International Journal of Primatology, Vol. 28, No. 1, February 2007 (© 2007)
DOI: 10.1007/s10764-006-9108-2

Techniques and Trap Models for Capturing Wild Tufted Capuchins

Vlamir J. Rocha,[1,9] Lucas M. Aguiar,[2,3] Gabriela Ludwig,[2,3] Carmen L. S. Hilst,[4] Gustavo M. Teixeira,[5] Walfrido K. Svoboda,[6,7] Marcos M. Shiozawa,[7] Luciano S. Malanski,[7] Italmar T. Navarro,[7] José Hernan F. Mariño,[8] and Fernando C. Passos[2,3]

Received September 13, 2005; accepted November 9, 2005; Published Online February 15, 2007

The difficulty of capturing capuchins (genus Cebus*) via anesthetic projectiles, as well as the scarcity of methodological descriptions of operational trapping programs, are widely known. The limitations hamper studies focusing on the conservation and evaluation of the health of capuchins that depend on their capture. We report on techniques and trap models used for capturing black tufted capuchins* (Cebus nigritus) *in Londrina, Telêmaco Borba, and Porto Rico, municipalities of the State of Paraná, Southern Brazil. Captures occurred in forest fragments, continuous forests, and gallery forests belonging to several vegetational formations. The trap model we developed was a* $2 \times 2 \times 3$ *m cage equipped with a* 2×1 *m door that we operated manually*

[1]Klabin S.A., Manejo Ambiental, Fazenda Monte Alegre, Lagoa s/no.- Pesquisa Florestal, CEP 84279-000, Lagoa-PR, Brasil.
[2]Graduate Program in Zoology, Departamento de Zoologia, Universidade Federal do Paraná, 81531-980 Curitiba, PR, Brazil.
[3]Biodiversity, Conservation and Ecology of Wild Animals Laboratory, Departamento de Zoologia, Universidade Federal do Paraná, 81531-980 Curitiba, PR Brazil.
[4]Veterinary Hospital, Departamento de Clínicas Veterinárias, Universidade Estadual de Londrina-UEL, 86050-970 Londrina, PR, Brazil.
[5]Zoology Laboratory, Curso de Ciências Biológicas, Faculdade de Apucarana, R. Osvaldo de Oliveira 600, 86811-500 Apucarana, PR, Brazil.
[6]Public Health Laboratory, Universidade Federal do Paraná, Campus Palotina, Rua Pioneiro, 2153, Jardim Dallas, 85950-000 Palotina, PR, Brazil.
[7]Protozoology Laboratory, Departamento de Medicina Veterinária Preventiva, Universidade Estadual de Londrina-UEL, 86050-970 Londrina, PR, Brazil.
[8]Departamento de Biologia Animal e Vegetal, Universidade Estadual de Londrina-UEL, 86050-970 Londrina, PR, Brazil.
[9]To whom correspondence should be addressed; e-mail: vlamir@klabinpr.com.br.

from a distance. We used live traps measuring 0.5 × 0.5 × 0.5 m simultaneously with large traps. We provided weekly bait stations using ca. *20 kg of food 1–2 mo before capture, during which we developed a whistle emulating a type of vocalization emitted by the primates that we used to habituate and attract the group to the bait station. The technique was very useful to find groups and to attract them more easily to the traps. We physically contained the captured individuals with nets, followed by manual restraining. For chemical restraining, we applied an anesthetic protocol based on the use of Zoletil®. We kept the subjects in smaller cages until they recovered from anesthesia, and maintained them in the cages thereafter, facilitating the attraction of other individuals to the larger cage.* We *captured 85 capuchins in the State of Paraná. Of the individuals that could be sexed, 65.1% were males and 34.8% were females. In addition to the capture of primates, we showed that the type of cage described here was versatile enough to capture other mammals such as tayra* (Eira barbara)*, peccary* (Pecari tajacu)*, and coatis* (Nasua nasua)*. Because of the similarity in the foraging behavior and diet among capuchin species, we suggest that the program described here could be extended to the capture of other species in the genus* Cebus *throughout its geographical range. We also describe a list of steps that need to be taken, based on our satisfactory results in several different localities, to conduct a capture program that is both efficient for researchers and safe for the subjects.*

KEY WORDS: capture of mammals; *Cebus*; management; primates; traps.

