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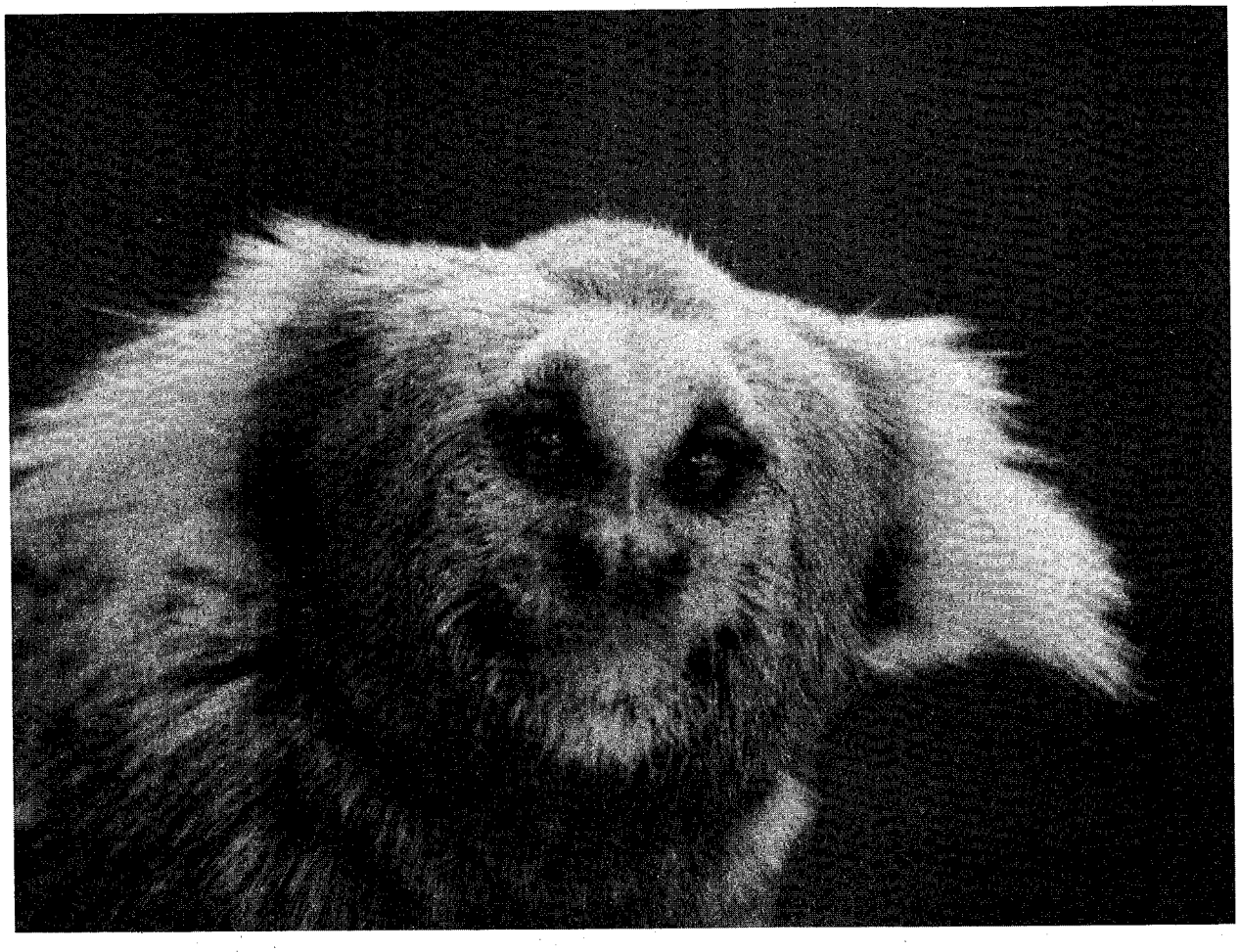

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Articles

THE MOST ENIGMATIC MONKEY IN THE BOLIVIAN RAIN FOREST - *CALLIMICO GOELDII*

Anita Christen

Introduction

Goeldi's monkey (*Callimico goeldii*) is one of the most enigmatic primates in the Amazon basin. In spite of its large distribution, from southern Colombia in the north, over eastern Peru and south-western Brazil to north-western Bolivia in the south (Hershkovitz, 1977), little is known of its present-day distribution or behavioural ecology in the wild. The only recent sightings are documented from the Pando Department in north-western Bolivia. The Pando is part of the upper Amazon basin, and covers an area of about 63,000 km². It has a very low human population density of about 0.9 inhabitants per km². The forests, mostly seasonally dry tropical rain forest, are exploited for Brazil nuts, sorva gum, and rubber. Annual rainfall is 1600-1900 mm and the mean annual temperature is 24.7°C (Montes de Oca, 1989). For a more detailed description of the region see Christen and Geissmann (1994).

Field Surveys

During two surveys, in February-July, 1991 and July-December, 1996, 18 localities in the Pando were visited and explored specifically to locate *Callimico goeldii*. In the 1996 survey, Goeldi's monkeys were found around the locality of Virazon, Río Acre, on the frontier with Brazil, and about six to nine hours by boat from Cobija. A rudimentary camp site was set up there, and we carried out daily surveys along 6 km of seringa trails (paths of the rubber tappers) as well as 4-5 km of new trails cut by us, from August 23 to December 13, 1996 (Fig. 1). The seringa trails were walked for 6-7 hours each day in search of Goeldi's monkey groups (Fig. 1). Vegetation analyses were carried out in two areas where *Callimico* was observed most frequently. All trees with a diameter of more than 5 cm were recorded and identified (Table 4, Fig. 2).

Results

The home range of the main study group overlapped the home ranges of at least two groups of saddleback tamarins, *S. fuscicollis*. Red-bellied tamarins, *S. labiatus*, on the other hand were rarely observed in the area. The main *Callimico* study group was occasionally observed eating in the same or neighbouring trees with *S. fuscicollis*, but after feeding, the two groups separated and travelled alone. Agonistic behaviour was observed among *S. fuscicollis* group members, but never between *S. fuscicollis* and *Callimico*.

On August 25, I recorded a possibly pregnant female sitting quietly on a branch, 3-5 m high (Fig. 1: point 4), and a month later, on September 26, a female was seen carrying a very small infant while sitting on a tree at a height of about 6-8 m in a nest-like entanglement of branches. The female and two other group members were sitting together and grooming each other and their own tails, and the impression was gained that the infant had just been born. The other group members were climbing, jumping and sitting around nearby, in an area covering about 15 x 20 m. The group was observed at this location several times (Fig. 1: point 5), and a few weeks later, a second female was also seen carrying an infant. There was just one, easily recognised, adult male in the group. On November 5, when the infants were about 6 weeks old and measured about 12-15 cm, head-to-tail, they were still being carried. On November 23, the infants were seen running about and climbing on their own. One infant was also present in a neighbouring group, and on occasion when the four adults saw me, they ran away and left their two-month old infant behind in spite of its distress calls.

Other primate species were also seen with new born infants at this time. On 1 October new-born infants were observed in groups of *Saguinus fuscicollis, Saimiri boliviensis* and *Pithecia irrorata*.

Towards the end of November, there were more fruits in the home range, and on one occasion it was possible to follow the main study group from 06:00 in the morning until mid-day (Fig. 1: points 32 + 33). During that 6-hour period, they travelled a distance of about 1 km. Table 1 summarises the behavioural activities of the study group seen each time it was sighted, and Table 2 shows the habitat and substrate preferences of the main study group.

Despite the similarity of their long calls, saddleback tama-

Table 1: The behaviours and activities of the main study group on first being sighted.

Behaviour/activity	No of sightings
Calling (spontaneous)	7
Grooming	4
Foraging and eating[1]	10
Running, climbing, leaping	25
Resting	5
Calling (reply to playback)	3
Flight	4
Tongue clicking	4
Staring at observer	3

[1] mushroom (species not identified) (1), grasshopper (1), fruits of *Cecropia* sp., *Theobroma cacao, Eschweilera coriacea* and "capela de cuchilla" species not identified (8).

Table 2: Habitat and substrate preferences of the main study group.

Habitat	No of sightings
River edge forest	35
Disturbed forest	6
River edge forest with palm trees	5
Height above ground(m)	
1-4	5
5-9	27
11-15	7
Substrate diameter (m)	
0.10-0.14	18
0.15-0.19	10
>0.20	10

Cover photograph by Alice Guimarães: Buffy-headed marmoset, *Callithrix flaviceps*, at the Caratinga Biological Station, Minas Gerais, Brazil.

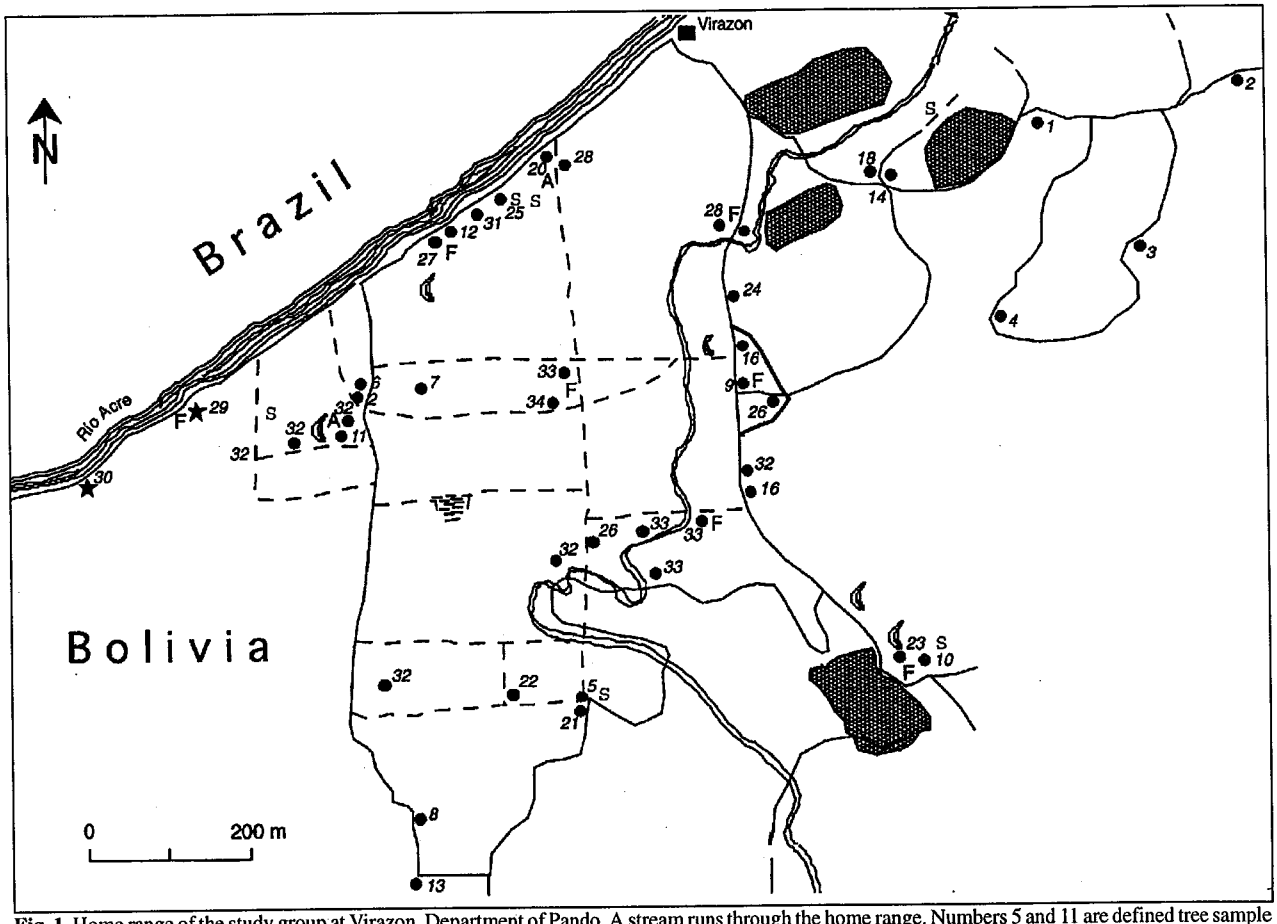

Fig. 1. Home range of the study group at Virazon, Department of Pando. A stream runs through the home range. Numbers 5 and 11 are defined tree sample areas. Hatched plots are "chacos" (agricultural plantings). Symbols: numbered circles = sightings of Goeldi's monkey, group 8; asterisks = sightings of Goeldi's monkey group 4; lines = already existing seringa trails; dotted lines paths marked and cut during the 1996 survey; S: possible sleeping sites; bananas = bunches of banana used as bait. Virazon = camp site.

rins and Goeldi's monkey appeared to differ in several aspects of their behaviour (Table 3). The trees identified in sample areas 5 and 11 are listed in Table 4. Sample area 5 (Fig. 2, area 5) was close to a bamboo patch. Visibility was poor. It contained trees with heights of 4-25 m (two emergents with big crowns were about 30 to 40 m tall). Sample area 11 (Fig. 2, area 11) contained trees of 4-30 m height, lianas, few bamboos and several fruit trees. Visibility was fair to excellent, with no dense ground vegetation. *Callimico* often met *Saguinus fuscicollis* in this area.

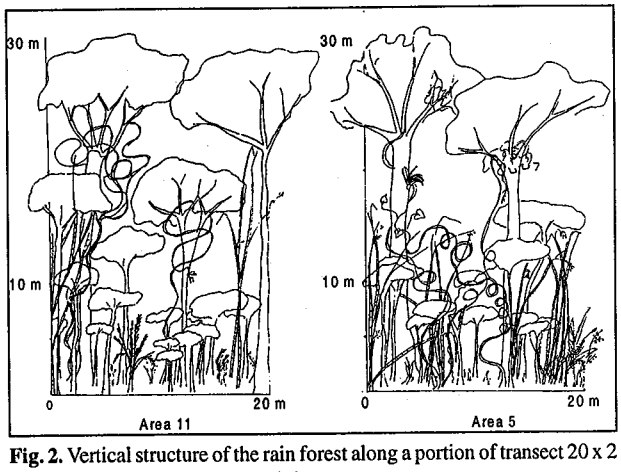

Fig. 2. Vertical structure of the rain forest along a portion of transect 20 x 2 m in Area 11 (left) and Area 5 (right).

Discussion

The main study group of 10 animals included two adult females, each carrying an infant and two juveniles of about the same age. This suggests that births in the study group occurred during the end of September and the beginning

Table 3: Some behavioural differences between saddleback tamarins (*Saguinus fuscicollis*) and Goeldi's monkeys (*Callimico goeldii*).

Variable	*Saguinus fuscicollis*	*Callimico goeldii*
Activity level	more active	less active
Inquisitive behaviour	curious	shy
Self-grooming	less frequent	frequent, especially tail grooming
Descent	head first	mostly tail first (like cebids), occasionally head first
Foraging	with frequent vocalisations	very quietly
Threat call	chatter with nose wrinkling	tongue-clicking
Long call	similar, shrill	similar, softer

Table 4: Plant species identified in sample areas 5 and 11, both habitats of *Callimico goeldii*.

Species - Area 5[1]	Family
Rollinia sp.	Annonaceae
Cordia goeldiana	Boraginaceae
Hevea brasiliensis	Euphorbiaceae
Hura crepitans	Euphorbiaceae
Bambusa sp.	Graminae
Unidentified	Lecythidaceae
Unidentified	Mimosaceae
Neea sp.	Nyctaginaceae
Capirona decorticans	Rubiaceae
Leonia racemosa	Violaceae
Rinoreocarpus ulei	Violaceae
Species - Area 11	
Aspidosperma ramiflorum	Apocynaceae
Philodendron sp.	Araceae
Terminalia amazonica	Combretaceae
Dyospyros melinoni	Ebenaceae
Sloanea sp.	Elaeocarpaceae
Bambusa sp.	Graminae
Rheedia achachairu	Guttiferae
Eschweilera albiflora	Lecythidaceae
Eschweilera coriacea	Lecythidaceae
Inga sp.	Mimosaceae
Batocarpus amazonicus	Moraceae
Castilla ulei	Moraceae
Cecropia sp.	Moraceae
Maquira coriacea	Moraceae
Neea sp.	Nyctaginaceae
Theobroma cacao	Sterculiaceae

[1]34 additional species in Area 5 remain unidentified.

of October. This agrees with the observations of Masataka (1981a): Two births, one in September and the other in October.

The status of *Callimico goeldii* is difficult to judge, although the evidence suggests that populations are declining in the Pando. During the surveys in 1991, no Goeldi's monkeys were found at Triunfo and Mucden (Christen, 1994; Christen and Geissmann, 1994), although they were sighted and studied there during earlier surveys (Buchanan-Smith, 1991; Izawa, 1979; Masataka, 1981a, 1981b; Pook and Pook, 1981, 1982). Similarly, during the 1996 survey, no Goeldi's monkeys were found in any of the five areas where I had observed them in 1991. Local people informed me that they chase adult Goeldi's monkeys away in order to capture their infants (see above). The infants are kept as pets or sold, but most of them die.

Acknowledgements

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References

Buchanan-Smith, H. M. 1991. Field observations of Goeldi's monkey, *Callimico goeldii*, in northern Bolivia. *Folia Primatol.* 57: 102-105.

Christen, A. 1994. Goeldi's monkey, *Callimico goeldii*, in Northern Bolivia. In: *Current Primatology, Vol. 1: Ecology and Evolution*, J. J. Roeder, B. Thierry, J. R. Anderson and N. Herrenschmidt, (eds.), pp.73-78. Université Louis Pasteur, Strasbourg.

Christen, A. and Geissmann, T. 1994. Primate survey in northern Bolivia with special reference to Goeldi's monkey, *Callimico goeldii*. *Int. J. Primatol.* 15: 239-274.

Hershkovitz, P. 1977. *Living New World Monkeys (Platyrrhini), vol. 1, With an Introduction to the Primates*. The University of Chicago Press, Chicago.

Izawa, K. 1979. Studies on peculiar distribution pattern of *Callimico*. *Kyoto University Overseas Research Reports of New World Monkeys* 1: 1-19.

Masataka, N. 1981a. A field study of the social behaviour of Goeldi's monkeys (*Callimico goeldii*) in north Bolivia. I. Group composition, breeding cycle, and infant development. *Kyoto University Overseas Reports of New World Monkeys* 2: 23-32.

Masataka, N. 1981b. A field study of the social behaviour of Goeldi's monkeys (*Callimico goeldii*) in north Bolivia. II. Grouping pattern and intragroup relationship. *Kyoto University Overseas Reports of New World monkeys* 2: 33-41.

Montes de Oca, I. 1989. *Geografia y Recursos Naturales de Bolivia*. 2nd edition. Ministerio de Educación y Cultura, La Paz.

Pook, A. G. and Pook, G. 1981. A field study of the socioecology of the Goeldi's monkey (*Callimico goeldii*) in northern Bolivia. *Folia Primatol.* 35: 288-312.

Pook, A. G. and Pook, G. 1982. Polyspecific association between *Saguinus fuscicollis*, *Saguinus labiatus*, *Callimico goeldii* and other primates in north-western Bolivia. *Folia Primatol.* 38: 196-216.

A Broad-Band Contact Call by Female Mantled Howler Monkeys: Implications for Heterogeneous Conditions

Clara B. Jones

In 1975, Wilson considered howler monkeys (*Alouatta*) worthy of attention by sociobiologists because their communication is "primarily vocal", implying that non-damaging signals and displays dominated their communication system. Indeed, most students of the genus have been impressed with the vocal reportoire of howlers (e.g., Baldwin and Baldwin, 1976; Whitehead, 1995; Sekulic, 1982), and vocalizations appear to facilitate highly communal behavior and the resolution of interindividual conflicts of interest (e.g., Jones, 1982). As their name suggests, howlers are usually characterized by the sonorous roars of the adult male (e.g., Whitehead, 1995). Except for these long-distance vocalizations, the functions of howler calls are not well known (Whitehead, 1995). The spectrographic characteristics of howler vocalizations have been described by Baldwin (1976), Whitehead (1995), and others, however, providing a baseline for the following observations. This note describes a broad-band contact call (see Bradbury and Vehrencamp, 1998) emitted by female mantled howler monkeys (*A. palliata* Gray) in apparently related contexts.

In his discussion of primate vocal communication, Seyfarth (1987) concluded that "there is a direct relation between the function of a call and its acoustic properties" (p. 445). Low-frequency sounds traveling through tropical forests are less attenuated than high-frequency sounds, for instance, and Waser and Waser (1977) have shown that sounds in the range of 500 and 1,500 Hz exhibit relatively low attenuation as a function of distance. Figure 1 is a sonogram of the vocalization described in this note, the characteristics of wich are consistent with expectation for a call specialized for long-distance transmission, such as contact calls employed by forest primates (see Seyfarth, 1987, pp.445-446). This broad-band call may be equivalent to the "Wrah-ha, Type K" call described by Baldwin and Baldwin (1976, pp.100-101; J. Whitehead, pers. comm.). These authors identified this call as a contact vocalization given by adult females "when they became separated from their troops". Baldwin and Baldwin determined that the call was audible for about 100 m through the forest, and they had the impression that females emitting this vocalization were unaware of the location of their group.

