	310	fled on the ground vocalization	group nearby integrated after 30 min.
3	01.V.93	0.6 0.72*	0.3 0.36*	upper abdomen	30 35	40	80	95	133	uncoordinated climbed up tree	group remained integration immediate
4	20.VI.93	0.9	0.45	left part of abdomen	4	19	66	92	120	uncoordinated climbed up tree	group nearby integrated after 40 min.
5	06.XI.93	0.6 0.3*	0.3	right lower leg muscle	10 15	55	62	69	120	uncoordinated climbed up tree	group found by vocalization, integrated after 162 min.

\* 2nd dose.

In the second darting (No.2), the group was easier to follow, and a male was darted directly while feeding in a fruit tree. The radio-transmitter Type I was fitted to the hip. During the first two weeks it showed some problems when jumping but was not injured. It was recaptured (No.3) nine months later, and a smaller transmitter (Type II, weight 22 g) was fitted to its neck, which, however, failed after six weeks. It was captured again (No.4), and we found minor lacerations of the skin on both sides of the mandibular region. As a result we refitted a transmitter (Type I) to the hip again (No.4). Two biologists continued the observations and the transmitter was replaced again (No.5).

**Conclusion:** The attachment of a radio-collar to the neck of a titi monkey is evidently dangerous. It resulted in infections through wounds caused by the tight radio-collar. The angular region of the titi's mandible is very large. The caudoventral part of the lower jaw is extended to provide for a resonance cavity and the space required for the radio-collar on the neck is insufficient. On the other hand, attachment of a radio-collar to the hip of a female would be dangerous in the case of pregnancy. The best solution is to use a hip attachment only on males. For females, we will be designing and testing a backpack-style harness (see, for example, Savage *et al.*, 1993).

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### THE NISIA FLORESTA COMMON MARMOSSET RESEARCH STATION



**Introduction:** The psychobiology group at the Federal University of Rio Grande do Norte (UFRN), Natal, Brazil, began using the common marmoset (*Callithrix jacchus*), native to north-east Brazil, as a research model in the early 1970's. The "Núcleo de Primatologia" was established in 1985: a breeding colony to support the increasing research demand. It was not long, however, before the need was felt to establish a field site to carry out studies on the ecology and behaviour of wild groups in order to complement or gain a better understanding of the behavioral and physiological research being carried out on the captive population.

Our search for an adequate field site resulted in the choice of the Experimental Forestry Station (EFLEX) of the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama), 2 km from the town of Nisia Floresta and 45 km from Natal. Following due permission obtained from the Brazil

Science Council (CNPq), the first study of the marmoset population there began in January 1991. Due to collaboration between Ibama and UFRN, the research has prospered. Here we briefly describe the site, the research underway and the site's potential for the future.

**The Study Site:** The EFLEX/Ibama study site (6°5' S, 35°12' W) is located 2 km from Nisia Floresta, and about 45 km from Natal, the capital of the state of Rio Grande do Norte. The Research Station has an area of 180 ha, including 80 ha of



secondary Atlantic coastal forest and 40 ha of experimental plantations. The plantations are of pine, eucalyptus, coconut, and various commercial fruit and timber species. Trees in the plantation reach up to 30 m in height, and the understorey is kept clear. The secondary forest can reach 20 m in height, with some trees having trunks as large as 50 cm in diameter at breast height. Vines, bromeliads, orchids and grasses are abundant. The soils are sandy, and the humus layer is generally about 20 cm in depth. All the areas occupied by marmoset study groups, both in and away from the forest, are divided into 50 x 50 m quadrants and the intersections are marked with flagging tape. The quadrant trail system currently covers 28 ha of forest and 15 ha of the plantation area. Although the north-east of Brazil is mostly dry, the coastal regions have distinct seasonality in rainfall. The dry season peaks in December, and the rainy season in May. However, rain rarely interferes seriously with observation schedules. Temperatures are highest during the dry season, reaching 33°C, and lowest during the rainy season, dropping to as low as 20°C. Ibama has allocated a small two-bedroom house to the research group, providing accommodation and laboratory space.