INTRODUCTION

Given the proposal to elevate *Cebus apella nigritus* to the level of species (Groves, 2001; Rylands *et al.*, 2000, 2005; Silva Júnior, 2001, 2002), *Cebus nigritus* is characterized via a geographical distribution that is both narrow and poorly delimited. Therefore, studies on the species are necessary to describe its biology and to assess its actual need for conservation. Black tufted capuchins live in Brazil from the left margin of the Doce river (Silva Júnior, 2001) to the municipality of São Lourenço do Sul, State of Rio Grande do Sul (Printes *et al.*, 2001). In the east, they are limited by the Atlantic Ocean, and in the west by the Paran River. They also live throughout northwestern Argentina (Silva Júnior, 2001).

Black tufted capuchins commonly occur in forest fragments in the State of Paran (Rocha, 2001). Natural habitats in the state have experienced intense deforestation to give way to cattle and agricultural activities, which decimated native forests and reduced them *ca.* 7% of their original range (SPVS, 1996). Because of their omnivorous diet, the black tufted capuchins have considerable adaptability to habitats that have been disturbed by human activities. According to Rocha (2000), the individuals survive in small, disturbed forest fragments as long as there is access to neighboring

plantations. Accordingly, rural producers see members of the species as a forest pest, given that they invade plantations to forage in orchards, corn, sugarcane and cassava fields and even in plantations of *Pinus* spp. (Ludwig *et al.*, 2006).

The capture of individuals of the species could, therefore, contribute to a better understanding of a variety of taxonomic and conservation issues through the collection of morphometric and biological samples. The information would in turn be instrumental in evaluating the effects of forest fragmentation on natural populations, which are frequently restricted to small, narrow, and often isolated areas. Finally, captures can be used for the management and translocation of individuals among populations, particularly in cases where there are conflicts with local farmers.

Contrary to the capture of howlers (*Alouatta*), the capture of capuchins, either via blow darts or another special type of gun, is hampered by their high mobility and low target area. Only one researcher (Causey *et al.*, 1948) recorded the use of cages to capture capuchins, and few studies have focused on developing an efficient capture program for *Cebus*. Thus, studies focusing on the conservation and the assessment of health conditions that require their capture are hindered. We here report on techniques and trap models used to capture *Cebus nigritus* in 4 forest fragments and 2 continuous forests in the State of Paraná, southern Brazil. In addition, we demonstrate the versatility of our traps to capture other mammals: tayra (*Eira barbara*), peccary (*Pecari tajacu*), and coatis (*Nasua nasua*). In general, the goal of our captures varied from the collection of biological material for genetic and biomedical analyses to the transport of individuals elsewhere.

MATERIALS AND METHODS

Study Areas

We conducted captures in forests belonging to 3 municipalities in the State of Paraná, Southern Brazil: 2 forest fragments (Forest of the Universidade Estadual de Londrina, UEL, and Arthur Thomas Park) in the Municipality of Londrina (1), northern region; a continuous forest (Monte Alegre Farm/Klabin S.A.) in the Municipality of Telêmaco Borba (2), east-central region; and 2 forest fragments (Zezão Forest and Guido Nogueira Forest, belonging to Indiana Farm and Divina Pastora Farm, respectively) and a gallery forest of the Paraná river (Praia Grande Farm) in the Municipality of Porto Rico (3), northwest region (Fig. 1). The characteristics of

Table I. Characteristics of the collection sites of the black tufted capuchins in 3 municipalities in the State of Paraná, Southern Brazil