My observations differ somewhat from those of Baldwin and Baldwin. My subjective impression of the call was

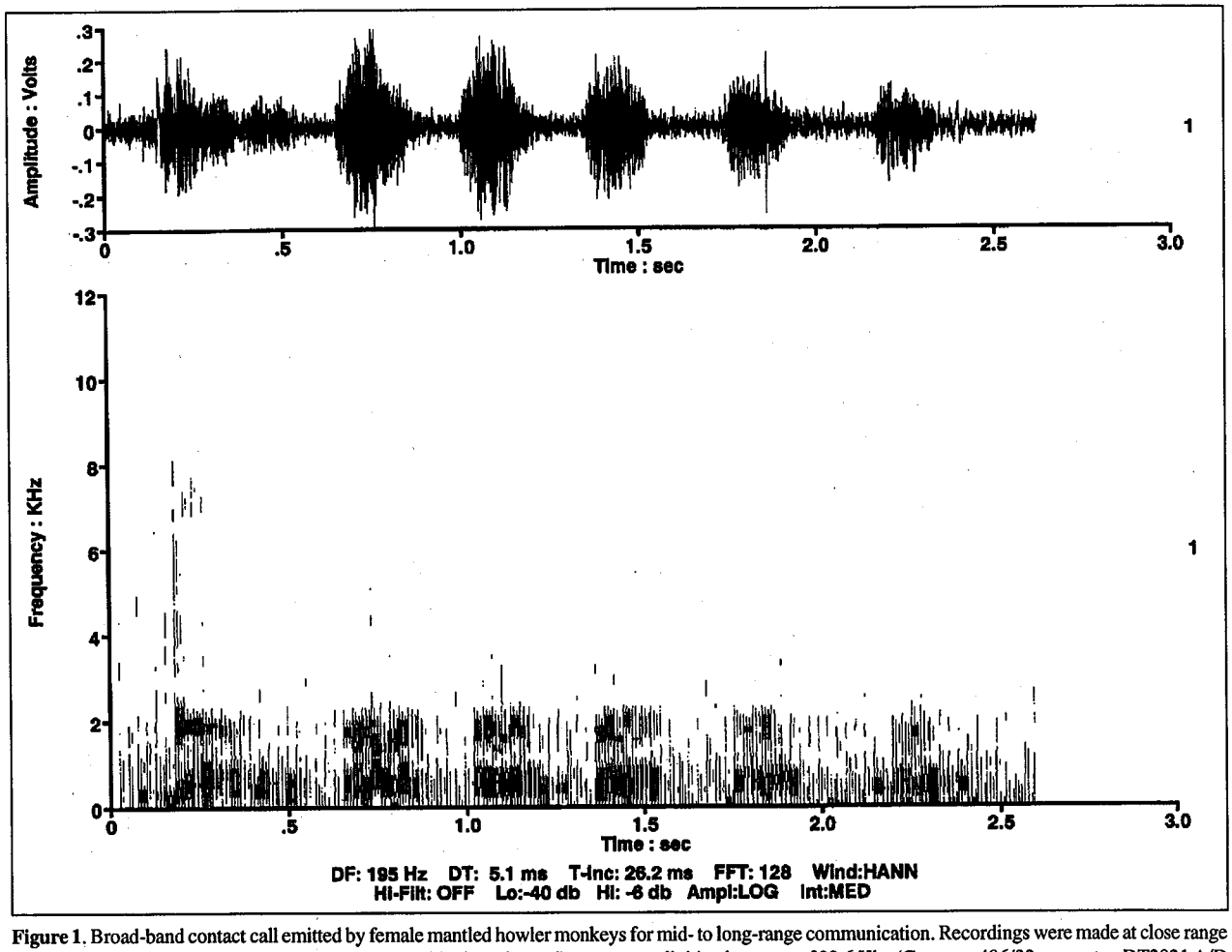

Figure 1. Broad-band contact call emitted by female mantled howler monkeys for mid- to long-range communication. Recordings were made at close range with a portable Panasonic tape recorder and hand-held microphone. Spectrogram digitized at a rate of 22.6 Khz (Gateway 486/33 computer, DT2821 A/D board) using SIGNAL sound analysis software (Engineering Design, Belmont, MA, USA).

that it was a raspy bark audible for >100m. I agree with Baldwin and Baldwin that "there was a moderate amount of variance in the call, in both intonation and intensity. The first syllable was almost always the louder, and the second appeared to be an inhaled tone." (p.100). I heard this call 61 times in >1,000 h of focal and *ad libitum* observation, and censusing of animals and trees at Hacienda La Pacifica, Cañas, Guanacaste, Costa Rica in 1976 and 1977. The forest there is classified as "tropical dry", and two groups were studied in two different habitats, riparian (Group 5, 402 h) and deciduous (the patchier, drier, and presumably more stressful area, Group 12, 114 h). Frankie *et al.* (1974) provided a detailed description of the environment, and Jones (1980) a description of the groups.

The broad-band call shown in Fig. 1 was emitted non-randomly by context. It was given 19 times during group movement, 22 times in sexual contexts, six times in the midst of a female group (including one juvenile vocalizer), five times during foraging and feeding (see note at end of text), and on nine occasions the context was not recorded. Thus, I witnessed the call most often when the group was moving from one location to another (i.e., from one feeding site to another), and in association with reproductive activity. Middle-aged or old females were the most frequent callers, accounting for 28 of the 34 occasions when the vocalizer was identified individually (see Jones, 1996). The call was given at about the same rate in both habitats, 49 times in the riparian forest group (0.12/h), and 0.11/h in the deciduous forest group. In some instances, the call appeared to be responsible for changes in the direction of group movement, and it is interesting to note that on three occasions in the deciduous forest group, two or more females emitted this call in synchrony.

It is my impression that the contact call is intimately associated with food, both during group movements, in sexual contexts, and when females forage independently or in small parties. It is also possible that females employ this call in sexual contexts to "incite" male-male competition during a process of "female choice". Sex, food, and group dispersion are closely linked in mantled howlers because females seem to prefer males who will defend a food source for them (Jones, 1995a), and it is likely that selection has acted upon the vocal repertoire of the species to produce a call with complex utility. Boinski and Mitchell (1977), for example, have demonstrated that "chuck vocalizations" in *Saimiri sciureus* identify the caller and transmit information about food. Vocal signals may supplement visual and chemical signals in the identification of howler individuals in addition to communicating location (and quality?) of food.

What effect will increased deforestation have on the expression of this contact call? In my study, the contact call was emitted at about the same rate in both habitats. This observation is consistent with howlers' resilience under changing conditions (e.g., Jones, 1995b) and suggests that the call has been favored in a variety of physical conditions. Other calls, however, may be less effective with increasing habitat fragmentation. This possibility raises the issue of the role of behavioral, including vocal, adaptations in the conservation of primate species. Species whose repertoires of response are most highly adapted to wet forest conditions may experience fitness deficits in heterogeneous regimes due to an inability to respond genetically, physiologically, and behaviorally in a manner or at a rate necessary to sustain effective population size (N_e). Such species will go extinct or require continued management and husbandry.

Note. On four occasions in the riparian forest I witnessed a delicate, owl-like ("whoooo-whoooo") call, twice emitted by the old female SS (see Jones, 1996) sitting in a small tree. These and other opportunistic sightings of lone females separated from their groups reinforce my impression that females may forage alone for patchy resources. I once observed the group recruited by this call to *Muntingia calabura*, and K. E. Glander and I have discussed the possibility that the use of these small trees may serve as assays for hard times for howlers in riparian forest at La Pacifica (see Fleming *et al.*, 1985).

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References

Baldwin, J. D. and Baldwin, J. I. 1976. The vocalizations of howler monkeys (*Alouatta palliata*) in southwestern Panama. *Folia Primatol.* 26: 91-108.

Bradbury, J. W. and Vehrencamp, S. L. 1998. *Principles of Animal Communication*. Sinauer Associates, Sunderland, Massachusetts

Fleming, T. H., Williams, C. F., Bonaccorso, F. J. and Herbst, L. H. 1985. Phenology, seed-dispersal, and colonization in *Muntingia calabura*, a neotropical tree. *Am. J. Bot.* 72: 383-391.

Frankie, G. W., Baker, H. G., and Opler, P. A. 1974. Comparative phenological studies of trees in tropical wet and dry forests in the lowlands of Costa Rica. *J. Ecol.* 62: 881-919.

Jones, C. B. 1980. The functions of status in the mantled howler monkey (*Alouatta palliata* Gray): Intraspecific competition for group membership in a folivorous Neotropical primate. *Primates* 21:389-405.

Jones, C. B. 1982. A field manipulation of spatial relations among male mantled howler monkeys. *Primates* 23:130-134.

Jones, C. B. 1995a. Alternative reproductive behaviors in the mantled howler monkey (*Alouatta palliata* Gray): Testing Carpenter's hypothesis. *Boletin Primatológico*

Latinoamericano 5:1-5.
Jones, C. B. 1995b. Howler monkeys appear to be pre-adapted to cope with habitat fragmentation. *Endangered Species Update* 12:9-10.
Jones, C. B. 1996. Temporal division of labor in a primate: Age-dependent foraging behavior. *Neotropical Primates* 4:50-53.
Sekulic, R. 1982. Daily and seasonal patterns of roaring and spacing in four red howler (*Alouatta seniculus*) troops. *Folia Primatol.* 39:22-48.
Seyfarth, R. M. 1987. Vocal communication and its relation to language. In: *Primate Societies*, B. B. Smuts, D. L. Cheney, R. M. Seyfarth, R. W. Wrangham, and T. T. Struhsaker (eds.), pp. 440-451. University of Chicago Press, Chicago.
Waser, P. and Waser, M. S. 1977. Experimental studies of primate vocalizations: Specializations for long-distance propagation. *Z. Tierpsychol.* 43:239-263.
Whitehead, J. M. 1995. Vox Alouattinae: A preliminary survey of the acoustic characteristics of long-distance calls of howling monkeys. *Int. J. Primatol.* 16:121-145.
Wilson, E. O. 1975. *Sociobiology*. Harvard University Press, Cambridge, Massachusetts.

Observations on Reproduction and Behavior of the Muriqui, *Brachyteles arachnoides*, in Captivity

Alcides Pissinatti
Adelmar F. Coimbra-Filho
Anthony B. Rylands

Introduction

Until the 1980's, information on the muriqui, or woolly spider monkey, was restricted to the geographic survey of Aguirre (1971) and observations and reports by Coimbra-Filho (1972). However, discovery of a population at what is now the Caratinga Biological Station by Célio Valle and Ney Carnevalli, then of the Federal University of Minas Gerais, in 1977, resulted in the pioneer work of Nishimura (1979, 1988) and inspired an extraordinary interest in the species. The ecology and behavior of *Brachyteles* has since been the subject of numerous studies of demography, behavior, ecology, and reproduction and reproductive physiology (see, for example, Milton, 1984; Fonseca, 1985, 1986; Strier, 1986, 1991, 1992, 1996, 1997, Nishimura *et al.*, 1988). Strier (1996) discussed specifically the reproductive ecology of muriquis at the Caratinga Biological Station, including seasonal birth peaks and interbirth intervals, and Strier and Ziegler (1997) provided information on ovulatory cycles, the discrete copulation periods observed for females, and gestation lengths from data obtained through fecal steroid analyses, which were validated with urine from females at the CPRJ (Ziegler *et al.*, 1997). Odália-Rímoli and Otta (1997) reported on a study of the development of infant muriquis at the Caratinga Biological Station. All observations to date have been for muriquis in the wild. Only recently have muriquis been bred in captivity (Coimbra-Filho *et al.* 1993; Pissinatti *et al.*, 1994), and here we provide some observations on births and reproductive behavior in *ex situ* conditions: a colony established at the Rio de Janeiro Primate Center (CPRJ-FEEMA). We emphasize that the observations are preliminary, and the conclusions arising should be subject to corroboration, most especially on wild populations.

The Captive Group at CPRJ

The muriquis are maintained in a large cage, especially designed for them, and described in detail in Coimbra-Filho *et al.* (1993). The original group was composed of two adults and a young female from the state of Minas Gerais. Two immature males from São Paulo were introduced shortly afterwards. With the recognition of two distinct forms (Vieira, 1944; Torres de Assumpção, 1983; Coimbra-Filho 1990, 1992a, 1992b; Lemos de Sá *et al.*, 1993; Coimbra-Filho *et al.* 1993), the group was then composed of two male *B. a. arachnoides* (from São Paulo), and three female *B. a. hypoxanthus* (from Minas Gerais). The offspring born into this group are therefore hybrids. For the exact origin of each of these animals see Coimbra-Filho *et al.* (1993), who also described the formation of the group and the births resulting (see also Pissinatti *et al.*, 1994).

The females (CPRJ-850, 891, and 924) were introduced to the cage on 15 May 1989. In the same month, a juvenile male (CPRJ-1012) was obtained, which had been caught in the Serra da Bocaina, in the region of the state boundary between Rio de Janeiro and São Paulo. It was

Table 1: Copulations and births. Male CPRJ-1091 and female CPRJ-924.

Copulations	Births CPRJ-924
09 January 1991	
	10 September 1991- CPRJ-1245
30 September 1991	
12 November 1991	
	03 June 1992 - CPRJ-1335
20 September 1992	
02 November 1992	
27 April 1993	
16 July 1993*	
	12 October 1993 - CPRJ-1430
	24 June 1994 - CPRJ-1488

* On this day the male CPRJ-1012 also copulated with the female CPRJ-924.

Table 2: Copulations and births. Male CPRJ-1091 and female CPRJ-891.

Copulations	Births CPRJ-891
22 October 1990	
02 May 1991	
30 September 1991	
	30 October 1991 - CPRJ-1286
12 November 1991	
30 December 1991	
08 October 1992	
15 October 1992	
02 November 1992	
10 November 1992	
16 July 1993	
	25 April 1994 - CPRJ-1475

Obs: On 10 August 1989, the female CPRJ-891 attempted mounting the female CPRJ-924. There were no males in the colony at the this time.

about four months-old when it arrived, and in very poor condition. After a period of intensive care, it was fully recovered and introduced to the females. Another male (CPRJ-1091) arrived in January 1990, aged about eight months, and evidently quite healthy, and therefore introduced after only a short quarantine. Both were accepted by the female group without any problem. The subsequent development of the male CPRJ-1091 was remarkable, and contrasted with that of the first male CPRJ-1012, which having suffered health problems was more retarded.

The first copulation observed occurred between the male CPRJ-1091 and the female CPRJ-891 on 22 October 1990. The first offspring was born, however, on 10 September 1991, as a result of a mating between this male and another female, CPRJ-924.

The belief has been that male muriquis reach sexual maturity at four to five years. However, the male CPRJ-1091 arrived at the Center at about eight months old and was first observed to copulate at 18 months. Given the conditions described, it can be seen that sexual maturity is reached considerably earlier. There have been no evident agonistic interactions between the two males, even now, when both are fully adult. This might not be true of the females, especially during estrus, although all have copulated. If there is some sort of hierarchical dominance in females, it is difficult to detect because at estrus, when it might be manifested, they are, under any circumstances, extremely restless. Although based on few observations, the behavior of estrus and non-estrus females coincides with the descriptions of Lindberg (1987) and Strier (1987, 1992).

Births

The muriqui births at CPRJ have shown a clear seasonality (Tables 1 and 2), in accordance with numerous other primate species in south-east Brazil (Coimbra-Filho and Maia, 1979; Lindberg, 1987). They have occurred during September/October, the beginning of the rainy season, and the tail end of the annual birth peak recorded by Strier (1996) for females at the Caratinga Biological Station, Minas Gerais.

Female CPRJ-924

The first birth of the female CPRJ-924 (primiparous) occurred on 10 September 1991 (Table 1). The father was the male CPRJ-1091, and the infant was given the number CPRJ-1245. This female came to the Center in extremely poor condition, having been kept in very restrictive and precarious conditions.

During the birth, the female was restless, moving about, lying down on its left side, on the ground and on the poles in the cage, but mainly in a birth position on its back, with its legs drawn back and forcing the abdominal musculature to expel the fetus, which was already appearing in the birth canal. On occasion, the male who was not the father (CPRJ-1012) would approach and inspect her genitals.

The female was evidently having difficulty in giving birth. This situation continued during the entire morning and part of the afternoon. After more than eight hours of labor, we decided that a cesarean was necessary, but as we were preparing for this, the female went up onto a platform, more than 4 m up, and managed to expel the fetus, which fell to the ground, hitting its head on the cement boundary. Ten minutes later, the female, evidently sore and tired, descended to pick up the new-born, covered with sand and detritus, and which showed no effort to hold on to its mother. Observing that the infant's reflexes were abnormal, it was taken to the infirmary, cleaned up with warm physiological solution, dried off, and placed in a soft towel. It was given 0.5 ml physiological solution orally. It was agitated and vocalized constantly, and was taken to the cage to see if the mother would still show interest. It was left there for thirty minutes, but the mother failed to pick up the infant. It was decided that at least temporary hand-rearing was necessary. Each hour it was given 1 ml of Nestogen (Nestlé) for new-born babies, dissolved in physiological solution in equal parts. The infant was kept at a temperature of 32°C.

The infant, a female, was cared for in this manner until the afternoon of the following day, when after a bout of intense vocalizations it died in convulsions (Pissinatti *et al.*, 1997). The recovery of the female was rapid after the second day, although she was withdrawn and eating very

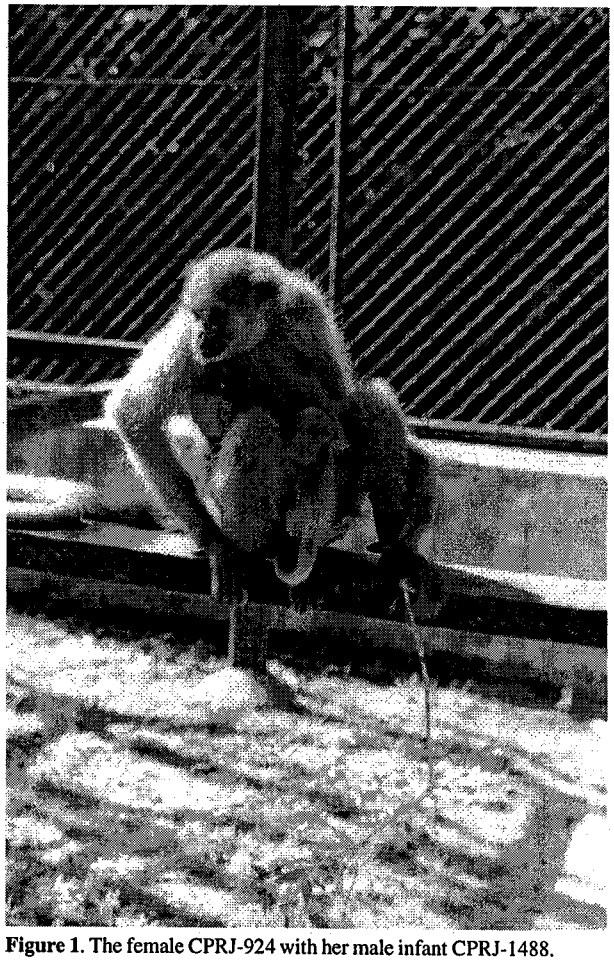

Figure 1. The female CPRJ-924 with her male infant CPRJ-1488.

little, probably due to the tiredness resulting from the prolonged birth.

The cause of death was respiratory insufficiency. The postmortem indicated that the pulmonary vein had been ruptured following its fall. There were pulmonary lesions, with diffuse hemorrhaging, and a serious, acute, fibrinopurulent broncho-pneumonia. It weighed 315 g, with a total length of 480 mm, tail 284 mm, foot 61 mm, ears 20 x 24 mm, and the thumb 2.5 mm.

Twenty days later, the same female copulated again, and subsequently gave birth on 3 June 1992, quite normally, to another offspring, CPRJ-1335. In October 1993, this same female, gave birth for the third time, and again had problems. It was apparent that it was due to the exceptionally large size of the fetus. Birth was at night, the infant (CPRJ-1430) was stillborn and found on the floor of the cage in the morning, in large part eaten, probably by opossums. Only part of the head and limbs were found.

During the births described here, there was no manifestation of interest or collaboration on the part of the other group members, excepting quick inspections of the female's genitals by the juveniles. After eight and a half months, the female CPRJ-924 gave birth again, at six in the morning, to a fourth and healthy infant CPRJ-1488 (Fig. 1).

Female CPRJ-891

The female CPRJ-891 first gave birth on 30 October 1991, one month after the first birth of the female CPRJ-924 (Coimbra-Filho *et al.*, 1993) (Table 1). This infant was registered with the number CPRJ-1286, and developed extremely well. Thirty months later, on 25 April 1994, CPRJ-891 gave birth again, to a second offspring CPRJ-1475. The gestation and births of both were normal, despite the fact that the mother, like CPRJ-924, had suffered seriously in terms of poor nutrition and cruel handling as an infant, when kept as a pet.

Behavior and Development of the Offspring

Of the six infants born at CPRJ to date, four have survived, a male and three females. The two infants which succumbed were unsexed. The offspring are fully dependent on their mothers until about five months of age. Play is limited to the juvenile stage, as was observed by Nishimura *et al.* (1988). They generally showed interest in copulating adults, sometimes approaching closely but being abruptly pushed away, as was observed in the young male CPRJ-1407 when he was first introduced to the group and one of the females was in estrus. During births, the juveniles would approach and inspect the genitals of the female in labor, but would run away at any movement on her part.

Regarding the first offspring of female CPRJ-891, a female (CPRJ-1286, 6½ years old in April 1998), following the birth, the infant clung to the mother immediately and attempted to suckle while the female was cleaning it. During the first three months it clung to the mother's ventrum. Attempts to pick up food were observed at one month. From the fourth to fifth months it generally rode on the mother's back, and attempted its first steps alone, although always near to the mother, and holding on to her with its tail.

At this time, the pelage is pale gray, shiny on the back, but with the abdomen a drab yellow. From birth, the face was blackish. It has the rudimentary thumb typical of the subspecies *B. a. hypoxanthus* (see Coimbra-Filho *et al.*, 1993). Suckling continued until the infant was aged 15 months, and weaning occurred slowly without evident trauma, as has been observed in the wild by Strier (1986). At nine months it was locomoting independently, and exploring the entire cage on its own, and occasionally taking food from the hands of the females and the adult males. Its play frequently involved provoking the adults, including pulling their tails, but they were evidently never put out. No alloparental behavior was observed.

The second infant of the female CPRJ-924, a female CPRJ-1335, was born normally, and also had a dark face and the rudiment of a thumb. It showed similar development and behavior to CPRJ-1286, but was a little more precocious, and in the third month it was riding on the base of the back of the mother, and on occasion going about around the cage on its own. The pelage of the infant was more of a drab-yellow than CPRJ-1286, and more similar to that of the adults. In the sixth month it was parasitized by botflies, which was cured quickly, and in the tenth month it suffered an extensive lesion and inflammation on its knee, which, although cured, affected its development at that age.

The second infant of the female CPRJ-891, a male CPRJ-1475, was born normally. Its fur was shiny and very pale on the forearm and legs, and pale straw-colored on the rest of the body, similar to adults. As with the other infants, it was born with a fully pigmented face and a rudimentary thumb. The infant CPRJ-1488 was the fourth of the female CPRJ-924, and showed a similar phenotype to the rest (Fig. 1).

The development of the infants in captivity complies in general with that observed in the wild. Odália-Rímoli and Otta (1997) observed that infants were carried in the ventral position until the 2nd or 3rd months, and only by six months would they move up to 2 m from the mother. At one year old, they would still spend about 50% of their time in contact with the mother. As in captivity, weaning was observed to begin at about 15 months (Odália-Rímoli and Otta, 1997).