**The Marmoset Groups:** Three groups have been observed continuously since 1991: Belém (Group B), Chui (Group C), and Plantação (Group P). Groups B and C live in the forest area, while Group P inhabits the plantations. Six more groups were included in January 1993: Argentinos (Group Δ), Atlântico (Group A, which recently split up), Meio (Group M, new arrivals), Nisia (Group N, which split from Group Δ), and Oeste (Group O), all in the forested area, and lastly Quatro (Group Q, neighbors to Group P) in the plantation area. Figure 1 indicates the location of the groups in the study area. All individuals in the groups which are followed have been captured, measured, tattooed and fitted with

colored beads on metal chains. The beads, in combinations of two or three, identify the group and the individual. A permanent file is kept recording information on each of the marked individuals.

**Routine Activities - Captures:** The study groups or individuals are routinely captured for collar fitting or replacement, dye marking and biometry. Compartmented traps are baited for several consecutive days and manually operated for the selective capture of individuals. Before new groups are captured they are followed for several days for the identification of areas of exclusive use. Automatic traps are used on occasion. The traps are made of small gauge wire mesh over a wooden frame, with either five or seven compartments, each measuring

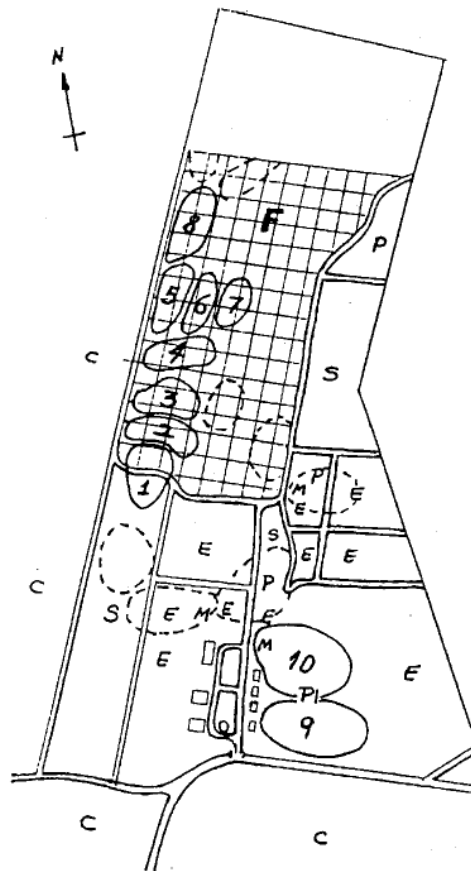


Figure 1. Schematic representation of the study area ( $\pm 1:15,000$ ). Numbered circles indicate marked and followed groups; traced circles indicate known but unmarked groups. Letters indicate the predominant vegetation types of the different areas. Groups: 1 = Argentinos, 2 = Nisia, 3 = Oeste, 4 = Meio, 5 = Chui, 6 = Atlântico II, 7 = Atlântico I, 8 = Belém, 9 = Plantação, 10 = Quatro. Vegetation: C = coconut plantation, E = eucalyptus plantation, F = forest, M = mahogany plantation, P = pine plantation, S = scrub.

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roughly 50 x 10 x 20 cm. They are placed on a 1 m high platform at the base of heavily used gum trees. The marmosets are trapped by manual closure of a hinged, vertically-closing door, using nylon fishing line. The operator, a few meters away from the trap, is usually hidden in a blind of coconut palm leaves. Initial trapping and handling does cause some stress to the animals, but groups re-habituate quickly to being followed and the procedure appears to do no damage to observations in the long run.

*Routine Activities - Monitoring:* In addition to the collection of data for specific research projects, each researcher is assigned a group for long-term monitoring. This involves weekly checking of the composition and apparent health and reproductive condition of the individuals, along with records of the use of space and any observable changes in the habitat. This gives us a picture of the long-term history of the groups, and has been routine since the beginning of the study.

*Routine Activities - Meetings:* Administrative and scientific meetings are held regularly by the Nisia Research Group. Aspects of the administration of the research and the study site, the results of the routine monitoring and research projects are discussed at these meetings. Attendance is obligatory for all the participants in the program.