	Localities					
	(1) Londrina		(2) Telemaco-Borba		(3) Porto Rico	
Attributes	UEL Forest (10 ha)	A. Thomas Park (65 ha)	Continuous Forest (46,000 ha)	Gallery Forest of Paran River	Zezão Forest (50 ha)	G. Nogueira Forest (116 ha)
Domain of the forest	Seasonal semideciduous	Seasonal semideciduous	Ecotone (seasonal semideciduous and Araucaria pine forest)	Seasonal semideciduous alluvial	Seasonal semideciduous	Seasonal semideciduous
Forestal succession	Secondary and reforestation	secondary and disturbed primary	secondary, disturbed primary and reforestation	secondary	secondary	disturbed primary
Geographic coordinates	23°19′42″S and 51°12′18″W	23°20′31″S and 51°08′21″W	24°07′55″S and 50°22′45″W	22°47′04″S and 53°18′20″W	22°50′45″S and 53°18′16″W	22°52′00″S and 53°19′58″W
Elevation	700 m	700 m	750 m	230 m	230 m	230 m
Mean annual rainfall	1500 mm	1500 mm	1550 m	1250 mm	1250 mm	1250 mm
Years of the captures	1991	1995	2003	2004	2004/2005	2004/2005
Seasons of the captures	Autumn	Spring	Winter	Autumn	Spring	Summer

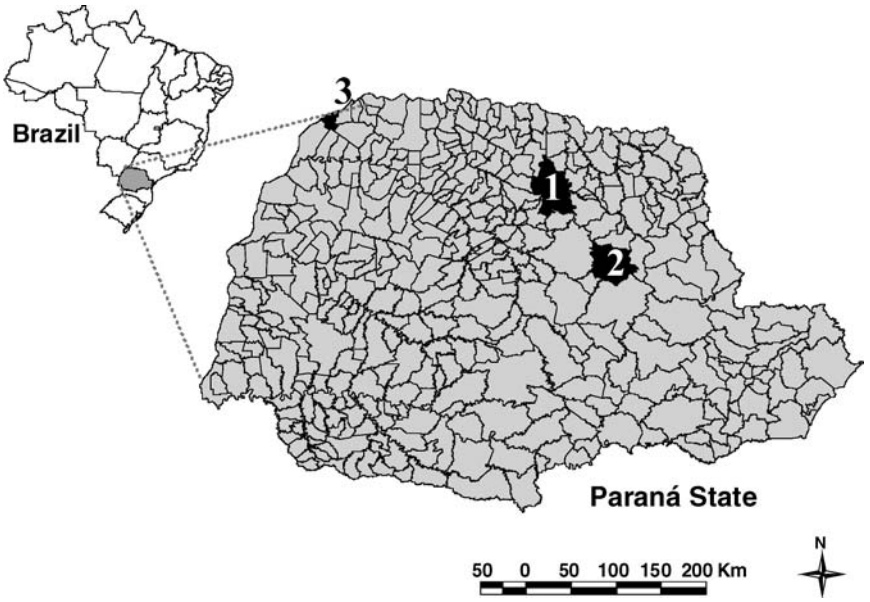

Fig. 1. Municipalities in the State of Paraná, Southern Brazil, where we conducted captures of black tufted capuchins: 1, Municipality of Londrina, northern region; 2, Municipality of Telêmaco Borba, west-central region; 3, Municipality of Porto Rico, northwestern region.

each capture site are summarized in Table I. We used the classification of IBGE-FIBGE (1992) for the forest cover in the State of Paraná.

Methods

After scanning the study areas and choosing the group of capuchins to be captured, we visited the areas for 2–4 wk to determine the site where we would set up the trap based on the frequency of observation of individuals in each potential site. The trap model we developed was a ground cage, with 4 $\times$ 4 cm mesh size, measuring 2 m in height, 2 m in width and 3 m in length, and a door measuring 1.8 m in height and 1 m in width, which was directly on the ground (Fig. 2). We first built the cages in area 1 (Fig. 2) as permanent structures in the study site. Later, owing to the high demand for cages in multiple sites, we designed assemblable traps to reduce costs and to facilitate their transport. We built the walls of the cages separately, and assembled them in the field via clamps.