Interactions between Adult Males

The two adult males were introduced to the cage together when they were very young. The development of the male CPRJ-1012 was severely impaired due to health problems, in contrast to that of the male CPRJ-1091 which has occupied the dominant position in the group, and remains

extremely well-developed and healthy. The first male, CPRJ-1012, is the more active of the two, but it is possible to detect the dominance of the second through certain subtle behaviors. No agonistic behavior has been observed between the two males, and CPRJ-1012 copulated with a female, even though she was in the last stages of her gestation.

On being introduced into the group, a third young male of about six months CPRJ-1407, was perfectly well-accepted by the group members until a moment when female in estrus was copulating with the male CPRJ-1091. On approaching the female, the infant was repelled violently by the male, and suffered several wounds. The male had to be removed from the group for treatment. It was subsequently maintained in a smaller cage, near to the group, in the hopes that it could be re-introduced. Its presence, however, caused considerable disturbance amongst the group members, calling and showing pilo-erection, and even causing aggression between them, especially the females. The removal of the infant resulted in the group returning to their normal behavior. This causes us to consider the possibility that the cage is already too small to introduce more animals, especially with regard to the lack of space for individuals to maintain sufficient distance, when necessary, from the other group members, as they would in the wild.

Interactions between Adult Females

When in estrus, and lacking an adult male, the females try to mount other females, a behavior which has never been recorded, for example, amongst the numerous callitrichids kept in the Center. When two females are in estrus at the same time, there is no evident competition between them regarding the sexual attention of the males. Both merely vocalize and follow the male.

Alloparental care (or at least carrying) has never been observed, the females maintain exclusivity in the care of their young. In only one situation have dependent infants been observed on the backs of the males. This happens during copulation. For example, on occasions when the male CPRJ-1012 attempted to copulate with the female CPRJ-924 carrying the infant CPRJ-1488, he first pushed the infant onto his back. The infant vocalized, but both mother and infant consented.

Interactions between Adult Males and Females

Conflict between males and females is unusual (Milton, 1984; Mendes, 1990; Strier, 1992). Embracing displays occur between females, occasionally between males and females, and rarely between the adult males. In the wild, male-male embraces are frequent (Mendes, 1990; Strier, 1992). We have never observed embracing between juveniles. Food snatching has been observed between the young. Sexual interactions are relaxed, as observed by Strier and Ziegler (1997), both outside of and during estrus.

Considering the relatively small size of the group, it is difficult to establish any comparative basis with regard to the frequency of copulations and the number of males which copulate with each female, although the patterns appear to be similar to those recorded in the wild (Aguirre, 1971; Milton, 1984, 1985; Strier, 1996). During all but one of the births, the group members remained at a distance, only rarely approaching the mother. We believed that this may have been due to the disparate origins and lack of genetic relationship between the muriquis during the development of the group. However, on the occasion of the sixth birth (to the female CPRJ-924), we were able to observe intense and evidently emotional interactions between the males and the mother. They remained close to her, emitting low vocalizations and touching and stroking her while she was lying on her back in the feeding compartment of the cage. Only right at the moment of birth did the other female CPRJ-891 approach, and touch and embrace the female. This affiliative behavior is a clear characteristic of this remarkable primate.

Interactions between Females and Young

Muriquis are extremely attentive and tender mothers. Agonism towards the young was never observed, even during play. They stay away from the cage netting when someone approaches during the first days after birth. Suckling is always relaxed and only rarely does the infant appear to cause discomfort.

Conclusions

Preliminary observations in captivity allow us to conclude that: a) maternal care is never transferred to other females or group members; b) the births show seasonality similar to other primates of south-east Brazil; c) it would appear that birth intervals are shorter than is typical for wild populations (Strier, 1991, 1997); d) during birth, the relations between the juveniles and the mother are less significant than between the mother and other group members, especially the adult males who stay near the mother, vocalizing, touching and stroking her; e) a male at 18 months is sexually mature and capable of successful copulation; f) by the third month the infants are capable of riding on their mother's back; and g) attempts at food handling by infants are observed in their first month; and h) the hybrid offspring all have the rudimentary thumb typical of *B. a. hypoxanthus*, which indicates that the southern, nominate form is the derived subspecies (see Coimbra-Filho *et al.*, 1993).

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References

Aguirre, A. C. 1971. *O mono* Brachyteles arachnoides *(E. Geoffroy). Situação atual da Espécie no Brasil.* Academia Brasileira de Ciências, Rio de Janeiro.

Coimbra-Filho, A. F. 1972. Mamíferos ameaçados de extinção no Brasil. In: *Espécies da Fauna Brasileira Ameaçadas de Extinção*, pp.13-98. Academia Brasileira de Ciências (Ed.), Rio de Janeiro.

Coimbra-Filho, A. F. 1990. Sistemática, distribuição geográfica e situação atual dos símios brasileiros (Platyrrhini-Primates). *Rev. Brasil. Biol.* 50: 1063-1079.

Coimbra-Filho, A. F. 1992a. Endangered animals. In: *Ecology in Brazil: Mythes and Reality*, Fundação Pró-natureza (Funatura) (ed.), pp.120-143, Gráfica JB, Rio de Janeiro.

Coimbra-Filho, A. F. 1992b. Mammals. In: *Atlantic Rain Forest*, pp. 69-77. Editora Alumbramento, Livro Arte Editora, Rio de Janeiro.

Coimbra-Filho, A. F. and Maia, A. de A. 1979. A sazonalidade do processo reprodutivo em *Leontopithecus rosalia* (Linnaeus, 1766) (Callitrichidae - Primates). *Rev. Brasil. Biol.* 39(3): 643-651.

Coimbra-Filho, A. F., Pissinatti, A. and Rylands, A. B. 1993. Breeding muriquis (*Brachyteles arachnoides*) in captivity: the experience of the Rio de Janeiro Primate Centre (CPRJ-FEEMA) (Ceboidea, Primates). *Dodo, J. Wildl. Preserv. Trusts* 29: 66-77.

Fonseca, G. A. B. da. 1985. Observations on the ecology of the muriqui (*Brachyteles arachnoides* É. Geoffroy 1806): implications for its conservation. *Primate Conservation* (5): 48-52.

Fonseca, G. A. B. da. 1986. Observações sobre a ecologia do mono carvoeiro ou muriqui (*Brachyteles arachnoides*) e sugestões para a sua conservação. In: *A Primatologia no Brasil - 2*, M. T. de Mello (ed.), pp.177-183. Sociedade Brasileira de Primatologia, Brasília.

Lemos de Sá, R. M., Pope, T. R., Struhsaker, T. T. and Glander, K. E. 1993. Sexual dimorphism in canine length of woolly spider monkeys (*Brachyteles arachnoides*, E.Geoffroy, 1806). *Int. J. Primatol.* 14(5): 755-763.

Lindberg, D. G. 1987. Seasonality of reproduction in primates. In: *Comparative Primate Biology, Vol. 2A: Behavior, Cognition, and Motivation*, G. Mitchell and J. Erwin (eds.), pp. 167-218. Alan R. Liss, Inc., New York.

Mendes, F. D. C. 1990. Afiliação e hierarquia no muriqui: o grupo matão de Caratinga. Unpublished Master's thesis, University of São Paulo, São Paulo.

Milton, K. 1984. Habitat, diet, and activity patterns of free-ranging woolly spider monkeys (*Brachyteles arachnoides* E.Geoffroy, 1806). *Int. J. Primatol.* 5: 491-514.

Milton, K. 1985. Mating patterns of woolly spider monkeys, *Brachyteles arachnoides*: implications for female choice. *Behav. Ecol. Sociobiol.* 17: 53-59.

Nishimura, A. 1979. In search of the woolly spider monkeys. *Kyoto Univ. Overseas Research Reports of New World Monkeys* 1979: 21-37.

Nishimura, A., Fonseca, G. A. B. da, Mittermeier, R. A., Young, A. L., Strier, K. B., Valle, C. M. C. 1988. The muriqui, genus *Brachyteles*. In: *Ecology and Behavior of Neotropical Primates, Vol. 2*, R. A. Mittermeier, A. B. Rylands, A. F. Coimbra-Filho, and G. A. B. da Fonseca (eds.), pp.577-610. World Wildlife Fund, Washington, D. C.

Odália-Rímoli, A. and Otta, E. 1997. A relação espacial entre mãe-infante como medida do processo de independência do filhote muriqui (*Brachyteles arachnoides*). In: *A Primatologia no Brasil - 5*, S. F. Ferrari and H. Schneider (eds.), pp. 15-27. Universidade Federal do Pará, Sociedade Brasileira de Primatologia, Belém.

Pissinatti, A., Coimbra-Filho, A. F., Santos, J. L. dos, and Rylands, A. B. 1994. Muriqui births at the Rio de Janeiro Primate Center. *Neotropical Primates* 2(3): 9-10.

Pissinatti, A., Cruz, J. B. and Coimbra-Filho, A. F. 1997. Aspectos clínicos patológicos e tratamento de muriquis, *Brachyteles arachnoides*, em cativeiro (Ceboidea, Primates). In: *A Primatologia no Brasil - 5*, S. F. Ferrari and H. Schneider (eds.), pp. 185-194. Universidade Federal do Pará and Sociedade Brasileira de Primatologia, Belém.

Strier, K. B. 1986. Reprodução de *Brachyteles arachnoides* (Primates, Cebidae). In: *A Primatologia no Brasil - 2*, M. T. de Mello (ed.), pp. 163-175. Sociedade Brasileira de Primatologia, Brasília.

Strier, K. B. 1991. Demography and conservation in an endangered primate, *Brachyteles arachnoides. Conservation Biology* 5: 214-218.

Strier, K. B. 1992. *Faces in the Forest. The Endangered Muriqui Monkeys of Brazil.* Oxford University Press, Oxford.

Strier, K. B. 1996. Reproductive ecology of female muriquis (*Brachyteles arachnoides*). In: *Adaptive Radiations of Neotropical Primates*, M. A. Norconk, A. L Rosenberger, and P. A. Garber, (eds.), pp.511-532. Plenum Press, New York.

Strier, K. B. and Ziegler, T. E. 1997. Behavioral and endo-

crine characteristics of the reproductive cycle in wild muriqui monkeys, *Brachyteles arachnoides. Am. J. Primatol.* 42: 299-310.

Torres de Assumpção, C. 1983. An ecological study of the primates of southeastern Brazil, with a reappraisal of *Cebus apella* races. Ph.D. thesis, University of Edinburgh, Edinburgh.

Vieira, C. da C. 1944. Os símios do Estado de São Paulo. *Papeis Avulsos, Zoologia, São Paulo* (4): 1-31.

Ziegler, T. E., Santos, C. V., Pissinatti, A. and Strier, K. B. 1997. Steroid excretion during the ovarian cycle in captive and wild muriquis, *Brachyteles arachnoides. Am. J. Primatol.* 42: 311-321.

Primate Densities in the Natural Reserve of Nouragues, French Guiana

Philip Kessler

Introduction

In December 1995, a new Natural Reserve of 100,000 ha was created around the Research Station of Nouragues (UPS 656/CNRS) near the Arataye river in French Guiana (Fig. 1). Seven primate species are known to occur in the reserve: *Alouatta seniculus, Ateles paniscus, Cebus apella, Cebus olivaceus, Pithecia pithecia, Saimiri sciureus* and *Saguinus midas*. The common squirrel monkey (*Saimiri sciureus*) has been observed along the Arataye and Approuague rivers, but never in the vicinity the Nouragues Research Station (Charles-Dominique, 1993). A number of studies have been conducted on primate ecology at Nouragues over the last 10 years (e.g., Julliot, 1992; Zhang, 1995; Kessler, 1995a). Two studies have reported on population densities for *Alouatta* and *Saguinus* at Nouragues, both derived from estimates of home ranges and group size during detailed studies (Julliot, 1992; Kessler, 1995b). Here I report on censuses carried out to obtain basic data on primate abundance in the region, a necessary basis for further studies and comparisons of primate ecology between Nouragues and other regions.

Methods

The census was conducted between June and October 1997 in the Natural Reserve of Nouragues in French Guiana. The area contains uninhabited primary rain forest. Data were collected using a transect census technique. A small, rarely used, forest trail was chosen as the transect line. A section of 4 km was marked every 20 m and censused once a week between 0700 and 1200 am, yielding a total of 15 censuses. For each census the observer walked quietly (average speed: 1 km/h) and stopped every 20 m to look and listen more intensively for monkeys. When a monkey group was detected, it was observed for up to a maximum of 10 minutes to determine the species and number of individuals. Animal-to-transect distance was calculated on the basis of the trigonometric relationship of animal-observer distance and sighting angle to the transect. The total strip width was determined by the maximal animal-to-transect distance of all first sightings for each species (National Research Council, 1981). Population densities expressed in individuals/km² and observed group sizes should be considered as minimal estimations because it is probable that not all group members could be detected during the 10 minutes of observation. Howler monkey densities are probably undestimated due to their discreet behaviour. Likewise, *C. apella* groups are often dispersed over up to 100 m, and therefore group sizes are probably underestimated.

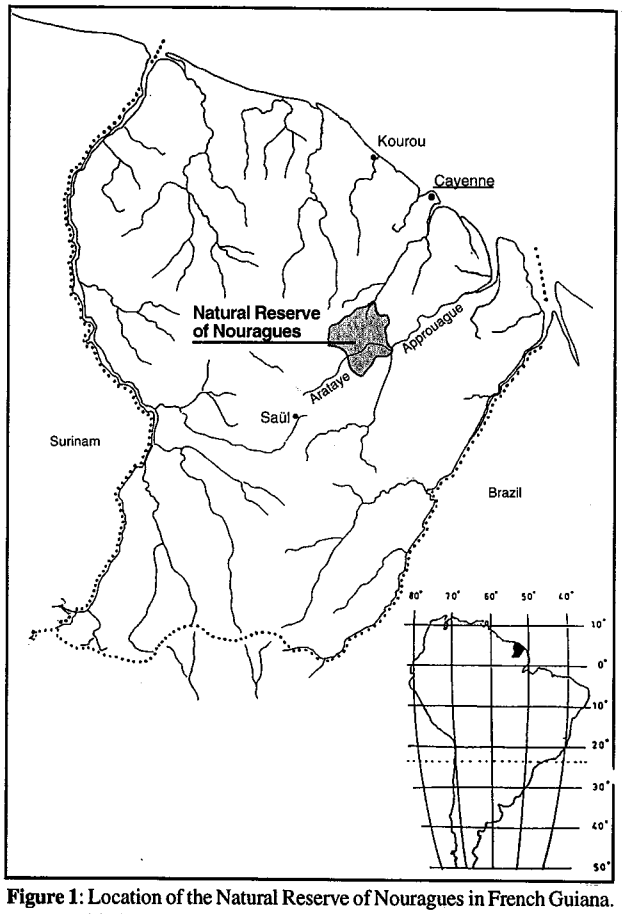

Figure 1: Location of the Natural Reserve of Nouragues in French Guiana. Map provided by author.

Results

Population density estimates and minimum group sizes are shown in Table 1. There are no data for *Pithecia pithecia* and *Cebus olivaceus*. These two species are present in the reserve, but were never seen during the 15 transect censuses. The data on group sizes for these two

Table 1: Estimation of minimal group sizes and population densities of the primate population in the Natural Reserve of Nouragues, French Guiana.

Species	No. of groups	Minimum group size[1]	Density[2] (groups/km²)	Density[2] (ind/km²)
A. seniculus	9	5.1 ± 1.4	2-3 (2.50)	11-15 (12.78)
A. paniscus	10	3.6 ± 1.8	2-3 (2.28)	7-10 (8.57)
C. apella	7	7.7 ± 2.9	1-3 (1.94)	13-17 (15.00)
C. olivaceus[3]	6	13.2 ± 4.4	-	-
P. pithecia[3]	4	2.8 ± 1.0	-	-
S. midas	13	4.2 ± 1.5	5-6 (5.42)	20-25 (22.92)

[1] mean ± standard deviation.
[2] range of 95% confidence interval, mean in parentheses.
[3] group sizes estimated by sightings outside transect censuses.

species are derived from other sightings.

Discussion

Minimum estimates of density and group sizes in *Saguinus midas* are similar to those found during intensive studies at the same study site by Kessler (1995b): 16.5 ind/km²,4.8±1.5 ind/group, n=4. Julliot (1992) calculated a higher density for *Alouatta seniculus* (17-22 ind/km², 6.3±2 ind/group n=6) than estimated in the present study. This is best explained by the fact that howler groups are often missed, and, when resting, are difficult to count. Estimates from another study site in the Guianan region (Raleighvallen-Voltzberg Reserve, Surinam) for *Alouatta seniculus* (17 ind/km²), *Ateles paniscus* (7.1 ind/km²) and *Saguinus midas* (23.5 ind/km²) are comparable to results of the present study (Mittermeier, 1977; Van Roosmalen, 1980).

Observed group sizes of *Ateles paniscus* refer to foraging units rather than to social units. Spider monkeys are known to form social groups of up to 15-20 individuals, but forage in small sub-groups of 2-3 animals (Klein and Klein, 1979; Van Roosmalen, 1980). This pattern was also typical at Nouragues. The lack of data for *Cebus olivaceus* and *Pithecia pithecia* probably reflects very low densities. *Pithecia* is also a very shy and quiet species, and difficult to detect (pers. obs.).

Hunting pressure evidently exerts the major impact on primate populations in French Guiana, especially along large rivers such as the Approuague. *Cebus, Ateles* and *Alouatta* are the most-hunted primates (Roussilhon, 1988). Comparing data from two localities, Raleighvallen-Voltzberg Nature Reserve and Brownsberg Nature Park in Surinam, with no hunting pressure, with a heavily hunted area in French Guiana (Saül) (Mittermeier *et al.* 1977), the population densities estimated for the Natural Reserve of Nouragues indicate that hunting pressure is absent or light.

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References

Charles-Dominique, P. 1993. Speciation and coevolution: an interpretation of frugivory phenomena. In: *Frugivory and Seed Dispersal: Ecological and Evolutionary Aspects,* T. H. Fleming and A. Estrada (eds.), pp.75-84. Kluwer Academic Publishers, Belgium.

Julliot, C. 1992. Utilisation des ressources alimentaires par le singe hurleur roux, *Alouatta seniculus* (Atelidae, Primates), en Guyane: Impact de la dissemmmination des Graines sur la regénération forestière. Thèse de doctorat, Université de Tours.

Kessler, P. 1995a. Preliminary field study of the red-handed tamarin (*Saguinus midas*) in French Guiana. *Neotropical Primates* 3: 184-185.

Kessler, P. 1995b. Revierverhalten, Ernährungsstrategie und Habitatpräferenzen des Rothandtamarins (*Saguinus midas midas*) in Französisch-Guayana. M.Sc.thesis, University of Zürich-Irchel, Zürich.

Klein, L. L. and Klein, D. J. 1979. Social and ecological contrasts between four taxa of Neotropical Primates. In: *Primate Ecology: Problem Oriented Field Studies,* R.W. Sussman (ed.), pp. 107-131. John Wiley and Sons, New York.

Mittermeier, R. A. 1977. The Distribution, Synecology and Conservation of Surinam monkeys. PhD thesis, University of Harvard, Cambridge.

Mittermeier, R. A., Bailey, R. A. and Coimbra-Filho, A. F. 1977. Conservation Status of the Callitrichidae in Brazilian Amazonia, Surinam, and French Guiana. In: *The Biology and Conservation of the Callitrichidae,* D. G. Kleiman (ed.). pp. 137-146. Smithsonian Institution Press, Washington D.C.

National Research Council (US), Committee on Nonhuman Primates, and Subcommittee on Conservation of Natural Populations. 1981. *Techniques for the Study of Primate Population Ecology*. National Academy Press, Washington, D.C.

Van Roosmalen, M. G. M. 1980. Habitat Preferences. Diet, Feeding Strategy and Social Organization of the Black Spider Monkey (*Ateles paniscus paniscus* Linnaeus 1758) in Surinam. Ph.D. thesis, Wageningen.

Roussilhon, C. 1988. The general status of monkeys in French Guiana. *Primate Conservation* (9): 70-74.

Zhang, S.-Y. 1995. Activity and ranging patterns in relation to fruit utilization by brown capuchin monkeys (*Cebus apella*) in French Guiana. *Int. J. Primatol.* 16: 489-507.

Temporal and Acoustic Properties of Long-distance Calls of the Masked Titi Monkey, *Callicebus personatus*

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Adelaide H. P. Silva

Vocal communication is important for forest primate species with structural features of the environment limiting visual contact. Long-distance calls, often produced by primates and used in intra and inter-group signalling, may have spacing and other coordinative functions (Chivers, 1969).

The titi monkeys, genus *Callicebus*, are distributed in the Brazilian Atlantic coastal forest and forested areas of the basins of the Rios Amazonas, Orinoco and Paraguai (Kinzey, 1988). *Callicebus* monkeys emit loud calls de-

scribed as long vocal sequences of varying phrases (Moynihan, 1966; Robinson, 1979). These vocalizations are frequently uttered by a reproductive pair. Robinson (1979) described duetting for *Callicebus moloch* as coordinated vocalizations between a mated male and female with individuals producing identical sequences.

The analysis of the acoustic properties of long-distance calls of neotropical cebid primates are almost entirely restricted to the howler monkeys *Alouatta* (Baldwin & Baldwin, 1975; Bonvicino, 1989; Drubbel & Gautier, 1993; Whitehead, 1995) and squirrel monkeys *Saimiri* (Newman, 1985; Boinski & Newman, 1988). Robinson (1979) documented the structural variations in loud vocalizations of *Callicebus moloch.* Here, we present a temporal and spectrographic analysis of the long-calls of free-ranging *Callicebus personatus nigrifrons.*

Study Site and Methods

The study was carried out in a 17-ha forest fragment of a privately-owned farm in Monte Belo, Minas Gerais, Brazil (21° 23'S, 46° 15'W), *c.* 820 m above sea level. The vegetation is secondary, tropical, semideciduous forest with a discontinuous canopy reaching a height of up to 30m. The fragment is surrounded by coffee and sugar-cane plantations and pasture. The data were obtained during a long-term study on the feeding ecology of a buffy-tufted-ear marmoset group, *Callithrix aurita.* Two adults and a juvenile *C. personatus* were resident in the area and frequently observed. In August 1994, only one of the adults and the young were seen, and in August 1995 another adult joined these two individuals and was apparently accepted.