*Research Projects - Dissertations:* The three groups B, C, and P were studied by Leslie J. Digby (University of California, Davis) from January 1991 to June 1992, as part of her doctoral research which examined particularly reproductive strategies and social organization. Dr Steven Ferrari (Federal University of Pará, Belém) also participated in this study. Fabíola Albuquerque, a Master's student in the Psychobiology Course at UFRN, studied the distribution of parental care in Groups B and P from August 1992 to December 1993. Carla Soraia de Castro, also a Master's student in the Psychobiology Course at UFRN, studied rhythmicity in grooming and locomotion during the same period (Groups C and P). From January 1993 to January 1994, Cláudio Barreto (UFRN), who acted as field assistant to Leslie Digby, studied differences in scent-marking behavior between two reproductive females of Groups C and P. The data are currently being analyzed. Arrilton Araújo, a doctoral student from the Université de Paris - Nord, has been observing the Nisia marmosets since March 1993, studying behavioral, kinship and ecological influences on individual migration (Groups B and P), and Catherine Chojnacki, also a doctoral student from the same university, has begun observation on scent-marking and olfactory recognition. Maria Carla

Nascimento and Beatriz Stumpf have begun studies on the vocal repertoire and the contextual use of vocalizations, both for UFRN Master's degrees.

*Research Projects - Long-Term Project:* An integrated project "Ecology, Communication, and Social Development in Wild Groups of *Callithrix jacchus*" is currently being developed by Dr Maria de Fátima Arruda (social development and parental care), Dr Dwain Santee (communication, vocal signatures), and Maria Socorro Borges Freire (ecology, botany), with partial support from the Brazil Science Council (CNPq). This project is assisted by the graduate students listed above, visiting students from the University of São Paulo (Rogério Zanaga de Camargo Neves Jr., Marcos Roberto Pinheiro, and Ruth Teixeira Nunes), and an undergraduate student Rozinelly Queiroz de Miranda.

*Funding:* Activities at the field station are maintained by small grants from ANAP (*Associação Norte-Riograndense de Amparo a Pesquisa*) for the purchase of utilities and equipment. Some equipment has also been purchased with a grant from FINEP (*Financiadora de Estudos e Pesquisas*, Rio de Janeiro). The Department of Physiology at UFRN provides daily stipends for their staff, and also contributes to the daily running of the house. The integrated project mentioned above also counts on a grant from the Brazil Science Council (CNPq) for contracting unskilled labor and the purchase of field materials. The funds available are evidently insufficient, however, for the development of the site and the equipping of the laboratory. The maintenance of the field site is guaranteed in large part by the researchers themselves. Visiting researchers support their own projects and contribute a small daily fee.

*Potential:* There are a number of advantages offered by this field station. In terms of the logistics, geography and climate: the terrain is flat and relatively sparse understoreys mean that it is easy to walk through the forest, rainfall is minimal (only a few weeks of the year) as are temperature variations, the area is protected by Ibama, is only 2 km from the town of Nisia Floresta and 45 km from Natal, can be reached by bus, and being near the Equator has a photoperiod of 12L:12D±15 min. The numerous groups allow for diverse types of socio-ecological studies: new group formation, migrations, and group splitting are not uncommon; groups can be found living in contrasting habitats, from secondary forest to bushes and pine/eucalyptus plantations; and the high density means that intergroup encounters are frequent (sometimes seen several times a day, and involving more than two groups).

The research at the Nisia Floresta study site follows the regulations imposed by Ibama and CNPq. Researchers linked to academic institutions interested in conducting field research at the site should contact Dr. Maria de Fátima Arruda (Research Coordinator) or Dr. Dwain Santee.

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## News

### A BLACK HOWLING MONKEY STUDY IN BELIZE

January 1993 marked the onset of a year-long study of the black howling monkey (*Alouatta pigra*) in northern Belize. Observations were made on three troops of marked monkeys (colored ankle tags), living in a semi-deciduous riverine habitat at the Bermudian Landing Sanctuary, in the Community Baboon Sanctuary, Belize. These troops of marked monkeys were selected for study based on their accessibility, size, and cohesiveness. The majority of troops consisted of one adult male, several adult females, and juvenile offspring: 5-6 individuals in total. An average troop range size was 3 ha, and in two of the observed troops ranges were overlapping.

Each troop was observed from sunrise to sunset for several consecutive days each month (four days for two troops and two days for the third). Data were collected using scan sampling, recording the activity of each troop member in sight. Six main categories were recorded: feeding, resting, moving, travelling, howling, and playing. When feeding, the plant part and name were noted, and a sample of the food item



was collected than the 30 minute period

The study involved 1,500 hours of observation censusing a series of monthly at suggests t between A howling m mantled h commonly (Milton, 19 study this adult female instigating feeding site not unusual the study tr m along th feeding tree

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