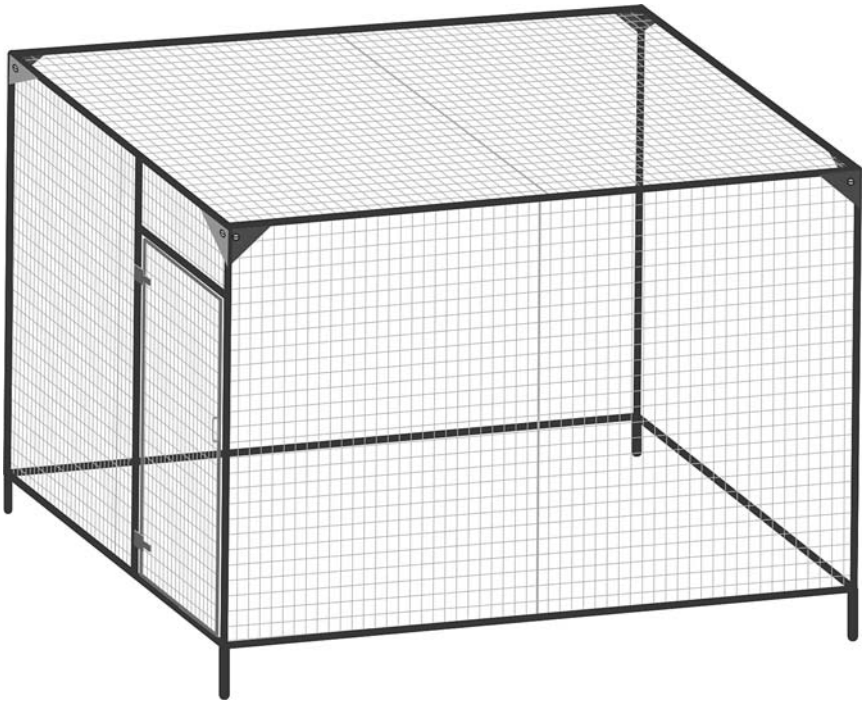

Fig. 2. Cage-type trap used for the capture of black tufted capuchins in the State of Paraná: 2 m in height, 2 m in width, and 3 m in depth.

We set up weekly bait stations (a platform inside the cage) for 1–2 mo before capture so that the individuals could habituate to the presence of the trap. Each bait station consisted of *ca.* 10 kg of food, e.g., bananas, mangos, oranges, corn, and sugarcane, placed on top of a wooden platform inside the cage. The trap door remained open so that the individuals could have free access to enter or exit the cage. After the habituation period, the primates began to await the arrival of the food, remaining longer in the vicinity of the cage. Conversely, the habituation period in area 2 lasted much longer, continuing for 7 mo. First, we placed food on top of a 1 m^2 platform that was suspended by a rope attached to a branch *ca.* 8 m above the cage. After the initial habituation period, which lasted for *ca.* 3 mo, we placed the platform on the ceiling of the cage to force individuals to descend to it. At that time, we also placed food within the cage. Finally, *ca*. 1 mo before the captures, we made food available to the individuals only within the cage.

During the captures in forest fragments in areas 1 and 3, we used a whistle to contact the group during habituation and to attract the capuchins

to the bait stations. The cue consisted of emulating one of their vocalizations, i.e., the food-associated whistle series (Di Bitetti, 2003, 2005). The technique consisted of the emission of a series of short whistles that begin with lower tones and modulate to higher tones, with the whole process repeated 4–5 times in an accelerating rhythm (Rocha, 1992, 1995). Whenever it was possible to use the technique, it proved very useful to locate the group and to attract them more easily, given that they responded to our vocalization, even after being captured in previous days.

To conduct the captures, we built a camouflaged hideout to allow us to activate the trap from a distance, closing the trap door with a rope when ≥ 1 primates were already inside it. We physically contained captured individuals with nets, followed by manual restraining with the protection of leather gloves. For chemical restraining, we applied an anesthetic protocol, developed specifically for the purpose, based on Zoletil® (C. L. S. Hilst, *unpublished data*). After proper handling, we maintained the subjects within the smaller cages until they recovered from anesthesia. We released all individuals at the same site where they were captured, except for the ones captured in area 1, which we transported to more appropriate areas (Rocha, 1992). We also used live traps measuring 0.5 m high, 0.5 m wide, and 1 m long simultaneously with the cage in area 1 and in the gallery forest in area 3, also using the same food at the bait stations and being activating them from a distance.