Duration and time of long-distance calls were registered between May 1994 and January 1995. Whenever possible, location and the posture of the callers were recorded. Close recording (<3m) of a loud-call emitted by an adult and a young masked titi monkey was obtained using a portable Panasonic RQ-L307 recorder of frequency ranging from 0.2 to 6 kHz. The call was recorded on 11th, December 1994 at 2:12pm.

Selected plots of the call were digitized at 30 kHz. Spectrograms were generated on SpectroGram 3.2 in the Laboratory of Biology, Ecology and Bioacoustics of Amphibians (LABEBA) of the State University of Campinas (Unicamp). We used a resolution of 16bit, and frequency scale of 1024 FFT over a temporal scale of 6 seconds. Terminology used follows Robinson (1979) and Whitehead (1995): a syllable is an uninterrupted spectrographic tracing and the emphasized or dominant frequency is the band of greatest energy (blackest part of a spectrogram). Intersyllable intervals, the period between the end of one syllable and the beginning of the next, were measured. These correspond to the pause in Robinson's study.

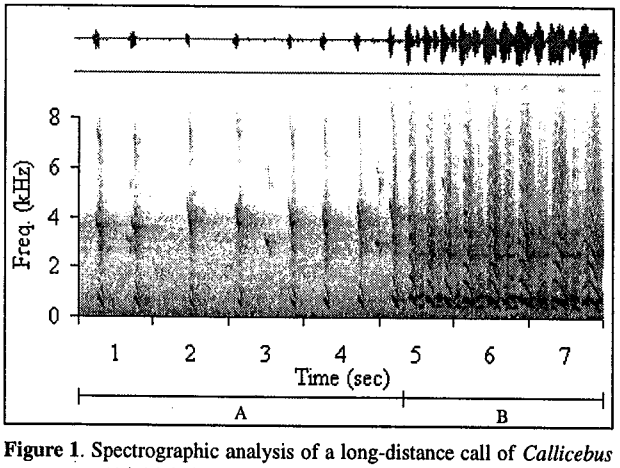

Figure 1. Spectrographic analysis of a long-distance call of *Callicebus personatus* A) initial phase B) "duet" phase.

Results and Discussion

Twenty-five long-distance calls were registered. Fifteen were heard between 0700 and 0900 h, seven between 0900 and 1100 h, two between 0500 and 0700 h and one between 1300 and 1500 h. The titi family, therefore, showed a peak of calling early in the morning as has been found for *Alouatta seniculus* (Sekulic, 1982; Drubbel & Gautier, 1993). Callers usually positioned themselves on the top of a tree, facing another forest fragment where another *Callicebus* group had been heard on several occasions. During the call recording, however, both animals were about 2 m above the ground. The younger titi did not always participate in calling. Unfortunately, it was not possible to determine which calls belonged to which sex. The shortest call lasted 28 seconds and the longest 12 minutes and 19 seconds. Average duration was 3 minutes and 27 seconds, which is very similar to the 3 minutes and 28 seconds reported for *A. seniculus* (Drubbel & Gautier, 1993).

The acoustic measurements may have been affected by the low frequency range (0.2 to 6 kHz) offered by the recorder used in the present study. Thus, as frequency range above 10 kHz is poorly sampled, the spectrogram must be interpreted with caution. An average maximum frequency of 6917.9 ± 332.1 Hz was registered for the adult titis while for the younger animal, the average maximum frequency was 2073.6 ± 684.6 Hz. Maximum dominant frequency of the adult titi was at 750.7 ± 25.96 Hz and for the younger at 458.7 ± 44.2 Hz. These values correspond to the range of 300 and 1000 Hz of howlers roars recorded by Whitehead (1995), and, as pointed out by the author, fits a window in the ambient noise spectrum, thus improving sound propagation in arboreal environments.

The recorded call lasted 4 minutes, and was composed of two sequences with an interval of 17 seconds of silence between them. Robinson (1979) described seven sound categories based on acoustic characteristics, but the limitations of the present study make categorization difficult. Spectrographic analysis showed two structurally distinct phases. The initial phase (Fig. 1A), produced only by the older individual, was characterized by short syllables which may correspond to the moaning phase cited by Robinson (1979). The second phase (Fig. 1B) corresponds to a "duetting sequence" in which both individuals participated,

but the sequences produced by each one are totally different, not corresponding to a normal duet. The sequence produced by the older seems to alternate between pants and bellows, such as was registered for *C. moloch* by Robinson (1979).

In the recorded call, the rhythm of syllables emitted by the older titi varied between phases. During the initial phase, intersyllable intervals were, on average, 345.6 ± 57.8 msec (N = 15 intervals). Close to or during the "duet" sequence, the rhythm was accelerated (141.2 ± 52.1 msec; N = 5). Absence of similar data in the literature precludes comparisons with a conventional duet. On the other hand, discernible structural differences between the syllables produced by the older and the younger individuals, besides the major degree of definition presented by the older one, is indicative that participation in "duets" with one or both parents may be a way of learning vocal signs. Time intervals between syllables may function as a clue to coordinate vocalization.

Acknowledgments

This study is dedicated to the late Dr. Adão Cardoso. We are most grateful to Dr. Francisco Mendes for critical comments. Marcos Grid Pappi, Nancy Sierra and Cinthia Brasileiro provided helpful advice.

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References

Baldwin, J. D. and Baldwin, J. I. 1975. The vocal repertoire of howler monkeys (*Alouatta palliata*) in southwestern Panama. Library of Natural History Sounds, Laboratory of Ornithology, Cornell University, Ithaca, NY.

Boinski, S. and Newman, J. D. 1988. Preliminary observations on squirrel monkey (*Saimiri oerstedi*) vocalizations in Costa Rica. *Am. J. Primatol.* 14: 329-343.

Bonvicino, C. R. 1989. Ecologia e comportamento de *Alouatta belzebul* (Primates: Cebidae) na mata Atlântica. *Rev. Nordestina Biol.* 6(2): 81-108.

Chivers, D. J. 1969. On the daily behaviour and spacing in howling monkeys groups. *Folia Primatol.* 10: 48-102.

Drubbel, R. V. and Gautier, J.-P. 1993. On the occurence of nocturnal and diurnal loud calls, differing in structure and duration, in red howlers (*Alouatta seniculus*) of French Guyana. *Folia Primatol.* 60: 195-209.

Kinzey, W. G. 1988. The Titi Monkey, Genus *Callicebus*. In: *Ecology and Behavior of Neotropical Primates*, vol. 1, A. F. Coimbra-Filho and R. A. Mittermeier (eds.), pp. 241-276. Academia Brasileira de Ciências, Rio de Janeiro.

Moynihan, M. 1966. Communication in the titi monkey *Callicebus*. *J. Zool., Lond.* 150: 77-127.

Newman, J. D. 1985. Squirrel monkey communication. In *Handbook of Squirrel Monkey Research*, L. Rosenblum (ed.), pp. 99-126. Plenum Press, New York.

Robinson, J. G. 1979. An analysis of the organization of vocal communication in the titi monkey *Callicebus moloch*. *Zeit. Tierpsych.* 49(4): 381-403.

Sekulic, R. 1982. Daily and seasonal patterns of roaring and spacing in four red howler *Alouatta seniculus* troops. *Folia Primatol.* 39:22-48.

Whitehead, J. M. 1995. Vox Alouattinae: a preliminary survey of the acoustic characteristics of long-distance calls of howling monkeys. *Int. J. Primatol.* 16: 121-144.

Unusual Sexual Posture in a Howler Monkey Couple, *Alouatta fusca clamitans*

Sandra Steinmetz
Mônica de Souza

The sexual behavior of primates varies considerably from species to species. In some, copulation is performed rapidly, preceded by little or no courtship, and completed in just a few seconds, in others copulation is more elaborate, lasting for several hours, with courtship continuing over several days. Copulation usually takes place in a dorsal-ventral position, the male mounting the female from the rear (Chalmers, 1979). Mendes (1985) observed eight copulations of *Alouatta fusca clamitans*, all of them in a dorsal-ventral position. Other species of *Alouatta* have also been observed with the same postural copulatory pattern, for example, *A. palliata* - Bernstein (1964), Carpenter (1965); *A. belzebul* - Bonvicino (1989); *A. caraya* - Calegaro-Marques (1992); and *A. seniculus* - Neville (1972). Here, we describe an unusual mount posture of the howler monkey *A. fusca clamitans*.

The observations were made while conducting a field study on the feeding ecology of neotropical squirrels (*Sciurus ingrami*) at the Cantareira State Park (23°22'S and 46°26'W), north of São Paulo, Brazil. On February 26th, 1998, at 09:32 h, we observed a couple of howler monkeys approximately 15 m above us. The female was dark brown and adult in size. The male was red-brown and bigger than the female. When we arrived, both individuals were seated side-by-side. After a few minutes, the female leaned back on the branch, with slightly flexed legs wide opened sideways. The male approached and, facing the female, took an almost seated position between her legs. The male then stood quadrupedally over her with his legs slightly flexed, and began a pelvic thrusting lasting 10 seconds. Meanwhile, the female remained still with her head sideways observing us. Intromission and ejaculation could not be reliably seen; difficult to ascertain in howler monkeys in general (Carpenter, 1965). The ejaculation in some copulations is determined by an interval between the thrusting pelvic movements of the male (Hanby and Brown, 1974).

After the ventro-ventral position mount and pelvic thrusting, the couple remained together embracing each other

with their muzzles touching. Then a group of howler monkeys arrived (one adult male, two females and three infants) and stopped approximately 50 m away and at the same height in the forest as the couple. The adult male in the group began to roar and was joined by one of the females. While both howler monkeys roared, the couple stayed quietly for some moments and then at 09:45 h they disappeared through the trees. The group stopped roaring at 09:47 h.

This kind of ventro-ventral position is very rare in primates, only described in humans and bonobos (*Pan paniscus*). Ventro-ventral copulations constitute between 26% and 38% of the heterosexual copulations observed in field studies of bonobos in Wamba and the Lomako Forest, Zaire (de Waal, 1989). In heterosexual pairs it usually occurs with the male in the active role, on top of the female, but exceptions do occur (de Waal, 1989). Some studies have noted that young monkeys and apes assume a ventro-ventral posture while thrusting. For example, Bingham (1928) and Goodall (1968) describe this for chimpanzees, *Pan troglodytes*, and Hanby and Brown (1974) observed it in Japanese macaques, *Macaca fuscata*. This pattern often disappears with age or experience, but is reminiscent of the relation between close maternal contact, ventro-ventral embraces, and genital stimulation (Hanby, 1976).

Social experience is very important in the development of primates, and behaviors that we think of as primarily sexual (e.g., mounting) are engaged by primates in a wide variety of other social situations (Hanby and Brown, 1974). In spite of the importance of such socio-sexual behaviors, their development needs to be studied further, especially in Neotropical primates.

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References

Bernstein, I. S. 1964. A field study of the activities of howler monkeys. *Anim. Behav.* 12: 92-97.

Bingham, H. C. 1928. Sex development in apes. *Comp. Psych. Monog.* 5: 1-161.

Bonvicino, C. R. 1989. Ecologia e comportamento de *Alouatta belzebul* (Primates: Cebidae) na Mata Atlântica. *Rev. Nordestina Biol.* 6: 149-179.

Calegaro-Marques, C. 1992. Comportamento social de um grupo de *Alouatta caraya* (Primates, Cebidae) em Alegrete, R.S., Brasil. Unpublished Master's thesis, Universidade de Brasília, Brasília.

Carpenter, C. R. 1965. The howlers of Barro Colorado Island. In: *Primate Behavior: Field Studies of Monkeys and Apes*, I. DeVore (ed.), pp. 250-291. Holt, Rinehart & Winston, New York.

Chalmers, N. R. 1979. *Social Behavior in Primates*. Edward Arnold, London.

Goodall, J. Van Lawick. 1968. The behaviour of free-living chimpanzees in the Gombe Stream Research. *Anim. Behav. Monog.* 1: 165-311.

Hanby, J. 1976. Sociosexual development in primates. In: *Perspectives in Ethology - 2*, P. P. G. Bateson and P. H. Klopfer (eds.), pp. 1-67. Plenum Press, New York.

Hanby, J. P. and Brown, C. E. 1974. The development of sociosexual behaviours in Japanese macaques *Macaca fuscata. Behaviour* 49: 152-196.

Mendes, S. L. 1985. Uso de espaço, padrões de atividades diárias e organização social de *Alouatta fusca* (Primates, Cebidae) em Caratinga, MG. Unpublished Master's thesis, Universidade de Brasília, Brasília.

Neville, M. K. 1972. Social relations within troops of red howler monkeys (*Alouatta seniculus*). *Folia Primatol.* 18: 47-77.

de Waal, F. B. M. 1989. Behavioral contrasts between Bonobo and Chimpanzee. In: *Understanding Chimpanzees*, P. G. Heltne and L. A. Marquardt (eds.), pp. 154-175. Harvard University Press, Cambridge, Massachusetts.

News

Sobre a Ocorrência do Muriqui, *Brachyteles arachnoides*, em Mambucaba, Rio de Janeiro, Brasil

Aguirre (1971), relacionou seis exemplares de *Brachyteles arachnoides*, procedentes de Mambucaba, município de Angra dos Reis, estado do Rio de Janeiro, Brasil (Fig. 1), coletados entre 11 e 14 de setembro de 1942, associando-os à Fundação Rockefeller. Em nota, comentou que era desconhecido o paradeiro desses espécimes.

Anos mais tarde, conversando com o Sr. Aguirre, soubemos que foi através de fichas individuais que ele obteve informações sobre os animais. O Sr. Aguirre conseguiu, no final da década de 1960, encontrar num depósito do antigo prédio ocupado pela Fundação Rockefeller, no campus do então Instituto Osvaldo Cruz, uma considerável

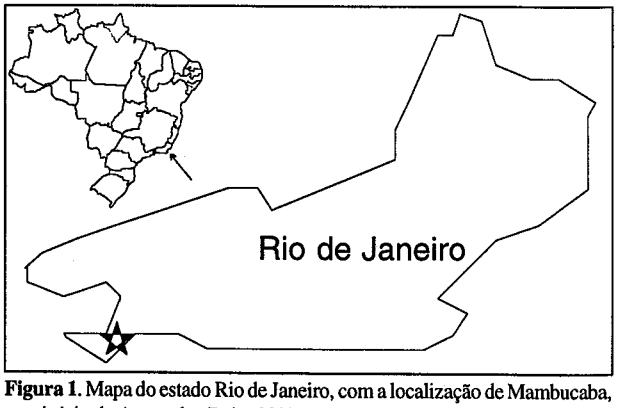

Figura 1. Mapa do estado Rio de Janeiro, com a localização de Mambucaba, município de Angra dos Reis (23°01'S, 44°31'W).

Tabela 1. Relação de espécimes mencionados por Aguirre (1971), provenientes de Mambucaba, Angra dos Reis, Rio de Janeiro.

Nº Museu (MNRJ)	Data	Sexo	Material	Nº Campo
24115	12.09.1942	M	crânio	14206
30189	12.09.1942	M	crânio	14205
30193	14.09.1942	M	crânio, esqeleto	14210
31304	14.09.1942	F	esqeleto	14211
31321	14.09.1942	M	crânio, esqueleto	14209

Obs. Da relação original, apenas o exemplar com número de campo 14204 continua desaparecido.

quantidade de mamíferos silvestres taxidermizados e documentos relativos a captura dos mesmos. Posteriormente (1970), esse material foi transferido e incorporado ao acêrvo do Museu Nacional (MNRJ).

Entre 1935 e 1949, o Serviço de Estudos e Pesquisas sobre a Febre Amarela (SEPSFA), em cooperação com a Divisão Internacional de Saúde da Fundação Rockefeller, realizou diversas investigações de campo envolvendo a captura de vertebrados silvestres em vários pontos do Brasil.

Reorganizando a coleção de primatas do Museu Nacional (MNRJ), tivemos a atenção atraída para duas caixas com a inscrição "guariba?". Examinado-as, verificamos que ao invés de conterem *Alouatta*, ambas guardavam crânio e partes do esqueleto de espécimes de *Brachyteles*. Curiosamente, os números das plaquetas do campo eram os mesmos figurados no trabalho do Sr. Aguirre. Posteriormente, três outros crânios, com as mesmas características, também foram encontrados.

A localização desses exemplares (Tabela 1) representa não somente o reencontro com espécimes que não se tinha notícias há muito tempo, mas a prova material da ocorrência passada de *Brachyteles arachnoides*, nessa parte da Serra do Mar.

A presente nota é dedicada à memória do engenheiro-agrônomo Álvaro Coutinho Aguirre, ilustre amigo que dedicou parte da sua vida a preservação da vida selvagem do Brasil.

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Referências

Aguirre, A. C. 1971. *O mono* Brachyteles arachnoides *(E. Geoffroy). Situação atual da Espécie no Brasil.* Academia Brasileira de Ciências, Rio de Janeiro. 53pp.

Gilmore, R. M. 1943. Mammalogy in an epidemiological study of jungle yellow fever in Brazil. *J. Mammal.* 24: 144-162.

Primate Type Specimens in the Museu Nacional, Rio de Janeiro

A recent issue of the *Publicações Avulsas do Museu Nacional* (number 70, 1997) provides an annotated listing of the 72 mammal type specimens in the collection of the Museu Nacional, Rio de Janeiro. The primates which are listed are all callithrichids, as follows: *Callithrix argentata marcai* Alperin, 1994 (holotype MN2856, and two paratypes); *Hapale coelestis* Miranda Ribeiro, 1924 (lectotype MN2825, and two paralectotypes); *Mico melanoleucus* Miranda Ribeiro, 1912 (lectotype MN2835); *Hapale petronius* Miranda Ribeiro, 1924 (lectotype MN2824, and one paralectotype); *Leontocebus melanoleucus acrensis* Carvalho, 1957 (paratype MN23868); *Leontopithecus caissara* Lorini & Persson, 1990 (holotype MN28861); and *Saguinus fuscicollis primitivus* Hershkovitz, 1977 (holotype MN22908).

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References

Ávila-Pires, F. D. de. 1968. Tipos de mamíferos recentes no Museu Nacional, Rio de Janeiro. *Arq. Mus. Nac.*, Rio de Janeiro 53: 161-192.

Langguth, A., Limeira, V. L. A. G. and Franco, S. 1997. Novo catálogo do material-tipo da coleção de mamíferos do Museu Nacional. *Publ. Avuls. Mus. Nac.*, Rio de Janeiro (70): 1-29.

Miranda-Ribeiro, P. 1955. Tipos das espécies e subespécies do Prof. Alípio de Miranda-Ribeiro depositados no Museu Nacional. *Arq. Mus. Nac.*, Rio de Janeiro 42: 389-417.

Reorganização da Coleção de Primatas do Museu Nacional, Rio de Janeiro

Foi concluída a primeira etapa da reorganização da coleção de primatas do Museu Nacional (MNRJ). Esse fase envolveu as Famílias Lemuridae, Daubentoniidae, Lorisidae, Tarsiidae e Callitrichidae. No tocante, a última família citada foram inventariados 1.766 espécimes, assim distribuídos: *Callimico goeldii* (1), *Callithrix argentata* (18), *C. leucippe* (5), *C. marcai* (3), *C. melanura* (16), *C. humeralifera* (7), *C. chrysoleuca* (16), *C. intermedia* (1), *C. aurita* (37), *C. flaviceps* (6), *C. geoffroyi* (75), *C. jacchus* (206), *C. penicillata* (217), *C. kuhlii* (954), *Cebuella pygmaea* (4), *Leontopithecus caissara* (1), *L. chrysomelas* (14), *L. chrysopygus* (1), *L. rosalia* (39), *Saguinus b. bicolor* (6), *S. b. martinsi* (1), *S. fuscicollis acrensis* (1), *S. f. avilapiresi* (3), *S. f. fuscicollis* (7), *S. f. fuscus* (1), *S. f. melanoleucus* (5), *S. f. primitivus* (1), *S. f. weddelli* (18), *S. imperator* (2), *S. labiatus* (3), *S. leucopus* (1), *S. midas midas* (28), *S. m. niger* (46), *S. mystax mystax* (14), *S. m. pileatus* (6), *S. geoffroyi* (1), *S. oedipus* (1).

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Reserva Biológica Fazenda União, Rio de Janeiro

Em 22 de abril de 1998, foi assinado em Brasília o decreto para a criação da Reserva Biológica Federal da Fazenda União no estado do Rio de Janeiro, Brasil. A nova Reserva, localizada na divisa dos municípios de Rio das Ostras, Casimiro de Abreu e Macaé, possui uma área total de 3200 ha, com 2400 ha cobertos por mata Atlântica.

A história da criação da Reserva Biológica Fazenda União começou em 1991, durante o levantamento das populações de micos-leões-dourados realizado por M. C. M. Kierulff. Todas as matas localizadas na região originalmente ocupada por *Leontopithecus rosalia* foram visitadas, incluindo a Fazenda União e, apesar de não terem sido encontrados micos-leões na área, a mata foi escolhida para receber grupos resgatados e translocados de matas degradadas.

O Projeto de Translocação de grupos ameaçados de micos-leões-dourados começou em 1994 e até o momento foram translocados seis grupos. A nova população vem reproduzindo, e indivíduos que dispersaram dos grupos originais formaram novos grupos. Atualmente a população está formada por 12 grupos e mais de 50 indivíduos.

Originalmente a Fazenda União pertencia a Rede Ferroviária Federal SA (RFFSA) que usava parte da área para plantação de *Eucalyptus* e a produção de dormentes, e sempre protegeu a floresta nativa. Com a privatização da RFFSA em 1996, a Fazenda União não foi negociada e continuou a fazer parte da Rede Ferroviária. Porém, a produção de dormentes foi interrompida, e a Fazenda ficou abandonada. A presença dos pesquisadores do Projeto de Translocação residindo na Fazenda União e monitorando os micos-leões-dourados ajudou a manter área e protegi-la contra caçadores, pessoas interessadas em tirar madeira e invasões.

O interesse do Instituto Brasileiro do Meio-Ambiente (Ibama) e a presença dos micos-leões contribuíram para a criação da Reserva Biológica da Fazenda União que vai contribuir não só para a proteção de mais uma população de *L. rosalia*, como também vai garantir a manutenção de uma das áreas de mata Atlântica de baixada costeira mais bem preservadas do Rio de Janeiro.