In areas 1 and 2, we maintained the first individuals we captured in the live traps within the larger cage, which remained active, which facilitated the attraction of other individuals to the trap in the following day. In area 3, to avoid recapturing the same individuals in the same site, we shaved a band of hairs around the right wrists of the subjects, allowing us to identify previously captured individuals from a distance. In all study sites, we classified captured capuchins according to sex/age classes per Izawa (1980), except for a few individuals in area 1 for which the records were lost.

We also conducted captures of other mammals in all 3 municipalities. Coatis and tayras were often attracted to the bait stations provided to the capuchins, allowing us to assess the effectiveness of the capuchin traps to capture other mammalian species. In area 2 and in the Mata do G. Nogueira in area 3, several peccaries also entered the cages and we captured them via the same method, though using blow darts for chemical restrainst.

RESULTS

We captured 85 black tufted capuchins in the State of Paraná over the course of the study. The number of individuals, their sex, and sexual

maturity for each study site are in Table II. We captured more sexually mature individuals (57.6%) than immature ones (42.4%). Except for the 19 indeterminate (records lost) individuals from area 1, 65.1% of the individuals we captured were males and 34.8% were females. The bias also occurred in sexually mature individuals (65.3% of males and 34.7% of females). Of the 32 specimens we captured in the Municipality of Londrina area 1, 14 were in the forest of UEL (8 via the cage and 6 via the smaller traps), from the total of 21 individuals that inhabited the site. We classified captured individuals as: 1 β-male, 3 adult females (1 of which was pregnant and the other 2 nursing pups), and a subadult male. The remaining individuals were juveniles of varying ages.

In the Arthur Thomas Park, we captured 18 of the 44 individuals that inhabited the study area, 16 via the cage and 2 via the smaller traps. We classified them as 3 adult males (including 1 α-male), 3 adult females (1 of which was pregnant), 2 subadult males, 7 juveniles of both sexes, and 3 infants of undetermined sex.

In the municipality of Telêmaco Borba area 2, we captured 7 of the 24 individuals that inhabited the study area: 6 adult males (including 1 α and 1 β) and an adult female.

Finally, we captured 46 individuals in the municipality of Porto Rico area 3. We captured 13 of the 27 individuals of a group in the gallery forest: 5 mature males, 2 mature females, 5 immature males, and 1 immature female. In the Zezão Forest, we captured 15 individuals: 5 mature males, 6 mature females, 2 immature males, and 2 immature females. In the Guido Nogueira Forest, we captured 18 individuals: 9 mature males (including a likely α-male), 2 mature females, and 7 immature individuals (4 males and 3 females). A qualitative impression from observations in all collection sites in area 3 is that the first individuals to arrive at the bait stations were juveniles, most of which were solitary. Adult individuals arrived later, surrounded by juveniles, and usually forming subgroups of 3–6 individuals that entered the cage together. However, the entrance of solitary subjects, or in groups of 2 or 3 individuals, was the most frequent situation.

We captured a tayra in area 2. In addition, we recorded several peccaries entering the cage in area 2 and in the Guido Nogueira Forest in area 3, all of which we collected. In area 2, we actually observed peccaries entering the cage, whereas in area 3 we inferred their presence from the detection of footprints inside the cage. We captured 8 coatis in area 3, 7 of which were simultaneously in the cage of the Guido Nogueira Forest and 1 was captured via the small trap in the gallery forest. In areas 1 and 2, coatis also visited the traps, but we chose not to capture them. In area 3, we captured capuchins and coatis separately. When 1 species was present in the vicinity or at the bait station, the other species tended to be absent.

Table II. Number of individuals, sex, and sexual maturity status of specimens of black tufted capuchins captured in 3 municipalities in the State of Paraná, Southern Brazil

		Localities						
		(1) Londrina		(2) Telêmaco Borba		(3) Porto Rico		
	Age/sex	UEL Forest	A. Thomas Park	Continuous Forest	Gallery Forest of Paran river	Zezão Forest	G. Nogueira Forest	Total
Mature	Male	2	5	6	5	5	9	32
	Female	3	3	1	2	6	2	17
Immature	Male	0	0	0	5	2	4	11
	Female	0	0	0	1	2	3	6
	Indeterminate	9	10	0	0	0	0	19
	Total	14	18	7	13	15	18	85 (43 males, 23 females, 19 indet.)

DISCUSSION

We built the cage-type trap with large dimensions to mitigate possible sensations of confinement to the subjects, and, at the same time, to capture the largest possible number of individuals in a single event, thus optimizing the capture effort. Although Causey *et al.* (1948), using soil traps to capture capuchins (*Cebus apella*), did not provide data on the number of simultaneously captured individuals, we commonly captured ≥ 2 ≤ 6 individuals at the same time. We observed no aggression that could have resulted from the confinement, either due to stress or to dominance disputes.

In contrast to the female-biased sex ratio in the study of Causey *et al.* (1948), we captured more males (61.1%) than females (34.8%). Our data are not consistent with the overall female bias commonly observed in *Cebus* (Causey *et al.*, 1948; Fedigan and Jack, 2001; Freese and Oppenheimer, 1981; Nowak, 1999; Sussman, 2000). The discrepancy might reflect a regional shift in the sex ratio toward males. Alternatively, our method could inherently bias the collections to capture more males, possibly owing to the peripheral spatio-hierarchical distribution of the individuals (Di Bitetti and Janson, 2001). The individuals would be the first to arrive at the traps and therefore the ones that we more easily captured.

We want to emphasize the efficiency of the baiting effort. In particular, the regularity and abundance of food might have worked as a food aggregation site (patches), maintaining the individuals in areas close to the trap owing to the regular supply of abundant and high calorie food. Di Bitetti (2001) in Argentina already reported the restricted use of a portion of the home range of black tufted capuchins due to the availability of aggregated food the observer provided. Our choice to maintain captured individuals within the fixed cage also led the rest of the group to remain nearby in area 1, and facilitated the capture of other individuals in area 2.

The habituation and attraction of the group during the baiting period via a whistle emulating food-associated whistle series vocalization (Di Bitetti 2003, 2005) facilitated the capture of capuchins in areas 1 and 3, given that they responded and moved toward the traps to feed. Even in area 2 the subjects responded to the whistle, but did not go to the trap.

Though Mangini and Nicola (2004) asserted that the capture of capuchins is a low-efficiency endeavor, we devised traps and methods that are efficient in the capture of 85 black tufted capuchins from a variety of vegetational formations: forest fragments of different sizes and continuous forests. The versatility of the trap to capture other mammalian species is also noteworthy. We are successfully implementing the methods to capture *Cebus cay* (*Cebus libidinosus* sensu Groves, 2001; Rylands *et al.*, 2005) in the riparian forests along the Baía River, a tributary of the right bank of Paraná River in the State of Mato Grosso do Sul. Peccaries have also visited

capuchin bait stations in the site, and we could capture them for marking and to collect biological material.

Given the similarity in foraging strategies and in the diet of capuchin species (Freese and Openheimer, 1981), the capture program can be successfully applied to the capture of other species in *Cebus* throughout its geographical distribution, taking into account eventual particularities with respect to the environment or the species.