Agradecimentos: Agradecemos especialmente aos biólogos da equipe de Translocação: Edsel A. Moraes Jr., Marina J. Lapenta e Vanessa P. Veruli; e aos órgãos financiadores do Projeto de Translocação: National Geographic Society, Philadelphia Zoo, Jersey Wildlife Preservation Trust, Wildlife Preservation Trust International, Lincoln Zoo Scott Neotropic Fund, Margot Marsh Biodiversity Foundation, Fundação O Boticário de Proteção à Natureza, e Brooklyn Zoo.

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Superagüi National Park - Protection for the Black-faced Lion Tamarin

On 20 November 1997, the boundaries of the Superagüi National Park (Federal Decree 97.688, 25 April 1989), on the coast of the state of Paraná, Brazil, were changed, increasing its size from 21,400 ha to 34,254 ha (Law 9.513/ 20th November, 1997, published in the *Diário Oficial da União*, No. 226, 21 November, 1997). The increase in size comes from the inclusion of the north of the island and the entire eastern coast, as well as part of the continent immediately adjacent. This measure was deemed vital for the survival of the black-faced lion tamarin, *Leontopithecus caissara*, first described by Persson and Lorini in 1990, as advocated clearly in the Action Plan for the species drawn up by Admiral Ibsen de Gusmão Câmara (Fundação Brasileira para a Conservação da Natureza, Rio de Janeiro), co-chair, with Jeremy Mallinson (Jersey Wildlife Preservation Trust, Jersey), of the International Recovery and Management Committee (IRMC) for the species, and presented to the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Ibama) in June 1993 (Câmara, 1993). The new range limits have strengthened the integrity of the Park, threatened with land speculation along the coast, and increased significantly the protected population of *L. caissara*. The first proposal to include the coast and the northern part of the island was drawn up by Federal Deputy Luciano Pizzatto and presented to the National Congress in 1992 (Anon., 1998). Numerous people were involved in making this happen, but special credit must be given to the wildlife and parks departments of Ibama for their role in this most significant victory.

References

Anonymous. 1998. Parque Nacional do Superagüi tem limites ampliados. *Parabólicas, Newsletter of the Instituto Sociambiental*, São Paulo, 8(36):4.

Câmara, I. de .G. 1993. Action Plan for the black-faced lion tamarin. *Neotropical Primates* 1(3): 10-11.

Ecology and Social Behaviour of Buffy-headed Marmosets, *Callithrix flaviceps*

On June 4th, 1998, Alice Guimarães successfully defended her Master's thesis "Ecology, Reproductive Behaviour, and Scent-Marking in a Group of *Callithrix flaviceps* (Callitrichidae, Primates), at the Caratinga Biological Station, Minas Gerais", for the Postgraduate Course in Ecology, Conservation and Wildlife Management (ECMVS) of the Institute of Biological Sciences, Federal University of Minas Gerais, Brazil. Her supervisor was Anthony B. Rylands, and the study was supported by the U. S. Fish

and Wildlife Service, Washington, D. C., O Fundação Boticário de Proteção à Natureza, São José dos Pinhais, Paraná, the Brazil Science Council (CNPq), Brasília, and the Fundação Biodiversitas, Belo Horizonte. The following is the abstract of her thesis.

The ecology and behaviour of a group of buffy-headed marmosets, *Callithrix flaviceps*, was studied at the Caratinga Biological Station, Minas Gerais, between April and December 1996. The group was followed for 90 entire days, and ecological and social data were recorded using instantaneous scan sampling (a one minute scan at five minute intervals) and behaviour sampling. Group size varied from 15 to 20 individuals of all ages. The activity pattern recorded was the following: 36,7% travelling; 23,7% social behaviour; 21,3% foraging; 8,3% resting; 7,8% feeding on plant material; and 2,2% feeding on animal prey. They foraged more in the dry season, and were involved more in social activities and resting in the rainy season. The marmosets fed predominantly on gum throughout the study period. Gum comprised 76% of all feeding records during the dry season. Two species, *Anadenanthera peregrina* and *Acacia paniculata*, were the most important sources. Fruits, flowers and seeds were also important during the rainy season. The animal part of the diet was composed of numerous invertebrates and small vertebrates. The home range of the group was 33.86 ha. 29.9 ha were used during the period of systematic data collection. The mean daily distance travelled by the group was 883.8 $\pm$ 231.6 m, and the mean area covered per day was 4.0 $\pm$ 1.2 ha. The marmosets did not use the home range uniformly, showing a preference for the north and eastern portions where there were more gum sources. In 1996, nine infants were born to three different females. One of the females was considered dominant on the basis of the agonistic interactions and food sharing. The dominant female was seen copulating with one male on 33 occasions. The subordinate reproductive females were not seen to copulate. It was, therefore, not possible to determine if the mating system was monogamous or polygynous. The singleton of one of the subordinate females and all four infants of the dominant female survived until the end of the study period. Two of the four infants of one of the subordinate females disappeared during the study. All the adults and subadults carried infants of all three females. The subordinate females, however, first transferred their infants when they were 15 days old, whereas the dominant female transferred its infants when they were just two days old. All three females nursed the infants of the other females at least once. With regard to scent marking, 1329 records were obtained of circumgenital marking, 93 of sternal marking and 28 of muzzle-rubbing during the 90 days of systematic data collection. Marking rates increased with age, and were independent of sex. The animals marked predominantly while travelling (1047 records), and very little when feeding (54 records). The marmosets were not seen to mark during (rare) intergroup interactions. The reproductive subordinate females marked more during oestrus months, but this was not evident for the dominant reproductive female. The quadrats used most were also marked most. There was no significant difference in marking patterns between the area used exclusively by the group and that shared with other groups.

Alice Guimarães, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Minas Gerais, Brazil.

Reference

Guimarães, A. 1998. Ecologia, Comportamento Reprodutivo e Marcação de Cheiro em Um Grupo de *Callithrix flaviceps* (Callitrichidae, Primates), na Estação Biológica de Caratinga, Minas Gerais. Master's thesis, Universidade Federal de Minas Gerais, Belo Horizonte. 162pp.

A Muriqui PHVA Workshop

A PHVA Workshop for the muriqui, *Brachyteles*, was held in Belo Horizonte, Minas Gerais, Brazil, 23-26 May, 1998. It was run by Ulysses S. Seal, Chairman of the Conservation Breeding Specialist Group (CBSG), in collaboration with PSG member Karen B. Strier (University of Wisconsin - Madison), and was organized by the Fundação Biodiversitas, (Executive Director, Ilmar B. Santos) with Conservation International do Brasil (Director, Gustavo A. B. da Fonseca). Jenna Borovansky, Administrative Assistant at the CBSG, and Philip Miller, Program Officer, also contributed significantly to the organization of the workshop, and, with Karen Strier, the preparation of the "Briefing Book" (see "Recent Publications"), a vital reference for lubricating the workshop proceedings. Sponsorship was provided by the Margot Marsh Biodiversity Foundation and, most importantly, it was blessed by the Brazilian Institute for the Environment (Ibama), with the presence of the head of the Department of Wildlife, Maria Iolita Bampi.

On the first day, following the preliminaries, Karen Strier presented a talk reviewing key aspects of the demography, behavior and ecology of muriquis, pertinent to their conservation; Gustavo A. B. da Fonseca (Conservation International do Brasil) discussed aspects of the current status of the Atlantic forest, habitat for the species; as Director, Eduardo Marcelino Veado talked of the status of the Caratinga Biological Station in Minas Gerais (site of the long-term field study coordinated by Karen Strier) and plans for its future; and Alcides Pissinatti reviewed the development of the captive colony at the Rio de Janeiro Primate Center (CPRJ/FEEMA), as well as his experience on the pathology, husbandry and behavior of the animals. In the afternoon, Liege Mariel Petroni (University of São Paulo), who is studying muriquis at the Fazenda Intervales State Park, reviewed the current status of knowledge of the muriqui in the state of São Paulo, and likewise Sérgio Lucena Mendes, Director of the Mello Leitão Museum of Biology, Santa Teresa, talked of the populations

in the state of Espírito Santo, including his recent discovery of new populations. Ulysses Seal then gave a tremendous pep-talk concerning the psychology of such workshops, and outlined the basic procedures and methodologies involved. He emphasized, however, that his now considerable experience in such exercises has allowed him to conclude that each is different, and not only the species, which have ranged from minute goblin ferns to Florida panthers, to gorillas and (now) muriquis, but the quirks of the people and nations involved in each mean that no two are alike, and each workshop creates its own way of dealing with the problems and tasks at hand. The next two and a half days were given over to dealing with problems and tasks in a way that only those involved in muriqui conservation and research would imagine, overseen sublimely by Ulysses Seal, providing excellent suggestions, and on only a few occasions firmly pulling participants back onto the right path. There were four working groups. They dealt with a review of the distribution of the known and suspected remaining populations, with aspects of research, management and protected areas, with environmental education and socioeconomic aspects, and with the running of the VORTEX PHVA analyses, based on Karen Strier and her student's research on muriquis at the Caratinga Biological Station over the last 15 years.

Some discussion was given to the taxonomic status of the southern and northern populations. Some now regard them as different species (*hypoxanthus* in the north and *arachnoides* in the south), while others are doubtful, but under any circumstances it was recognized that the two populations (Minas Gerais, Espírito Santo, Bahia on the one hand, and São Paulo, Paraná, Rio de Janeiro on the other) need to be considered separately, not only in genetic terms but also because the conservation problems are rather different for each. In the south, notably São Paulo, there are large protected areas, with poorly known but apparently very low population densities, whereas in the north there are some small areas with high populations, but without adequate protection. One of the major conclusions reached was the need for a long-term survey of the status and distribution. There are numerous localities documented by Aguirre in the 1970s where muriquis may or may not still survive and, in the south especially, numerous localities where recent reports of their occurrence are restricted to hearsay or the sighting of just a few animals, with no reliable estimate of any sort of the total populations. As pointed out by Ulysses Seal, the excellence of the demographic data available, on a par only with that for the whooping crane, meant that the VORTEX analyses were exceptionally useful in predicting scenarios for the fate of the different populations identified.

The document arising from this workshop will be published by the CBSG, and will guide and stimulate new efforts for the conservation of *Brachyteles*, hopefully especially resulting in further research in new areas in the south, to date restricted mainly to the Fazenda Intervales and Carlos Botelho State Parks. As pointed out by Russell Mittermeier and Célio Valle, key figures in stimulating conservation efforts for the muriqui in the late 1970s and 1980s, the workshop will also hopefully result in the muriqui taking more of the limelight as a flagship species for the Atlantic forest, attracting renewed interest for its conservation throughout its range.

Anthony B. Rylands, PSG Deputy Chairman, c/o Conservation International do Brasil, Avenida Antônio Abrahão Caram 820/302, 31275-000 Belo Horizonte, Minas Gerais, Brasil.

A New Primate List-server - Primfocus

A new Primate Liste-server "Primfocus" was announced on "Primate-talk" by Rick Bogle. The purpose of primfocus is to: 1. Provide an open forum for discussions about protecting of primates; 2. Provide a bulletin board for posting news items regarding primates; and 3. Share information relating to primates. Primfocus is an unmoderated open list. The list owners request that discussions remain civil and germane to primate protection and other primate issues. The list owners reserve the right to remove anyone from the list who repeatedly fails to honor the above statements. To subscribe to PrimFocus, send a message to <waste@waste.org> with the following message (and no subject line): subscribe primfocus. For the digest version, use the following text: subscribe primfocus-digest. To post messages to PrimFocus send your news item or discussion topic to <primfocus@waste.org>.

IUCN/SSC Wildlife Trade Programme

The goal of the IUCN/SSC Wildlife Trade Programme is to promote the conservation of wild species subject to trade by assessing the effect of trade on the status of species and generating appropriate recommendations and conservation strategies.

The work of IUCN's Species Survival Commission (SSC) on the status of wild species in trade started over 10 years ago. The programme ran initially under the auspices of the Trade Specialist Group, established to enhance the SSC's scientific input to CITES (Convention on International Trade in Wild Fauna and Flora), and later as the Wildlife Trade Programme, co-ordinated by the SSC Secretariat. Gradually, the focus has broadened to encompass a wide range of trade issues. A major focus has been to identify species threatened by trade and to recommend actions to address these threats. This has involved working with Specialist Groups to monitor the status of species in trade and prioritise species for conservation action. Information is then relayed to decision makers within the international conservation community. The programme has, therefore, acted as a two-way process, encouraging the exchange of information between scientists and policy-makers.

The Wildlife Trade Programme works in collaboration

with its partner organisations, the TRAFFIC Network and WCMC (World Conservation Monitoring Centre). SSC formally recognises TRAFFIC as its primary source of expertise on trade data, and TRAFFIC recognises SSC as its primary source of expertise on the biological status of species in trade. By combining the data produced by the two organisations, the impact of trade on wild species can be assessed.

The Programmes objectives are as follows: 1) To identify situations where trade in wild species appears unsustainable or detrimentally affects the status of non-target species; 2) To focus on gaps in knowledge of the biology and status of species in trade; 3) To develop and promote those actions and/or mechanisms necessary to ensure the conservation of species detrimentally affected by trade; 4) To ensure that the SSC's expertise is used to influence the decisions of CITES and other relevant agreements; 5) To provide scientific support and capacity building to the Parties to CITES (and other relevant international agreements) in implementing conventions at national and regional levels and: To increase understanding about CITES and other relevant agreements within the SSC network.

Priority Action

- Identify a focal point for trade issues in each taxonomic Specialist Group to ensure that SSC can provide high-quality information to policy makers.
- Support for Specialist Group Action Planning to identify species affected by trade which may be of conservation concern.
- Determine where further information is needed on these species and stimulate the information collection.
- Work with interested parties to promote appropriate conservation action for species identified.
- Provide general assistance to the CITES Secretariat and Parties between the meetings of the Conference of Parties (COP).
- Provide specific assistance to the Parties for the meetings of the COP by publishing: CITES: A Conservation Tool, A Guide to Amending the Appendices to CITES. This publication provides guidance through the Convention's articles and resolutions governing the submission, presentation and adoption of proposals to amend the appendices.
- The Analyses of Proposals to Amend the CITES Appendices, produced in collaboration with the TRAFFIC Network, providing an independent assessment of the information provided in the proposals.
- Support the CITES Significant Trade process by identifying species subject to 'significant' levels of trade and development of conservation and management programmes for species in trade in their country of origin.
- Assist CITES Parties to review and, where it is necessary, to strengthen the capacities of their Scientific Authorities to undertake the monitoring and assessment procedures for wild species in trade.
- Contribute to policy documents, e.g., *CITES Guidelines for the Disposition of Confiscated Specimens*, IUCN Re-introduction Guidelines and *IUCN Guidelines for the Prevention of Biodiversity Loss due to Biological Invasion*.

The Wildlife Trade Programme aims to expand its work in three theme areas of particular conservation concern: trees, marine organisms, and medicinal plants and animals. The SSC tree networks are being further developed in conjunction with WCMC. Further emphasis is being placed on marine organisms. The Medicinal Plant Specialist Group is very active and a number of medicinal issues are of concern to animal Specialist Groups as well.

Further information is available from: IUCN The World Conservation Union: <www.iucn.org>; IUCN Species Survival Commission: <www.iucn.org/themes/ssc>; IUCN/SSC Wildlife Trade Programme: <www.iucn.org/themes/ssc/programs>; TRAFFIC Network: <www.traffic.org>; Convention on International Trade in Endangered Species of Wild Fauna and Flora: <www.wcmc.org.uk/CITES>.

Information on CITES, list of Parties, information on the meetings of the Conference of the Parties, Text of the Convention, Appendices, Reservations, Resolutions and information on publications are available at the World Conservation Monitoring Centre: <www.wcmc.org.uk>, or contact the Wildlife Trade Programme directly: IUCN/SSC Wildlife Trade Programme, 219c Huntingdon Road, Cambridge CB3 ODL, UK, Tel: +44 (0)1223 277966, Fax: +44 (0)1223 277845, e-mail: <iucn-ssc@wcmc.org.uk>.

Annual Meeting of the International Committees for the Lion Tamarins

The Annual meeting of the International Committees for the Recovery and Management of the Lion Tamarins, *Leontopithecus*, was held this year at the headquarters of the non-governmental organization IPÊ - Instituto de Pesquisas Ecológicas, Nazaré Paulista, São Paulo, hosted by Suzana and Claudio Padua, from 27-29 May. The meetings were chaired by the head of the Wildlife Department of the Brazilian Environment Institute (Ibama), Maria Iolita Bampi. Routine business included status reports on current field projects, discussion of future projects and proposals, the status of the captive population and the inclusion of new zoos and captive breeding instututions in the breeding programs, as well as the status of fund-raising efforts, particularly through the Lion Tamarins of Brazil Fund. There was reason for some celebration, landmarks over the past year including: the increase in the size of the Superagüi National Park, home to the black-

faced lion tamarin (*Leontopithecus caissara*), now covering a larger part of the island as well as part of the adjacent continent; Guadelupe Vivekananda, Director, reported that funding had been secured for drawing up the management plan for the Superagüi National Park, and that there were positive signs regarding the resolution of the presence of Indian families there; the success of the translocation program run by Cecília Kierulff (currently finishing her doctorate at the University of Cambridge with David Chivers) and Paula Procópio de Oliveira (beginning her doctorate with Gustavo Fonseca at the Federal University of Minas Gerais); the legal protection of the forest at the Fazenda União, site of the translocation program, which was converted into a Federal Biological Reserve on 22 April 1998; and Saturnino Neto de Souza, Director, reported on the completion of the Management Plan for the Una Biological Reserve (*L. chrysomelas*), and also informed that compensation would soon be available for the removal of the few remaining squatter families. Jon Ballou (National Zoological Park, Washington, D. C.) and his co-authors were congratulated on the completion of the final report of the PHVA Workshop for the genus, held during the 1997 meeting in Belo Horizonte (see "Recent Publications"). Bengt Olson (Copenhagen Zoo) reported on alternatives for fund-raising amongst the European zoo community and his preparations for a meeting to report on and promote the cause of lion tamarin conservation. Kristin Leus (Antwerp Zoo), studbook keeper for *L. chrysomelas*, reported on current progress in techniques and research for controlling reproduction in captive colonies. Other notable reports were given by Claudio Valladares-Padua concerning progress on the metapopulation management program for *L. chrysopygus* as well as plans, with Fabiana Prado (IPÊ), for the continuation of the distribution and population survey for *L. caissara* in Paraná and São Paulo; by Gabriel Rodrigues dos Santos (Instituto de Estudos Socio-ambientais do Sul da Bahia - IESB, Ilhéus) on his extension work with landowners, promoting the protection of forests surrounding the Una Biological Reserve; and by James Dietz (University of Maryland), concerning his research program on the demography and ecology and behavior of *L. chrysomelas*, as well studies of mixed-species groups with *Callithrix kuhlii* (by Becky E. Raboy, University of Maryland).

Admiral Ibsen de Gusmão Câmara (Fundação Brasileira para a Conservação da Natureza (FBCN), Rio de Janeiro) retired as Co-chair of the Committee for *Leontopithecus caissara* in 1997, and Jeremy Mallinson (Jersey Wildlife Preservation Trust, Jersey) proposed a most sincere vote of thanks for his remarkable efforts, dedication, and success in running the committee since 1990. Anthony Rylands (Conservation International do Brasil, Belo Horizonte) was appointed Co-Chair of the *L. caissara* committee in his place.

Fundação o Boticário de Proteção à Natureza - Projetos 1998

FUNDAÇÃO BOTICÁRIO DE PROTEÇÃO À NATUREZA

A Fundação Boticário de Proteção à Natureza apoiou 19 projetos na segunda etapa de seleção de 1997, de seu Programa de Incentivo à Conservação da Natureza. Os projetos são divididos em três categorias: Unidades de conservação (sete projetos); Pesquisa e proteção da vida silvestre (nove projetos); e Áreas verdes (três projetos). Um dos projetos aprovados é do Instituto de Pesquisas da Mata Atlântica - IPEMA, Diretor Geral, Paulo de Marco, Jr., Santa Teresa, Espírito Santo. O projeto - "Caracterização molecular de populações de duas espécies de primatas endêmicos da Mata Atlântica e de seus possíveis híbridos" constituirá a tese de mestrado em Genética da Universidade Federal de Viçosa, Minas Gerais, de Fabiano Rodrigues de Melo, sendo seu orientador Lúcio Antônio de Oliveira Campos, e co-orientador, Sérgio Lucena Mendes, do Museu de Biologia Mello Leitão, Santa Teresa. O projeto estudará a genética de populações selvagens de *Callithrix aurita* e *Callithrix flaviceps* nas regiões dos municípios de Viçosa, Alfenas, Alfredo Chaves e Carangola em Minas Gerais, e Santa Teresa, Espírito Santo, entre outros, e as populações em cativeiro do Museu de Biologia Mello Leitão e o Centro de Primatologia do Rio de Janeiro (CPRJ/FEEMA). O objetivo do projeto é a identificação de marcadores genéticos, usando-se a técnica de RAPD, que caracterizem e diferenciem populações de *aurita* das de *flaviceps* e de ambas de seus híbridos. Os resultados também poderão ser úteis na avaliação da extensão da zona de hibridação entre as espécies.

Miguel Serediuk Milano, Diretor Técnico, Fundação O Boticário de Proteção à Natureza, Avenida Rui Barbosa 3450, 83065-260 São José dos Pinhais, Paraná, Brasil.

The Lion Tamarins of Brazil Fund

Since the inception of this annual appeal to all holders of lion tamarins outside Brazil, the Lion Tamarins of Brazil Fund (LTBF) has raised in excess of US$100,000 in support of *in situ* conservation work. As has recently been highlighted, the initiation of the LTBF in 1991 represents the first time that an international fund has been established by which all holders of individuals of an endangered genus, held outside the country to which it is endemic, are requested to contribute annually to aid the conservation of the remnant wild populations.

The annual LTBF appeal letter reiterates that it is very much hoped that all holders of *Leontopithecus* outside Brazil will be able to provide some financial support, no matter how small, in order for the fund to generate

sufficient money to continue and increase its support for these model *in situ* conservation programmes. As recorded at the foot of the LTBF Appeal Form, zoos in North and South America are requested to send their donations to Dr. Jonathan Ballou or Dr. Devra Kleiman, Department of Zoological Research, National Zoological Park, Smithsonian Institution, Washington, D.C., 20008 USA. Zoos in Africa, Asia, Australasia and Europe are requested to submit them to Jeremy J.C. Mallinson, Jersey Wildlife Preservation Trust, Les Augrès Manor, Trinity, Jersey, JE3 5BP, British Channel Islands.

The June 1996 - May 1997 LTBF Appeal, which was mailed to over 150 holders of *Leontopithecus*, realised total contributions of US$ 19,347. This sum does not include the amount of US$5,000 by Copenhagen Zoo, in sponsorship of a family group of golden lion tamarins. At the 24th May, 1997 meeting of the International Recovery and Management Committees it was decided, as in previous years, that the funds raised should be shared equally between the four Lion Tamarin Committees. It is the responsibility of the respective IRMC Chairpersons to distribute the amounts to the most appropriate *in situ* lion tamarin projects that come under their jurisdiction.

The 1997 grants from the LTBF were made in support of: 1) the Golden Lion Tamarin Conservation Program's *L. rosalia* translocation programme, 2) research on the ecology, behaviour and population viability of *L. chrysomelas* in the Una Biological Reserve, 3) the *L. chrysopygus* metapopulation management programme, and 4) field surveys on *L. caissara* on the Island of Superagüi, Paraná.

During the period June 1996 - May 1997 donations to the LTBF were gratefully received from the following zoos: Adelaide Zoological Gardens, Australia; Apenheul Primate Conservation Trust, The Netherlands; Baltimore Zoo, Maryland, USA; Belfast Zoological Gardens, UK; Cleveland Metroparks Zoo, Ohio, USA; Colchester Zoo, UK; Copenhagen Zoo, Denmark; Fort Worth Zoological Park, Texas, USA; Jersey Wildlife Preservation Trust, British Isles; Lisbon Zoo, Portugal; Marwell Zoological Park, UK; Melbourne Zoo, Australia; Oklahoma City Zoological Park, Oklahoma, USA; Paignton Zoological and Botanical Gardens, UK; Penscynor Wildlife Park, UK; Phoenix Zoo, Arizona, USA; Racine Zoological Garden, Wisconsins, USA; Riverbanks Zoological Park & Botanical Gardens, SC, USA; Roger Williams Park Zoo, Rhode Island, USA; Sedgwick County Zoo Gardens, Kansas, USA; Singapore Zoological Gardens, Singapore; Taronga Park Zoo, Sydney, Australia; World of Birds, South Africa, Twycross Zoo, UK; Zoo La Palmyre, France; The Zoological Society of London, Whipsnade, UK; Zurich Zoo, Switzerland.

Jeremy J.C. Mallinson, Director, Jersey Wildlife Preservation Trust, Les Augrès Manor, Trinity, Jersey, JE3 5BP, British Channel Islands.

This note was first published in Tamarin Tales, *Newsletter of the International Committees for Recovery and Management of* Leontopithecus rosalia, L. chrysopygus, L. chrysomelas, *and* L. caissara, *1998, 2: 14-15.*

LINCOLN PARK ZOO 1998 SCOTT NEOTROPIC FUND PROJECTS

The Lincoln Park Zooo Scott Neotropic Fund was initiated by the Lincoln Park Zoological Soiety and Lincoln Park Zoological Gardens in 1986 in support of *in situ* conservation efforts throughout Latin America and the Caribbean. The aim is to support young conservation biologists working in their own countries, assisting a new generation of researchers in becoming the environmental decision-makers of tomorrow and strengthening the core of conservation leadership throughout the Americas. The following projects were approved for 1998.

Primate translocation as a tool for species preservation and community conservation in northwest Ecuador - Amy Galloway, University of Georgia; Waterhole use by mammals in Santa Rosa National Park, Guanacaste, Costa Rica - Jaime Andrés Cabrera, Universidad Nacional de Costa Rica; Evaluation of factors potentially contributing to the decline of the endangered Patagonian deer, the huemul - JoAne Smith-Flueck, Universidad Nacional del Comahue, Argentina; A "common garden" experiment to determine local adaptations in green iguanas - Martin Wikelski, Smithsonian Tropical Research Institute, Panama; A study of the habitat requirements, abundance, movements and strategies for conservation of a population of jaguars in Costa Rica - Roberval Tavares de Almeida; Effect of forest-pasture edges on a neotropical herpetofauna - Marin Schlaepfer, Cornell Univesity; Forest fragmentation and land use in the landscape mosaic of the Una region, south Bahia: Effects on the terrestrial mammal community - Renata Pardini, University of São Paulo, Brazil; Conservation biology of the lowland tapir at Morro Diabo State Park - Emília Patrícia Médici, IPÊ-Instituto de Pesquisas Ecológicas, Brazil; James' and Andean flamingos (*Phenicoparrus jamesi* and *P. andinus*): Abundance and characteristics of their habitats in the high Andean lakes of northwest Argentina - Sandra Caziani; Habitat use and seed dispersal activities of bats in a fragmented Neotropical landscape - Michelle Evelyn, Stanford Univesity; Translocation of isolated groups of golden lion tamarins, *Leontopithecus rosalia* - Maria Cecília Kierulff - University of Cambridge, Cambridge, UK; Molecular and morphological systematics of the fruit bat *Sturnira* (Stenodermatini, Chiroptera) - Carlos Alberto Iudica, University of Florida.

For more information: Lincoln Park Zoo Scott Neotropic Fund, Director of Conservation and Science, 2001 North Clark Street, Chicago, Illinois 60614-3895, USA.

Primate Societies

XVII Congress of the International Primatological Society

The dates for the XVII Congress of the International Primatological Society, University of Antananarivo, Antananarivo, Madagascar have changed. It will now take place from **10-15 August, 1998**. Note also that telephone and facsimile numbers have changed. To call from abroad or to send a fax, the new number is (261)-20-22-five digits. To call the Congress Secretary, the number is now: (261)-20-22-66048 or (261)-20-22-26991, ext. 24. (Reported in *IPS Bulletin* 25(1):2, May 1998).

Guidelines for Captive Care and Breeding

In 1993, The International Primatological Society published the "IPS International Guidelines for the Acquisition, Care and Breeding of Nonhuman Primates" in a special issue of *Primate Report*. It was edited by Trevor B. Poole for the IPS Captive Care and Breeding Committee (*Primate Report*, vol. 25, January, 1993). Contents: *Part I: Outline of General Principles.* Introduction; Capture from the Wild; International Shipments; Institutional Policies; Primate Housing; Animal Care and Health; Breeding in Captivity; Experimental/Ethical Considerations; Annexes. *Part II: Codes of Practice 1-3.* Members of the IPS Captive Care Committee 1988-1992; Preface; 1. Housing and Environmental Enrichment; 2. Levels of Training for Care-Giving Staff; 3. Health Care. For more information: Dr. Cobie Brinkman, IPS Vice-President for Captive Care, Division of Psychology, Australian National University, GPO Box 4, Canberra, ACTY 0200, Australia, Tel: 61 6 249 2803, Fax: 61 6 249 0499, e-mail: <cobie.brinkman@anu.edu.au>.

PSGB - Field Studies Supplement

Number 64, February 1998, of the Primate Society of Great Britain's newsletter, *Primate Eye* (Editor Dr William Sellers, University of Edinburgh, UK), included the supplement on "Current Primate Field Studies" (the seventeenth issue of the supplement), results of a world-wide survey carried out in 1997. Compiled by Julia M. Casperd (University of Liverpool, UK), this supplement provides information on 148 field studies, including: country, field site, the species and their IUCN categorisation as to their conservation status, the date the project started, duration and status of the project (planned, ongoing or completed), a brief description of the project's aims, and addresses. Julia Casperd also provides some critical analyses of the results of the survey, and compares them with those obtained for the 1996 survey. In the 1998 survey, 32% of the studies are in the Americas; 19 studies deal with Callitrichidae and 68 with Cebidae. Overall, 28% of the primates in the *1996 IUCN Red List of Threatened Animals* are the focus of conservation related field research. The following countries were listed for the Americas: Argentina (four studies); Belize (two); Bolivia (one); Brazil (20); Colombia (three); Costa Rica (six); French Guiana (two); Mexico (four); Panama (one); Peru (one); Suriname (one); Trinidad (one); Venezuela (two). An appendix provides a full listing of the threatened primates in the *1996 IUCN Red List.*

The *Primate Eye* "Current Primate Field Studies" supplement is available from the PSGB Treasurer, Dr Charlie Evans, Department of Biological Sciences, Glasgow College of Technology, Cowcaddens Road, Glasgow G4 OBA, UK, Tel: +44 (0)141 331 3209, Fax: +44 (0)141 331 3208 or 3242, e-mail: <csev@gcal.ac.uk>, at a price of £5.00.

Officers of The Primate Society of Great Britain (PSGB)

At the AGM of the PSGB in April, 1998, the President, Hilary Box, retired after four dedicated years in office. Phyllis Lee was elected as the new President. Geoff Hosey retired as Treasurer, and Charlie Evans was elected to replace him. Hannah Buchanan-Smith and Kate Hill were re-elected as Hon. Secretary and Membership Secretary, respectively. Contact details are given below. Applications to join the Society can be obtained from the Membership Secretary or electronically on the WWW site: <http://www.ana.ed.ac.uk/PSGB/>. **President**: Dr. Phyllis Lee, Department of Biological Anthropology, Downing Street, Cambridge CB2 3DZ, UK, Tel: (0)1223 335459, Fax: (0)1223 335460, e-mail: <pcl1@cus.cam.ac.uk>; **Hon. Secretary**: Dr. Hannah Buchanan-Smith, Department of Psychology, University of Stirling, Stirling FK9 4LA, UK, Tel: (0)1786 467674, Fax: (0)1786 467641, e-mail: <hmb1@stirling.ac.uk>; **Hon. Treasurer**: Dr. Charlie Evans, Department of Biological Sciences, Glasgow College of Technology, Cowcaddens Road, Glasgow G4 OBA, UK, Tel: (0)141 331 3209, Fax: (0)141 331 3208 or 3242, e-mail: <csev@gcal.ac.uk>; **Membership Secretary**: Dr. Kate Hill, Department of Anthropology, University of Durham, 43 Old Elvet, Durham DH1 3HN, UK, Tel: (0)191 374 7206, Fax: (0)191 374 7527, e-mail: <c.m.hill@durham.ac.uk>.

Recent Publications

Lion Tamarins and Muriqui - The Conservation Breeding Specialist Group

The lion tamarins, *Leontopithecus*, and the muriqui, *Brachyteles*, are the subjects of two important publications produced recently by the IUCN/SSC Conservation Breeding Specialist Group (CBSG). The first, "Leontopithecus *II, Final Report. The Second Population and Habitat Viability Assessment for Lion Tamarins* (Leontopithecus)", compiled by Jonathan D. Ballou, Robert C. Lacy, Devra Kleiman, Anthony Rylands and Susie Ellis (1998) is the final report of the PHVA Workshop held in Belo Horizonte, Minas Gerais, Brazil, 20-22 May 1997. The Workshop was a collaborative effort of the Conservation Breeding Specialist Group (CBSG) and the Primate Specialist Group (PSG). It was organized by the Fundação Biodiversitas, Belo Horizonte, in collaboration with the Brazilian Institute for the Environment (Ibama), Conservation International, Washington, D. C., Conservation International do Brasil, Belo Horizonte, The US Fish and Wildlife Service, and the Jersey Wildlife Preservation Trust, and was also sponsored by the Margot Marsh Biodiversity Foundation, and the Brazilian airline Co. - Transbrasil. The report details recommendations concerning future action for the conservation of the genus, and also describes the results of VORTEX analyses on the captive populations and those in protected areas. *Contents*: Executive summary; Introduction; Working group reports (Metapopulation, Habitat and Research, Communication, Population modeling, and funding); Updates on lion tamarin captive breeding program; and the following appendices - List of participants, BLT Metapopulation Management Plan, Agenda for the *Leontopithecus* Silver Anniversary Symposium, *Tamarin Tales* newsletter (vol. 2), and the members of the Lion Tamarin International Recovery and Management Committees.

The second is "*Population and Habitat Viability Assessment Workshop for the Muriqui* (Brachyteles arachnoides)*: Briefing Book*", compiled by the IUCN/SSC Conservation Breeding Specialist Group (CBSG) (1998). This is a compilation of information on *Brachyteles*, prepared for the Muriqui PHVA Workshop held in Belo Horizonte, Minas Gerais, 23-26 May, 1998; a collaborative effort of the CBSG and PSG, organized by the Fundação Biodiversitas, Belo Horizonte, in collaboration with Conservation International do Brasil, and the Brazilian Institute for the Environment (Ibama), and sponsored by the Margot Marsh Biodiversity Foundation. It is a most valuable compilation of published articles and documents concerning *Brachyteles*. *Contents*: Workshop invitation and tentative agenda; An introduction to the PHVA process; The genetics and taxonomy of *Brachyteles arachnoides*; Distribution and range; Reproductive and social behavior; Life history and demography; Diet and habitat characteristics; Conservation and management strategies; Captive populations; IUCN guidelines; and VORTEX technical reference.

The price of these publications is US$35.00 each (checks payable to CBSG on a US Bank, Mastercard and Visa also accepted). They are available from: IUCN/SSC Conservation Breeding Specialist Group, 12101 Johnny Cake Ridge Road, Apple Valley, MN 55124, USA, Fax; +1 612 432 2757, e-mail: < cbsg@epx.cis.umn.edu>.

1997 IUCN Red List of Threatened Plants

More than one out of eight plant species worldwide is at risk of extinction, according to the most comprehensive scientific assessment ever assembled on the status of the world's plants: the *1997 IUCN Red List of Threatened Plants*. The *IUCN Red List* reveals that 12.5%, or 34,000, of the world's vascular plant species are threatened with extinction. The *Red List* is the result of a 20-year effort by a unique coalition of scientists, conservation organizations, botanical gardens and The World Conservation Union (IUCN), and compiled by the World Conservation Monitoring Centre (WCMC), Cambridge, UK. Conservation assessments were provided by numerous scientists and conservationists with major input from the Smithsonian Institution's Department of Botany, The Nature Conservancy, Environment Australia and CSIRO, The National Botanical Institute (South Africa), The Royal Botanical Gardens, Kew and Edinburgh, and the New York Botanical Garden.

Of the estimated 270,000 known species of vascular plants, which include ferns, fern allies, gymnosperms (including conifers and cycads), and flowering plants, 33,798 were found to be at risk of extinction. These plants are found in 369 families and are scattered through 200 countries. Of the plant species named in the *Red List*, 91% are found only in a single country. In addition, islands or island groups, which also have high rates of endemicity, face high levels of threat to their flora. Seven of the top ten areas listed according to percentage of threatened floras were islands: St. Helena, Mauritius, Seychelles, Jamaica, French Polynesia, Pitcairn, and Reunion. A great number of plant species known to have medicinal value are at risk of disappearing. For instance, 75% of the species from the yew family, a source of important cancer-fighting compounds, are threatened. The willow family, from which aspirin is derived, has 12% of its species threatened. Numerous other species whose medicinal value has not yet been studied also are at risk.

The *Red List* shows that 380 species have become extinct in the wild, with an additional 371 species listed as Extinct/Endangered. Over 6,500 species are categorized as Endangered, indicating their numbers have been so drastically reduced to a critical level that they are deemed to be in immediate danger of extinction. Threat assessments

are according to the pre-1994 IUCN threat categories. The introduction to the book details the purpose and history of the project, an explanation of the information and an analysis of the list, including valuable tables on threatened plants in each country by IUCN category and by major taxa and families. Publication of the *IUCN Red List of Threatened Plants* marks a turning point for conservation. The book, an important new conservation tool, provides baseline information to measure conservation progress and serves as a primary source of data on plant species. Most importantly, it provides the building blocks on which to base worldwide efforts to conserve plant species and the ecosystems they inhabit. From *Biological Conservation Newsletter*, Smithsonian Institution, Department of Botany. April/May 1998, No. 178.

The *1997 IUCN Red List of Threatened Plants* is available for US$45 (plus shipping and handling) from the New York Botanical Garden, Scientific Publications, Bronx, NY 10458-5126, USA, Tel: +1 (718) 817-8721; Fax: +1 (718) 817-8842; e-mail: <scipubls@nybg.org>.

Tamarin Tales

Recently published was the second issue (Vol. 2, 1998) of the Newsletter of the International Committees for Recovery and Management of *Leontopithecus rosalia*, *L. chrysopygus*, *L. chrysomelas* and *L. caissara* - *Tamarin Tales*. This newsletter, produced by the Jersey Wildlife Preservation Trust, Jersey, and edited by J. D. Ballou, National Zoological Park, Washington, D. C., provides up-dates and short reviews on the conservation and breeding efforts worldwide for the four lion tamarin species, and is aimed particularly at the contributors to The Lion Tamarins of Brazil Fund. Volume 2 contains the following articles: PHVA: 1997 Population and Habitat Viability Assessment Workshop, pp.1-2; Current status of *Leontopithecus*: Update from the PHVA - Anthony B. Rylands, pp.2-4; The captive populations, pp.2-5; Wanted! Zoos for the expanding black lion tamarin *L. chrysopygus* population, p.5; Research update: Reproductive success and how Mom allocates her resources - Karen Bales, pp.5-6; The Segunda Água Group - Bengt Holst, pp.6-7; Golden-headed lion tamarins in Antwerp Zoo: Current highlights of research - Kristel de Vleeschouwer, Kristin Leus, and Linda van Elsacker, pp.7-9; Metapopulation management and translocations of black lion tamarins - C. Padua, pp.9-10; Conservation of protected areas through community participation - examples from the Brazilian Atlantic forest - Suzana M. Padua and Marlene F. Tabanez, pp.10-12; Golden lion tamarin translocation. Breeds success! - Maria Cecília Kierulff, Paula Procópio de Oliveira, Edsel Amorim Morães, Jr., Marina Janzatti Lapenta and Vanessa Veruli, pp.12-13; Update from the field: Golden-headed lion tamarins lead the way in mixed species associations - Becky E. Raboy, pp.13-14; Landowner's Environmental Education Programme surrounding Una Biological Reserve, Bahia - Gabriel Rodrigues dos Santos and Joaquim Blanes, p.14; The Lion Tamarins of Brazil Fund - Jeremy J. C. Mallinson, pp.14-15.

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Tropical Biodiversity

Tropical Biodiversity is a scientific journal published three times a year by the Indonesian Foundation for the Advancement of Biological Sciences. The journal is dedicated to disseminating research results about the ecology and conservation of tropical ecosystems throughout the world. Based in a megadiversity country, *Tropical Biodiversity* fills a unique niche in the world of ecological publications through its commitment to publishing the work of scientists from developing countries. The issue of Vol. 4(3) has just been published, marking the completion of the journal's fourth volume. With a worldwide distribution, and increasing readership and paper submissions, *Tropical Biodiversity* has established itself as an important forum for papers concerning tropical ecology and conservation issues. Editor: Dr. Jatna Supriatna, e-mail: <yabshi@rad.net.id> or <tropbiod@pacific.net.id>. Address: *Tropical Biodiversity*, Yayasan Bina Sains Hayati Indonesia (YABSHI), The Indonesian Foundation for the Advancement of Biological Sciences (IFABS), Jl. Tanah Baru Raya 98, Depok 16421, Indonesia, Tel/Fax: +62 (021) 775-1837.

Cadernos FBDS

The Fundação Brasileira para o Desenvolvimento Sustentável (FBDS) is a non-governmental organization, based in Rio de Janeiro, which, as its name suggests, works to promote the rational use and conservation of natural resources in Brazil. In 1998, FBDS initiated a publication series - *Cadernos para o Desenvolvimento Sustentável FBDS.*

The first volume, entitled *Conservação da Biodiversidade na Amazônia Brasileira: Uma Análise do Sistema de Unidades de Conservação* (1998, 65pp., in Portuguese), was written by Anthony B. Rylands and Luiz Paulo de S. Pinto, both of Conservation International do Brasil, Belo Horizonte, Minas Gerais. It contains an analysis of the protected areas system in the Brazilian Amazon and includes the following chapters: 1) Introduction; 2) History and evolution of the protected areas system in the Brazilian Amazon; 3) Bases for planning a protected areas system in the Brazilian Amazon; 4) Current situation of the protected areas; 5) Protected areas and biodiversity conservation in the Brazilian Amazon.

The second volume of *Cadernos FBDS* publishes the proceedings of the *Workshop: Forest Policies and Sustainable Development in the Amazon* (1998, 159pp., in Portuguese and English), organized by FBDS in collabora-

tion with the United Nations Development Program (UNDP), and held in Rio de Janeiro, 14-16 July, 1997. Volume 2 includes the following chapters: Preface - Israel Klabin, President, FBDS, and Ralph Schmidt, Director, Forest Programme Sustainable Energy and Environment Division, UNDP, pp.3-4; Executive Summary - Ângelo A. dos Santos, Milagre Nuvunga and Eneas Salati, pp.7-14; Economic considerations pertaining to the expansion of logging in the Amazon - Jeffrey R. Vincent, pp.15-24; Impact of international tropical timber trade on the Amazon Rainforest - M. L. Joshi, pp.25-39; Mercado nacional de madeiras tropicais - Ivan Tomaselli, pp.41-49; Geração, disponibilidade e uso de informações para manejar florestas na Amazônia - Paulo Barreto, pp.51-59; Certificação socioambiental, bom manejo florestal e políticas públicas - Virgílio M. Viana, pp.61-70; Forest concession policies and sustainable forest management of tropical forests - John A. Gray , pp.71-112; Política florestal coerente para Amazônia - Adalberto Veríssimo and Carlos Souza Júnior, pp.113-118; Some suggested contract provisions for forestry contracts on land owned by the Federative Republic of Brazil - David N. Smith, pp.119-134; Annotated bibliography - Namrita Kapur, pp.135-155. For further information please contact Ângelo Augusto dos Santos at the address below.