CONCLUSION

Based on our capture of capuchins in the State of Paraná and successful results in different localities, we present a list of steps in the implementation of the capture program that are efficient for the observers and safe for the subjects:

1) Survey an area that the group frequently uses that will be the target for capture. If possible, identify the core area of the home range of the group, which is where the cage trap should be built. Avoid clearings in favor of shady sites with a clear understory and a closed canopy.
2) Install smaller live traps in the vicinity of the larger trap. The strategy should minimize disputes for the food in the main bait station, optimizing the capture and reducing the risk of injury to the primates.
3) Provide regular abundant food at bait stations in and around the traps, 2–3 times a week. Associate the provisioning with a whistle or playbacks, during the entire baiting period. It is best to break food into pieces, causing the individuals to remain most of the time within the cages as opposed to obtaining the entire food and eating it elsewhere. When handling the food, it is important to wear gloves and masks to prevent the transmission of pathogens to the individuals and vice versa.
4) After habituation of the primates to the cages, capture attempts can be initiated. It will now be possible to notice that the individuals might already be waiting for food in the vicinity of the traps.
5) To build a camouflaged shelter away from the traps using tarp, branches, and leaves. It is from this shelter that the observer will activate manually the trap door. Even if the individuals are used to the traps, it is important that the observer is able to avoid providing cues of his or her presence as much as possible.
6) In the capture phase, it is important to provide food at the bait stations at dawn. Because the subjects did not feed at night, the strategy

can maximize the capture success during the first peak of foraging activity of the day.

7) Because of the spatial distribution of individuals in a group of black tufted capuchins (Di Bitetti and Janson, 2001), usually the first capuchins to arrive at the bait stations are lower-ranking individuals and juveniles of varying ages. Soon after, higher-ranking adults might arrive and dominate the bait station. Thus, if the goal of the study is to capture older or higher-ranking individuals, it is advisable to wait for the first individuals to feed until the target individuals arrive.
8) We recommend that some captured individuals should be kept inside the smaller traps within the larger cage, so that they attract the other members of the group that are outside the trap.
9) To mark individuals, shaving the hairs around is a very efficient method without the need for dyes or discolorants. If the use of permanent marks is desirable, the most appropriate method is the subcutaneous implantation of transponders (microchips).
10) Finally, it is imperative that professionals conduct captures and releases of individuals in a manner that minimizes the risk of mortality or weakening the cohesiveness of the group (Moinde *et al.*, 2004).

ACKNOWLEDGMENTS

We thank the Secretaria de Estado da Saúde do Paraná—SESA/PR and Klabin S.A., Telêmaco Borba, PR, for personnel and logistic support. Adilson Secorun, Gonçalves Beletato, Edílson Colhera, José Luis Filho, José do Parto dos Santos, and Valmir Ortiz da Silva provided technical assistance. We also thank CNPq and CAPES for research scholarships and the Universidade Federal do Paraná, Curitiba, PR and the Universidade Estadual de Londrina, Londrina, PR for support. João Marcelo D. Miranda provided helpful suggestions. We also thank 2 anonymous reviewers for their comments.

The article is contribution no. 1591 of Departamento de Zoologia, Universidade Federal do Paraná.

REFERENCES

Causey, O. R., Laemmert Jr., H. W., and Hayes, G. S. (1948). The home range of Brazilian *Cebus* monkeys in a region of small residual forests. *Am. J. Hyg.* 47: 304–315.

Di Bitetti, M. S. (2001). Home–range use by the tufted capuchin monkey (*Cebus apella nigritus*) in a subtropical rainforest of Argentina. *J. Zool. Lond.* 253: 33–45.

Di Bitetti, M. S. (2003). Food-associated calls of tufted capuchin monkeys (*Cebus apella nigritus*) are functionally referential signals. *Behaviour* 140: 565–592.