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Books

Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais, edited by Ângelo B. M. Machado, Gustavo A. B. da Fonseca, Ricardo B. Machado, Ludmilla M. de S. Aguiar, and Livia V. Lins, 1998, 605pp., 33 color plates. Fundação Biodiversitas, Belo Horizonte. In Portuguese. Price: Paperback US$35 (+p&p). A beautifully produced book describing 178 threatened animals of the state of Minas Gerais, Brazil, including 40 mammals, 83 birds, 10 reptiles, 11 amphibians, three fishes, 27 insects, one onychophore and three oligochaetes. Contents: Preâmbulo - Ângelo B. M. Machado, pp.11-12; Apresentação - Secretaria de Estado da Educação, Secretaria de Estado do Meio Ambiente, Instituto Estadual de Florestas & Fundação Biodiversitas, p.13; Prefácio - Célio de Murilo de Carvalho Valle, pp.15-16; Organização geral do livro, pp.21-25; Panorama geral da fauna ameaçada de Minas Gerais - Gustavo A. B. da Fonseca, pp.27-30; Há doze mile anos: A grande extinção - Cástor Cartelle, pp.31-35; Mamíferos, pp.37-169; Aves, pp.173-391; Répteis, pp.417-443; Anfíbios, pp. 445-475; Peixes, pp.477-491; Insetos, pp.493-561; Onicóforos, pp.563-569; Oligoquetas, pp.571-583; Índice remissiva de nomes populares, pp.585-587; Índice de nomes científicos, pp.589-591; Índice de ilustrações, p.593; Glosário, pp.595-605. For each species there are summary data sheets (including categorization in other national and international threatened species lists, and their occurrence in protected areas) and sections on general information (description, distribution, and natural history), the principal threats and the principal strategies necessary for their conservation, and a distribution map. Species of primates included are: *Callithrix kuhlii*, *C. flaviceps*, *C. aurita*, *Leontopithecus chrysomelas*, *Callicebus personatus* (including the subspecies *nigrifrons*, *melanochir* and *personatus*), *Cebus xanthosternos*, *Alouatta fusca fusca* and *A. f. clamitans*, and *Brachyteles arachnoides*. A most valuable reference. Available from: Fundação Biodiversitas, Avenida do Contorno 9155, 11o. Andar, Caixa Postal 1462, 30110-130 Belo Horizonte, Minas Gerais, Tel: +55 (0)31 291 9673, Fax: +55 (0)31 291-7658, e-mail: <cdcb@gold.horizontes.com.br>.

A Field Guide to the Mammals of Central America and South-East Mexico, by Fiona A. Reid, 1997, xvii + 334pp. Oxford University Press, New York. ISBN 0 19 506400 3, hardback, and ISBN 019 506401 1, paperback. Price: Hardback £45.00, paperback £22.50. This field guide provides detailed accounts and range maps for all species of terrestrial and aquatic mammals of Central America and southern Mexico. With 48 color plates illustrating 85% of the species, 11 line drawings, an extensive bibliography, and sections on how and where to find mammals. Primates pp.173-181. Available from: Order Department, Oxford University Press, Saxon Way, West Corby, Northamptonshire NN18 9ES, UK, 24-hour credit card hotline +44 (0)1536 454534, Fax: +44 (0)1536 454518, e-mail: <book.orders@oup.co.uk>.

L'Alimentation en Forêt Tropicale: Interactions Bioculturelles et Perspectives de Développement, edited by Claude Marcel Hladik, Annette Haldik, Hélène Pagezy, Olga F. Linares, Georgius J. J. Koppert and Alain Froment, 1996. Éditions UNESCO, Man and the Biosphere (MAB), Paris. ISBN 92 3 203381 X. Editions in French (1996) and English (1993). Contents of the French edition: *Volume I. Les ressources alimentaires: production et consommation.* 1. Introduction: le contexte actuel des recherches sur l'utilisation des resources des forêts tropicales - C. M. Hladik, O. F. Linares, H. Pagezy, A. Hladik, A. Semple & Alain Froment. *Part 1. Les ressources alimentaires des forêts tropicales en relation avec les tendances évolutives et le peuplement des différentes blocs continentaux.* 2. Resources alimentaires des forêts tropicales: une mise en perspective des tendances évolutives et de l'impact du peuplement humain - D. McKey, O. F. Linares, C. R.Clement & C. M. Hladik; 3. Fluctuations majeures de la forêt dense humide africaine au cours des vingt derniers millénaires - J. Maley; 4. Le peuplement de l'Amérique Centrale et de l'Amérique du Sud et les adaptations aux forêts tropicales avant la colonisation européenne - R. G. Cooke & D. Piperno; 5. Fragments pour une histoire de la forêt africaine et de son peuplement: les données linguistiques et culturelles - S.

Bahuchet; 6. Les plantes alimentaires des forêts humides intertropicales et leur domestication: exemples africains et américains - J.-L. Guillaumet; 7. Importance des espècies semi-domestiquées en Amazonie: impact sur la flore et la faune de leur dissémination par les Indiens Kayapó et ses conséquences sur les systèmes de gestion - D. A. Posey; 8. Composition biochimique des fruits et perception gustative: interactions et tendances évolutives dans les forêts tropicales - C. M. Hladik; 9. Écologie et évolution des produits secondaires du manioc et relations avec les systèmes traditionnels de culture - D. McKey & S. Beckerman; 10. Réponses des Dayak de Kalimantan aux fructifications massives et comportement du sanglier barbu: une analyse des analogies entre Nature et Culture - M. R. Dove. *Part 2. Production et valeur nutritionnelle des espèces spontanées et semi-domestiquées des forêts tropicales.* 11. Production des ressources alimentaires des forêts tropicales: contexte et dommées récentes - A. Hladik, E. G. Leigh, Jr. & F. Bourlière; 12. Fruits et graines de la forêt amazonienne: composition, production et utilisations pour un développement durable - C. R. Clement; 13. Les palmeraies amazoniennes: resources alimentaires et aménagement des écosystèmes forestiers - F. Kahn; 14. Les ignames spontanées des forêts denses africaines, plantes à tubercules comestibles - A. Hladik & E. Dounias; 15. Intérêt nutritionnel et socio-économique du gere *Gnetum* en Afrique centrale - F. Mialoundama; 16. Les plantes alimentaires de la forêt dense du Zaïre, au nort-est du Parc National de la Salonga - M. M. Dhetchuvi & J. Lejoly; 18. Les Pygmées camerounais face à l'insuffisance des produits alimentaires végétaux de la forêt équatoriale - J.-F. Loung; 19. Les ressources végétales de la forêt dense humide du Sri Lanka et leurs utilisations - M. I. U. A. Gunatilleke & S. C. V.Gunatilleke; 20. Les ressources alimentaires de la forêt d'une région tropical de montagne: la Mixteca (Mexique) - E. Katz; 21. Rôle des insectes dans l'alimentation en forêt tropicale - J. Ramos-Elorduy; 22. Utilisation des ressources forestières et variations locales de la densité du gibier dans la forêt du nort-east du Gabon - S. A. Lahm; 23. Chasse et conservation des espèces animales dans les forêts néotropicales - K. H. Redford. *Part 3. Aspects adaptatifs e la consommation alimentaire et de la dépense énergétique.* 24. Aspects adaptatifs de la consommation alimentaire et de la dépense énergétique: acquis et perspectives à propos des régions forestières tropicales - P. Pasquet, A. Froment & R. Ohtsuka; 25. Changements alimentaires et nutritionnels chez les Gidra des plaines de Papouasie-Nouvelle-Guinée - R. Ohtsuka; 26. Le coût énergétique de la fabrication du sagou en Papouasie-Nouvelle-Guinée: le travail en vaut-il la peine? - S. J. Ulijaszek & S. P. Poraituk; 27. Ressources alimentaires et mode de vie des Hagahai de Papouasi-Nouvelle-Guinée - C. Jenkins & K. Milton; 28. Consommation alimentaire dans trois populations forestières de la région côtière du Cameroun: Yassa, Mvae et Bakola - G. J. A. Koppert, E. Dounias, A. Froment & P. Pasquet; 29. Budget-temps et dépense énergétique chez les essarteurs forestiers du Cameroun - P. Pasquet & G. J. A. Koppert; 30. Les conséquences bioculturelles de la consommation du manioc (*Manihot esculenta*) sur le métabolisem et la micro-évolution de l'Homme - F. L. C. Jackson; 31. Sel de cendre, manioc et goitre: changement de régime alimentaire et développement du goitre endémique chez les Azandé d'Afrique centrale - A. Prinz; 32. Anthropmétrie nutritionnelle des Amérindiens: aspects biologiques et sociaux du déficit statural - R. Holmes; 33.Bien manger, vivre bien: état nutritionnel et santé des populations forestières du Cameroun - A. Froment, G. J. A. Koppert & J.-F. Loung; 34. Importance des ressources naturelles dans l'alimentation du jeune enfant en forêt tropicale inondée (Zaïre) - H. Pagezy. 35. Variation saisonnière du régime alimentaire et état nutritionnel des enfants dans les villages du Kwango-Kwilu (Zaïre) - L. Kukwikila, L Mashoko M., F. Kwilu & T. Mbemba F.; 36. Relations entre modèles de consommation et état nutritionnel des enfants, en forêt inondée du nord du Congo - I. Goma, F. Tchibindant & S. Mianzenza; 37. Variations saisonnière de la production alimentaire, statut nutritionnel, foction ovarienne et fécondité en Afrique centrale - M. R. Jenike, R. C. Bailey, P. T. Lellison, G. R. Bentley, A. M. Harrigan & N. R. Peacock; 38. La dépense énergétique au cours d'activités jorunalières de villageois Lésé de la forêt de l'Ituri (Zaïre) - A. Bisschop, M. R. Jenike, E. Nkiama & J. Ghesquiere. *Volume II. Bases culturelles des choix alimentaires et stratégies de développement. Part 4. Stratégies alimentaires en milieu forestier* 39. Les stratégies alimentaires en forêt tropicale: contexte et problématique - O. F Linares, H. Pagezy & P. Grenand; 40. Stratégies de subsistance en Amazonie: Les principaux modèles et leur variabilité - S. Beckerman; 41. Des fruits, des animaux et des hommes: stratégies de chasse et de pêche chez les Wayãpi de Guyane - P. Grenand; 42. La gestion des ressources dans les écosystèmes oligotrophes du Rio Negro (Amazonie Vénézuélienne) - L. E.Sponsel & P. C. Loya; 43.Le manioc amer dans les basses terres d'Amérique tropicale: du mythe à la commercialisation - F. Grenand; 44. Modalités de transformation et de consommation du manioc dans les différentes zones écologiques du Congo - S. Trèche & J. Massamba; 45. Stratégies de gestion des ressources par les Indiens Siona et Secoya - W. T. Vickers; 46. L'exploitation des ressources naturelles chez les Yanomami: une stratégie culturelle globale - J. Lizot; 47. Déterminismes écologiques et culturels des choix alimentaires des chasseurs-cueilleurs Mbuti du Zaïre - M. Ichikawa; 48. Stratégies de subsistance et apports en protéines du régime alimentaire des cultivateurs Ngandu et Boyela de la Cuvette Central du Zaïre - J. Takeda & H. Sato; 49. Écologie et alimentation des chasseurs-cueilleurs Onge des îles Andaman - D. Venkatesan; 50. Stratégies de susbsistance des chasseurs-cueilleurs Penan des forêts de Sarawak (Malaisie) - J. P. Brosius. *Part 5. Les choix alimentaires dans leur contexte socioculturel.* 51. Facteurs culturels et choix alimentaires: généralités- I. de Garine, S. Hugh-Jones & A. Prinz; 52. Les concepts "aliment" et "drogue" des populations du nord-ouest de l'Amazonie - S. Hugh-Jones; 53.Place de

l'alimentation dans la thérapeutique des Pygmées Aka de Centrafrique- E. Motte-Florac, S. Gahuchet, J. M. C. Thomas & A. Epelboin; 54. Préferences alimentaires et ressources de la forêt camerounaise - I. de Garine; 55. La douceur de l'amertume: une ré-évaluation des choix du manioc amer par les Indiens Tukano d'Amazonie - D. L. Dufour & W. M. Wilson; 56. La conservation du manioc chez les Indiens Tukano: technique et symbolique - C. Hugh-Jones & S. Hugh-Jones; 57. Les dimensions économique et symbolique d'un choix: vin de palme ou huile de palme? - O. F. Linares; 58. Le vin de palme et la noix de kola: nourritures paradoxales, médiateurs de la communication avec les dieux - C. Haxaire; 59. Sauvage ou cultivé? La paraculture des ignames sauvages par les Pygmées Baka du Cameroun - E. Dounias; 60. L'esprit, l'igname et l'éléphant: essai d'interprétation symbolique d'un rituel chez les Pygmées Baka du Sud Cameroun - D. V. Joiris; 61. Plantes alimentaires et identité culturelle chez les Marrons Boni (Aluku) de Guyane Française - M. Fleury; 62. Valeur symbolique des aliments en provenance de la forêt chez le Kelabit de Sarawak (Est-Malaisie) - M. R. H. Janowski; 63. Un aliment du corps social chez les Ankave-Anga de Papouasi-Nouvelle-Guinée: le *Pangium edule* - P. Bonnemère; 64. L'anguille chez les Ankave-Anga de Papouasie-Nouvelle-Guinée: matérialité et symbolique du piégeage - P. Lemonnier. *Part 6. Le futur des forêts tropicales: amélioration et valorisation des productions animales et végétales.* 65. Gestion et futur des forêts tropicales: une mise en perspective des systèmes d'amélioration et de valorisation - R. A. A.Oldeman, C. R. Clement, M. Hadley & A. Hladik; 66. Les potentialités de l'exploitation durable et de l élevage du gibier en zone forestière tropicale - F. Feer; 67. La découverte des phytopratiques tropicales traditionnelles - F. Hallé; 68. Établissement et gestion des agroforêts paysannes en Indonésie: quelquer enseignements pour l'Afrique forestière - H. De Foresta & G. Michon; 69. Les agroferêts Mvae et Yassa du Cameroun littoral: foctions socioculturelles, structure et composition floristique - E. Dounias & C. M. Hladik; 70. L'arboriculture et son impact économique et nutritionnel: une option pour reverdir le centre de l'Inde - U. Pingle; 71. Gestion étatique et déclin des ressources alimentaires dans les forêts de l'Uttarra Kannada (inde) - M. D. S. Chandran & M. Gadgil; 72. Biodiversité et problèmes de reconstitution des forêts tropicales au Bengale Occidental (Inde) - K. C. Malhotra; 73. La valorisation des sous-produits agroferestiers au Laos: une alternative pour le développement durable - F. Chagnaud; 74. Amélioration des espèces autochtones d'Océanie à usage alimentaire - V. Lebot; 75. Utilisation des connaissances des populations indigènes dans la gestion des ressources des divers écosystèmes amazonies - E. F. Morán; 76. L'extractivisme: une valorisation contestée de l'écosystème forestier - J.-P. Lescure & F. Pinton; 77. Extractivisme et agriculture: le choix d'une population riveraine du Rio Solimões - H. dos Santos Pereira & J.-P. Lescure; 78. L'*açaí (Euterpe precatoria)*, palmier alimentaire de la forêt amazonienne - A. de Castro; 79. Extractivisme et agriculture dans la région du Moyen Rio Negro (Amazonie Brésilienne) - L. Emperaire & F. Pinton; 80. Aspects socio-économiques de l'extractivisme en Amazonie, dans le Parc National de Jaú - N. C. Sizer; 81. Un "écosystème forestier de la vie" en Amazonie Péruvienne: l'*aguajal* - J. Ruiz M. & J. Levistre Ruiz; 82. La conservation de La Nature par la commercialisation des ressources - M. I. Evans; 84. Vers de nouvelles règles juridiques pour la gestion des forêts tropicales: l'exemple des pays membres de l'Organisation Africaine du Bois - G. Humbert; 86. Les peuples des forêts tropicales humides et les problèmes de conservation face au monde moderne - E. G. Leigh, Jr. The English language edition - *Tropical Forests, People and Food. Biocultural Interactions and Applications to Development*, C. M. Hladik, A. Hladik, O. F. Linares, H. Pagezy., A. Semple & H. Hadley (eds.), 1993, Vol. 13. Man and the Biosphere Series (editor J. N. R. Jeffers), UNESCO, Paris, and The Parthenon Publishing Group, Carnforth, UK. Available from: The Parthenon Publishing Group, UK Office, Casterton Hall, Carnforth, Lancashire LA6 2LA, UK, Tel: +44 (0)15242 72084, Fax: +44 (0) 15242 71587: USA Office, One Blue Hill Plaza, P.O.Box 1564, Pearl River, NewYork 10965, USA, Tel: +1 914 73 9363, Fax: +1 (914) 735 1385. Web site: <http://www/parthpub.com>.

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Floresta Amazônica: Dinâmica, Regeneração e Manejo, edited by Claude Gascon and Paulo Moutinho, 1998, 373pp. Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brasília. In Portuguese. Price: US$25.00 (+p & p). The results of a Workshop on Forest Regeneration, held in Manaus in July 1994, organized by the National Institute for Amazon Research (INPA), the Smithsonian Insutution, and the Global Climate Change Program of US/AID, Brazil. Contents: 1. Introdução - Virgílio Viana, pp.15-23; *Seção I. Processos e Padrões*. 2. Fenologia de espécies arbóreas tropicais na Amazônia Central - Jurandyr da Cruz Alencar, pp.25-40; 3. Aplicação de métodos de análise do padrão espacial em oito espécies arbóreas da floresta tropical úmida - Luiz M. B. Rossi & Niro Higuchi, pp.41-59; 4. Composição florística, biomassa, e estrutura de florestas tropicais em regeneração: uma avaliação por sensoriamento remoto - Richard M. Lucas *et al.*, pp.61-82; 5. Sobrevivência pós-dispersão de sementes e plântulas de três espécies de palmeiras em relação a presença de objetos naturais na Floresta Amazônica - Renato Cintra, pp.83-98; 6. Biomassa e estoque de carbono de florestas tropicais primárias e secundárias - Rafael de Paiva Salomão, Daniel C. Nesptad & Ima Célia G. Vieira, pp.99-119; 7. Profundidade mínima de enraizamento das florestas na Amazônia brasileira - Gustavo H. de Negreiros, Daniel. C. Nepstad & Eric. A. Davidson, pp.121-129; 8. Estratégias de árvores pioneiras nos Neotrópicos - G. Bruce Williamson, Rita de Cássia G. Mesquita, Kalan Ickes & Gislene Ganade, pp.131-144. *Seção II. Impactos*. 9. Recuperação do sistema radicular profundo em uma floresta secundária na Amazônia oriental - Teresa G. Restom, pp.145-153; 10. Impactos da formação de pastagens sobre a fauna de formigas: conseqüências para recuperação florestal na Amazônia oriental - Paulo R. S.Moutinho, pp.155-170; 11. Efeitos da herbivoria por saúvas (*Atta laevigata*) sobre a regeneração florestal em uma área agrícola abandonada da Amazônia central - Heraldo L. Vasconcelos & J. Malcolm Cherrett, pp.171-178; 12. Regeneração florestal em pastagens abandonadas na Amazônia central: competição, predação, e dispersão de sementes - Maria N. Miriti, pp.179-191; 13. Barreiras ao estabelecimento de árvores em pastos abandonados na Amazônia: banco de sementes, predação de sementes, herbivoria, e seca - Daniel C. Nepstad, Christopher Uhl, Cássio A. Pereira & J. M. C. da Silva, pp.191-218; 14. A comunidade de anfíbios da Amazônia central: diferenças na composição específica entre a mata primária e pastagens - Mandy D. Tocher, pp.219-232. *Seção III. Soluções*. 5. Alguns aspectos da ecologia de sementes de duas espécies de plantas invasoras da Amazônia brasileira: implicações para o recrutamento de plântulas em áreas manejadas - Moacyr B. Dias-Filho, pp.233-248; 16. Crescimento de árvores de valor econômico em áreas de pastagens abandonadas no nordeste do Estado do Pará - Cássio A. Pereira & Christopher Uhl, pp.249-260; 17. O impacto da remoção do dossel em florestas secundárias sobre o crescimento de duas espécies de árvores de importância econômica - Rita de Cássia G. Mesquita, pp.261-275; 18. Ecologia e manejo da castanha do Pará em reservas extrativistas no Xapurí, Acre -Virgílio M. Viana *et al.*, pp. 277-292; 19. Agro-silvicultura na política de desenvolvimento na Amazônia brasileira: a importância e os limites de seu uso em áreas degradadas - Philip M. Fearnside, pp.293-312; 20. Uma abordagem integrada de pesquisa sobre o manejo dos recursos florestais na Amazônia brasileira - Christopher Uhl *et al.*, pp.313-331; Síntese - Claude Gascon & Paulo Moutinho, pp.333-337; Bibliografia, pp.339-373. For more information: Claude Gascon, Projeto Dinâmica Biológica de Fragmentos Florestais, Departamento de Ecologia, Instituto Nacional de Pesquisas da Amazônia (INPA) Caixa Postal 478, 69011-970 Manaus, Amazonas, Brazil, e-mail: <pdbff@inpa.gov.br>.

The Encyclopaedia of Ecology and Environmental Management, editor-in-chief Peter Calow, 1998, 832pp., 303 illustrations. Blackwell Scientific Publications, Oxford, UK. Hardback. ISBN 0865428387. Price £95.00 (+£2.50 in the UK, £3.00 in Europe, and £5.00 for other countries, p&p). Cheques in sterling payable to "Marston Book Services". AMEX, Visa, Eurocard and Mastercard accepted. This encyclopaedia is designed to to provide a complete one-stop reference guide to the core definitions and issues in modern ecology. Available from: Anna Rivers, Blackwell Science Ltd., Osney Mead, Oxford OX2 0EL, UK, Tel: +44 1865 206206, Fax: +44 (0)1865 206096.

Handbook of Environmental Risk Assessment and Management, edited by Peter Calow, 1997, 592pp., 71 illustrations. Blackwell Scientific Publications, Oxford. ISBN 0865427321. Price: Hardback £99.50 (+£2.50 in the UK, £3.00 in Europe, and £5.00 for other countries, p&p). Cheques in sterling payable to "Marston Book Services". AMEX, Visa, Eurocard and Mastercard accepted. This authoritative handbook covers the way that scientific methodologies are used to assess risks from human activities, and the resulting objects and wastes, for the environment and for people in the environment. *Contents*: Part 1. Risk assessment; Part 2. Risk assessment in legislation; Part 3. Balancing risks with other considerations; Part 4. Risk management. Available from: Anna Rivers, Blackwell Science Ltd., Osney Mead, Oxford OX2 0EL, UK, Tel: +44 1865 206206, Fax: +44 (0)1865 206096.

A Neotropical Companion: An Introduction to the Animals, Plants and Ecosystems of the New World Tropics, by John Kricher, illustrated by William E. Davis, Jr. 2nd edition, revised and expanded, 1997. Princeton University Press, New Jersey. ISBN 0 691 04433-3. An entertaining, informative, attractive and interesting book. Avail-

able from: Princeton University Press, 41 William Street, Princeton, New Jersey 08540, USA.

Articles

Albernaz, A. L. K. M. 1997. Home range size and habitat use in the black lion tamarin (*Leontopithecus chrysopygus*). *Int. J. Primatol.* 18(6): 877-887.

Anderson, J. R. and Gallup, G. G., Jr. 1997. Self-recognition in *Saguinus*? A critical essay. *Anim. Behav.* 54(6): 1563-1567.