Di Bitetti, M. S. (2005). Food-associated calls and audience effects in tufted capuchin monkeys. Cebus apella nigritus. *Anim. Behav.* 69: 911–919.
Di Bitetti, M. S., and Janson, C. H. (2001). Social foranging and the finder's share in capuchin monkeys (*Cebus apella*). *Anim. Behav.* 62: 47–56.
Fedigan, L. M., and Jack, K. (2001). Neotropical primates in a regenerating Costa Rica dry forest: A comparison of howler and capuchin population patterns. *Int. J. Primatol.* 22: 689–713.
Freese, C. H., and Oppenheimer, J. R. (1981). The capuchin monkeys, genus Cebus. In Coimbra-Filho, A. F., and Mittermeier, R. A. (eds.), *Ecology and Behavior of Neotropical Primates*. Academia Brasileira de Ciências, Rio de Janeiro, pp. 331–496.
Groves, C. P. (2001). *Primate Taxonomy*. Smithsonian Institution Press, Washington, DC.
IBGE-FIBGE. (1992). *Manual técnico da vegetação Brasileira*. IBGE. (Série Manuais técnicos em geociencias; 1), Rio de Janeiro.
Izawa, K. (1980). Social behavior of the wild black-capped capuchin (*Cebus apella*). *Primates* 21: 443–467.
Ludwig, G., Aguiar, L. M., and Rocha, V. J. (2006). Comportamento de obtenção de Manihot esculenta Crantz (Euphorbiaceae), mandioca, por Cebus nigritus como uma adaptação alimentar em períodos de escassez. *Rev. Bras. Zool.* 23: 888–890.
Mangini, P. R., and Nicola, P. A. (2004). Captura e marcação de animais selvagens. In Cullen Jr., L., Valladares-Pádua, C., and Rudran, R. (eds.), *Métodos de estudos em Biologia da Conservação e manejo da Vida Silvestre*. UFPR, Fundação O Boticário de Produção a Natureza, Curitiba, pp. 91–124.
Moinde, N. N., Suleman, M. A., Higashi, H., and Hau, J. (2004). Habituation, capture and relocation of Sykes monkeys (*Cercopithecus mitis albotorquatus*) on the coast of Kenya. *Anim. Welfare* 13: 343–353.
Nowak, R. M. (1999). *Walker's Mammals of the World*. The Johns Hopkins University Press, Baltimore and London.
Printes, R. C., Liesenfeld, M. V. A., and Jerusalinsky, L. (2001). *Alouatta guariba clamitans* Cabrera, 1940: A new southern limit for the species and for neotropical primates. *Neotrop. Primates* 9: 118–121.
Rocha, V. J. (1992). *Desenvolvimento de um método de manejo envolvendo um grupo de macacos-pregos (Cebus apella) em condição semi-selvagem no Horto Florestal da UEL, Londrina-PR*. Monograph, Universidade Estadual de Londrina, Londrina.
Rocha, V. J. (1995). *Dieta, ação sobre sementes, padrão de atividade e rea de uso de Cebus apella (Linnaeus, 1758) em três fragmentos florestais de tamanhos distintos na região de Londrina—PR*. Master's Thesis, Universidade Federal do Paraná, Curitiba.
Rocha, V. J. (2000). Macaco-prego, como controlar esta nova praga florestal? *Floresta* 30: 95–99.
Rocha, V. J. (2001). *Ecologia de mamíferos de médio e grande portes do parque estadual Mata dos Godoy, Londrina (PR)*. Doctoral Thesis, Universidade Federal do Paraná, Curitiba.
Rylands, A. B., Kierulff, M. C. M., and Mittermeier, R. A. (2005). Notes on the taxonomy and distribution of the tufted capuchin monkeys (*Cebus*, Cebidae) of South America. *Lundiana* 6: 97–110.
Rylands, A. B., Schneider, H., Langguth A., Mittermeier R. A., Groves C. P., and Luna, E. R. (2000). An Assessment of the diversity of New World primates. *Neotrop. Primates* 8: 61–93.
Silva Júnior, J. S. (2001). *Especiação nos macacos-prego e caiararas, gênero Cebus Erxleben, 1777 (Primates, Cebidae)*. Doctoral Thesis, Universidade Federal do Rio de Janeiro, Rio de Janeiro.
Silva Júnior, J. S. (2002). Taxonomy of capuchin monkeys, *Cebus* Erxleben, 1777. *Neotrop. Primates* 10: 29.
SPVS. (1996). *Manual para Recuperação da Reserva Florestal Legal*. Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental, Curitiba.
Sussman, R. W. (2000). *Primate Ecology and Social Structure: New World Monkeys*. Pearson Custom Publishing, Needham Heights, MA.