Anonymous. 1998. Hand-rearing cotton-tops: A pragmatic comment. *Lab. Prim. Newsl.* 37(2): 26.

Anonymous. 1997. Results and conclusions of Second EUPREN/EMRG Winter Workshop. *Primate Report* 49: 9-10.

Boinski, S. and Mitchell, C. J. 1997. Chuck vocalizations of wild female squirrel monkeys (*Saimiri sciureus*) contain information on caller identity and foraging activity. *Int. J. Primatol.* 18(6): 975-993.

Boinski, S., Jack, K., Lamarsh, C. and Coltrane, J. A. 1998. Squirrel monkeys in Costa Rica: Drifting to extinction. *Oryx* 32(1): 45-58.

Boissinot, S., Zhou, Y.-H., Qiu, L., Dulai, K. S., Neiswanger, K., Schneider, H., Sampaio, I., Hunt. D. M., Hewett-Emmett, D. and Li, W.-H. 1997. Origin and molecular evolution of the X-linked duplicate color vision genes in howler monkeys. *Zoological Studies* 36(4): 360-369.

Buerge, T., Panoussis, B. and Weber, H. 1997. Primate housing facilities for pharmaceutical research in Switzerland (an example). *Primate Report* 49: 19-22.

Byrne, G. and Suomi, S. J. 1998. Relationship of early infant state measures to behavior over the first year of life in the tufted capuchin monkey (*Cebus apella*). *Am. J. Primatol.* 44(1): 43-56.

Cadavid, L. F., Shufflebotham, C., Ruiz, J. F., Yeager, M., Hughes, A. L. and Watkins, D. I. 1997. Evolutionary instability of the major histocompatibility complex class I loci in New World primates. *Proc. Nat. Acad. Sci.* 94(26): 14536-14541.

Cadavid, L. F. and Watkins, D. I. 1997. The duplicative nature of the MHC class I genes: An evolutionary perspective. *European Journal of Immunogenetics* 24(4): 3123-322.

Coimbra-Filho, A. F., Mendes, S. L. and Rylands, A. B. 1998. *Callithrix kuhli* (Wied, 1826). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 74-77. Fundação Biodiversitas, Belo Horizonte.

Coimbra- Filho, A. F. and Rylands, A. B. 1998. *Callithrix aurita* (É. Geoffroy, 1812). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 82-85. Fundação Biodiversitas, Belo Horizonte.

Dantas, S. M. M. D. and Barros. R. M. D. 1997. Cytogenetic study of the genus *Saguinus* (Callitrichidae, Primates). *Brazil. J. Genet.* 20(4): 645-649.

Fandeur, T. and Chalvet, W. Variant- and strain-specific immunity in *Saimiri* infected with *Plasmodium falciparum*. *Am. J. Trop. Med. Hyg.* 58(2): 225-231.

Fonseca, G. A. B. da and Strier, K. B. 1998. *Brachyteles arachnoides* (É. Geoffroy, 1812). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 93-97. Fundação Biodiversitas, Belo Horizonte.

Fragaszy, D. M. and Adams-Curtis, L. E. 1998. Growth and reproduction in captive tufted capuchins. *Am. J. Primatol.* 44(3): 197-203.

Gerstmayr, S., Gericke, C. and Felies, A. 1997. A procedure to avoid inbreeding in a small closed marmoset (*Callithrix jacchus*) population. In: *Methods in Development, Toxicology and Biology*, S. Klug and R. Thiel (eds.), pp.227-234. Blackwell Scientific Publications, Oxford.

Gittleman, J. L. and Purvis, A. 1998. Body size and species-richness in carnivores and primates. *Proc. Roy. Soc. Lond.* B265(1391): 113-119.

Guerra, R. F., Silveira, N. L. D. da, Bernardi, N. and Legal, E. J. 1997. Hand preference during behavioral tests and spontaneous activity in two species of common marmoset (*Callithrix jacchus* and *Callithrix penicillata*). *Rev. Bras. Biol.* 57(4): 563-570.

Hernández-López, L., Mayagoitia, L., Esquivel-Lacroix, C., Rojas-Maya, S. and Mondragon-Ceballos, R. 1998. The menstrual cycle of the spider monkey (*Ateles geoffroyi*). *Am. J. Primatol.* 44(3): 197-203.

Jantschke, B., Welker, C. and Klaiber-Schuh, A. 1998. Rearing without paternal help in the Bolivian owl monkey, *Aotus azarae boliviensis*: A case study. *Folia Primatol.* 69(2): 115-120.

Johnson, S. E. and Shapiro, L. J. 1998. Positional behavior and vertebral morphology in atelines and cebines. *Am. J. Phys. Anthropol.* 105(3): 333-354.

Karesh, W. B., Wallace, R. B., Painter, R. L. E., Rumiz, D., Braselton, W. E., Dierenfeld, E. S. and Puche, H. 1998. Immobilization and health assessment of free-ranging black spider monkeys (*Ateles paniscus chamek*). *Am. J. Primatol.* 44(2): 107-123.

Kaumanns, W. and Schönemann, U. 1997. Requirements for cebids. *Primate Report* 49: 71-80.

Kay, R. F., Madden, R. H., Van Schaik, C. and Higdon, D. 1997. Primate species richness is determined by plant productivity: Implications for conservation. *Proc. Nat. Acad. Sci.* 94(24): 13023-13027.

Kay, R. F., Ross, C., Williams, B. A. and Johnson, D. 1997. Cladistic analysis and anthropoid origins. Reply. *Science* 278(5346): 2135-2136. Letter.

Koenig, A. 1998. Visual scanning by common marmosets (*Callithrix jacchus*): Functional aspects and the special role of adult males. *Primates* 39(1): 85-90.

Laska, M. 1998. Laterality in the use of the prehensile tail in the spider monkey (*Ateles geoffroyi*). *Cortex* 34(1): 123-130.

Laska, M. Carrera-Sanchez, E. and Rodríguez-Luna, E. 1998. Relative taste preferences for food-associated sugars in the spider monkey (*Ateles geoffroyi*). *Primates* 39(1): 91-96.

Masterson, T. J. 1997. Sexual dimorphism and interspecific cranial form in two capuchin species: *Cebus albifrons* and *C. apella*. *Am. J. Phys. Anthropol.* 104(4): 487-511.

Miller, L. E. 1998. Fatal attack among wedge-capped capuchins. *Folia Primatol.* 69(2): 89-92.

Mitchell, R. W. and Anderson, J. R. 1997. Pointing, withholding information, and deception in capuchin monkeys (*Cebus apella*). *J. Comp. Psychol.* 111(4): 351-361.

Molinari, S. L., Navarro, J. A. C., Miranda Neto, M. H. de and Sant'Ana, D. M. G, 1996. Foramen and canal of the mandible of the squirrel monkey (*Saimiri sciureus* - Linnaeus, 1758). *Rev. Chilena Anat.* 14(2): 103-108.

Moreira, M. A. M., Canavez, F., Parham, P. and Seuánez, H. N. 1997. Assignment of TCF1, TGM1, CALM1, CKB, THBS1, B2M, and FES in *Ateles paniscus chamek* (Platyrrhini, Primates). *Cytogenet. Cell Genet.* 79(1-2): 92-96.

Nunes, A. 1998. Diet and feeding ecology of *Ateles belzebuth belzebuth* at Maracá Ecological Station. *Folia Primatol.* 69(2): 61-76.

Orduña, F. G. 1998. Los monos en el México Prehispánico. *Lab. Prim. Newsl.* 37(2): 19.

Panger, M. A. 1998. Hand preference in free-ranging white-throated capuchins (*Cebus capucinus*) in Costa Rica. *Int. J. Primatol.* 19(1): 133-163.

Perry, S. 1998. A case report of a male rank reversal in a group of wild white-faced capuchins. *Primates* 39(1): 51-70.

Pertz, C., Dubielzig, R. R. and Lindsay, D. S. 1997. Fatal *Toxoplasma gondii* infection in golden lion tamarins (*Leontopithecus rosalia*). *J. Zoo Wildl. Med.* 28(4): 491-493.

Pinto, L. P. de S., Coimbra-Filho, A. F. and Rylands, A. B. 1998. *Leontopithecus chrysomelas* (Kuhl, 1820). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 69-73. Fundação Biodiversitas, Belo Horizonte.

Pinto, L. P. de S., Coimbra-Filho, A. F. and Rylands, A. B. 1998. *Cebus apella xanthosternos* (Wied, 1820). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 86-89. Fundação Biodiversitas, Belo Horizonte.

Pope, T. R. 1998. Genetic variation in remnant populations of the woolly spider monkey (*Brachyteles arachnoides*). *Int. J. Primatol.* 19(1): 95-109.

Porter, C. A., Czelusniak, J., Schneider, H., Schneider, M. P. C., Sampaio, I. and Goodman, M. 1997. Sequences of the primate epsilon-globin gene: Implications for systematics of the marmosets and other New World primates. *Gene* 205(1-2): 59-71.

Ross, C. 1998. Primate life histories. *Evol. Anthropol.* 6(2): 54-63.

Rylands, A. B. 1998. Mamíferos. In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, edited by A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 39-41. Fundação Biodiversitas, Belo Horizonte.

Rylands, A. B. 1998. *Callicebus personatus* (É. Geoffroy, 1812). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 90-92. Fundação Biodiversitas, Belo Horizonte.

Rylands, A. B., Mendes, S. L., Coimbra-Filho, A. F. and Hirsch, A. 1998. *Callithrix flaviceps* (Thomas, 1903). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp.78-81. Fundação Biodiversitas, Belo Horizonte.

Rylands, A. B., Mendes, S. L. and Hirsch, A. 1998. *Alouatta fusca fusca* (É. Geoffroy, 1812). In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 98-100. Fundação Biodiversitas, Belo Horizonte.

Rylands, A. B., Hirsch, A. and Mendes, S. L. 1998. *Alouatta fusca clamitans* Cabrera, 1940. In: *Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, A. B. M. Machado, G. A. B. da Fonseca, R. B. Machado, L. M. de S. Aguiar and L. V. Lins (eds.), pp. 101-104. Fundação Biodiversitas, Belo Horizonte.

Santos, C. V., French, J. A. and Otta, E. 1997. Infant carrying behavior in callitrichid primates: *Callithrix* and *Leontopithecus*. *Int. J. Primatol.* 18(6): 889-907.

Savage, A., Zirofsky, D. S., Soto, L. H., Giraldo, L. H. and Causado, J. 1996. Proyecto Titi An integrated approach to conserving the cotton-top tamarin. *International Zoo News* 43(8): 544-552.

Schulz, T. G., Thiel, R., Davies, D. S. and Edwards, R. J. 1998. Identification of CUP2E1 in marmoset monkey. *Biochimica et Biophysica Acta* 1382(2): 287-294.

Smith, R. J. and Leigh, S. R. 1998. Sexual dimorphism in primate neonatal body mass. *J. Hum. Evol.* 34(2): 173-201.

Smith. T. E., Abbott, D. H., Tomlinson, A. J. and Mlotkiewicz, J. A. 1997. Differential display of investigative behavior permits discrimination of scent signatures from familiar and unfamiliar socially dominant female marmoset monkeys (*Callithrix jacchus*). *J. Chem. Ecol.* 23(11): 2523-2546.

Sterck, E. H. M., Watts, D. P. and Van Schaik, C. P. 1997. The evolution of female social relationships in nonhuman primates. *Behav. Ecol. Sociobiol.* 41(5): 291-309.

Thomas, W. W., Carvalho, A. M. V. de, Amorim, A. M. A., Garrison, J. and Arbelaéz, A. L. 1998. Plant endemism in two forests in southern Bahia. *Biodiversity and Conservation* 7: 311-322.

Torres, O. M., Enciso, S., Ruiz, F., Silva, E. and Yunis. I. 1998. Chromosome diversity of the genus *Aotus* from Colombia. *Am. J. Primatol.* 44(4): 255-275.

Treves, A. 1998. Primate social systems: Conspecific threat and coercion-defense hypotheses. *Folia Primatol.* 69(2): 81-88.

Tuttle, R. H. 1998. Global primatology in a new millennium. *Int. J. Primatol.* 19(1): 1-12.

Tuxill, J. 1997. Primate diversity, dwindling worldwide. In: *Vital Signs, 1997. The Environmental Trends that are Shaping Our Future*, L. Starke (ed.), pp.100-101. Worldwatch Institute, Washington, D. C.

Van Schaik, C. P. and Kappeler, P. M. 1997. Infanticide risk and the evolution of male-female association in primates. *Proc. Roy. Soc. Lond.* B264(1388): 1687-1694.

Van der Meer, P. J., Sterck, F. and Bongers, F. 1998. Tree seedling performance in canopy gaps in a tropical rain forest at Nouragues, French Guiana. *J. Trop. Ecol.* 14(2): 119-137.

Vermeer, J. 1997. The formation of a captive squirrel monkey group. *International Zoo News* 44(3): 146-149.

Waggie, K. S., Day-Lollini, P. A., Murphy-Hackley, P. A. Blum, J. R. and Morrow, G. W. 1997. Diagnostic exercise: illness, cutaneous hemorrhage, and death in two squirrel monkeys (*Saimiri sciureus*). *Adv. Exp. Med. Biol.* 418: 797-800.

Webb, E. L. 1998. Gap-phase regeneration in selectively logged lowland swamp forest, northeastern Costa Rica. *J. Trop. Ecol.* 14(2): 247-260.

Westergaard, G. C., Byrne, G. and Suomi, S. J. 1998. Early lateral bias in tufted capuchins (*Cebus apella*). *Am. J. Primatol.* 44(2): 147-153.

Westergaard, G. C. Kuhn, H. E., Babitz, M. A. and Suomi, S. J. 1998. Aimed throwing as a means of food transfer between tufted capuchins (*Cebus apella*). *Int. J. Primatol.* 19(1): 123-131.

Westergaard, G. C., Kuhn, H. E. and Suomi, S. J. 1998. Effects of upright posture on hand preference for reaching vs. the use of probing tools by tufted capuchins (*Cebus apella*). *Am. J. Primatol.* 44(2): 147-153.

Westergaard, G. C., Kuhn, H. E. and Suomi, S. J. 1998. Bipedal posture and hand preference in humans and other primates. *J. Comp. Psychol.* 112(1):55-64.

Westergaard, G. C., Kuhn, H. E. and Suomi, S. J. 1998. Laterality of hand function in tufted capuchin monkeys (*Cebus apella*): Comparison between tool-use actions and spontaneous non-tool actions. *Ethology* 104(2): 119-125.

Zucker, E. L., Clarke, M. R., Glander. K. E. and Scott, N. J., Jr. 1996. Sizes of home ranges and howling monkey groups at Hacienda La Pacifica, Costa Rica: 1972-1991. *Brenesia* 45-46: 153-156.

Abstracts

Bayart, F. and Pages, E. 1998. Ecological and social correlates of intergroup encounters in *Saguinus midas* (Callitrichidae) in French Guiana. *Folia Primatol.* 69(1): 42.

Chiu, C. H. 1998. Evolution and expression of the gamma-globin genes in New World monkeys. *Diss. Abst. Int.* B58(11): 5787. To order: #AAD98-15284. University Microfilms, Inc., Ann Arbor, MI 48106.

Higashi, Y. and Hirais, H. The translocation of ribosomal DNA in common marmoset (*Callithrix jacchus*). *Reichorui Kenkyu / Primate Research* 13(3): 241. In Japanese.

Kobayashi, S., Natori, M. and Gregorin, R. 1997. Geographical variation of cranial morphology in the brown howler monkey, *Alouatta fusca*. *Reichorui Kenkyu / Primate Research* 13(3): 246. In Japanese.

Ludes, E. 1998. Preferences for different types of litter by *Cebus capucinus*. *Folia Primatol.* 69(1): 50.

Mazurek, R. S. 1997. Wildlife use by the Waimiri-Atroari Indians in Central Amazon, Brazil. *Bull. Ecol. Soc. Am.* 78(4, suppl.): 141.

Nishimura, A. 1997. A face-whitening disease observed in a group of woolly monkeys at La Macarena, Colombia. *Reichorui Kenkyu / Primate Research* 13(3): 268. In Japanese.

Panger, M. A. 1998. Hand preference and object-use in free-ranging white-faced capuchin monkeys (*Cebus capucinus*) in Costa Rica. *Diss. Abst. Int.* A58(8): 3193. To order: #AAD98-03322. University Microfilms, Inc., Ann Arbor, MI 48106.

Pastor-Nieto, R. 1998. Familiarity and co-operation in spider monkeys: Coping with group living in captivity. *Primate Eye* (64): 23.

Rapaport, L. G. 1997. Food sharing in golden lion tamarins (*Leontopithecus rosalia*): provisioning young, maintenance of social bonds, and resource constraints. *Diss. Abst. Int.* A58(6): 2278. To order: #AAD97-36124. University Microfilms, Inc., Ann Arbor, MI 48106.

Robinson, E. L., Jr. 1998. Integration of circadian and homeostatic body temperature, heat production, and heat loss regulation in squirrel monkeys. *Diss. Abst. Int.* B58(8): 3996. To order: #AAD98-04651. University Microfilms, Inc., Ann Arbor, MI 48106.

Silva, S. C. 1998. The feeding ecology of translocated howler monkeys, *Alouatta pigra*, in Belize. *Diss. Abst. Int.* B58(11): 5760. To order: #AAD98-16361. University Microfilms, Inc., Ann Arbor, MI 48106.

Takai, M., Shigehara, N. and Setoguchi, T. 1997. Significance of the mandibular symphyseal suture line of *Branisella*, a late Oligocene platyrrhine fossil. *Reichorui Kenkyu / Primate Research* 13(3): 248. In Japanese.

Young, F. M., Illingworth, P. J., Lunn, S. F., Harrison, D. J. *et al.* 1998. Cell death during luteal regression in the marmoset monkey. *J. Pathol.* 184(suppl.): 27A.

In: *Advances in Ethology*, 32, 1997.

Carosi, M., Heistermann, M. and Visalberghi, E. Reproductive status and sexual behavior in female tufted capuchins (*Cebus apella*). p.58.

Casperd, J. M. and Dunbar, R. I. M. A comparative analysis of post-conflict behavior within the primate order. p.280.

Daub, S. and Kirkpatrick-Tanner, M. Reversal of the cuckoo strategy: Infant care in common marmosets, *Callithrix jacchus*. p.37.

Kaplan, G. and Rogers, L. J. Parental care and its influence on offspring in the common marmoset (*Callithrix jacchus jacchus*). p.243.

Kirkpatrick-Tanner, M. Principles of female dominance relations in the common marmoset *Callithrix jacchus*. p.146.

Kureta, Y. Vocal exchange of cotton-top tamarins in an isolated situation. p.125.

Müller, F. and Kirkpatrick-Tanner, M. Female behaviour in a polygynous group of common marmosets *Callithrix jacchus*. p.102.

Sanchez, S. and Pelaez, F. The cotton-top tamarin (*Saguinus oedipus*): Costs of carrying. p.255.

Santos, E. dos, Jr., Leme, S. C. and Pessutti. C. Golden-handed tamarin, *Saguinus midas midas*, ethogram. p.296.

Visalberghi, E. and Carosi, M. Courtship and sexual behaviour in female tufted capuchins (*Cebus apella*, Primates). p.299.

Voelkl, B. and Huber, L. Imitation of simple motor patterns in the common marmoset, *Callithrix jacchus*. p.86.

In: *American Journal of Physical Anthropology*, Supplement 26, 1998.

Collins, A. C., Dubach, J. and Leutenegger, W. Phylogenetic relationships among the Atelinae based on mtDNA analysis. p.69.

Cox, D. F. and Runestad, J. A. Effects of habitat change upon the social behavior of captive spider monkeys (*Ateles fusciceps*). p.71.

Digby, L. J., Merrill, M. Y. and Davis, E. T. Infanticide as an extreme form of female reproductive competition in primates and social carnivores. p.77.

Ford, S. M. and Davis, L. C. Sexual dimorphism in the postcranium of callitrichid primates. p.104.

Garber, P. A. and Rehg, J. A. Preliminary field study of positional behavior and habitat preference in *Callimico goeldii*. p.85.

Hamrick, M. W. Evolution of pads and claws in New World anthropoids. pp.89-90.

Johnson, D. Exudate feeding and interspecific variability in postcanine size among Callitrichidae. p.129.

Jones, A. L., Degusta, D., Turner, S. P., Campbell, C. J. *et al.* Craniometric variation and selection in an *Alouatta palliata* population. p.130.

Lucas, P. W., Teaford, M. F., Ungar, P. S. and Glander, K. E. Physical properties of foods in *Alouatta palliata*. pp.162-163.

Lynch, J. W. Mating behavior in wild tufted capuchins (*Cebus apella nigritus*) in Brazil's Atlantic forest. p.153.

Masterson, T. J. Canine forms in *Cebus*. p.156.

Miller, J. R. and Begun, D. R. Facial flexion and craniometric variation in the platyrrhine genus *Alouatta*. pp.163-164.

Moore, W. D. Patterns of variation in the platyrrhine cranio-orbital region: Implications for reconstructing the platyrrhine morphotype. p.166.

Perez-Sweeney, B., Forstner, N., Valladares-Padua, C. and Melnick, D. A preliminary examination of the taxonomy of *Leontopithecus* using mitochondrial ND4 and D-loop sequences. p.177.

Plavcan, J. M. Craniofacial and body mass dimorphism in anthropoid primates. p.179.

Yannopoulos, A. C. Variations in resource distribution and abundance as factors affecting the feeding ecology of *Cebus capucinus*. p.237.

Rehg, J. A. A dynamic modeling approach to the study of callitrichine life history, demography and social systems. p.186.

Runestad, J. A. and Glander, K. E. Patterns of sexual dimorphism in platyrrhine limb bone diaphysis. p.193.

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Schmitt. D., Turnquist, J. E., Rose, M. D. and Lemelin, P. Relationship between prehensile tail anatomy and kinematics in two atelines. p.196.

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Takai, M., Anaya, F., Shigehara, N. and Setoguchi, T. New fossil specimens of *Branisella boliviana*: Evidence for a primitive platyrrhine. p.215.

Zucker, E. L., Clarke, M. R. and Glander, K. E. Life histories of female mantled howling monkeys in Costa Rica: Weight, age, and status. pp.239-240.

In: *Primate Report*, Special Issue 48-2, December 1997. *1. Göttinger Freilandtage. Primate Socioecology: Causes and Consequences of Variation in the Number of Males per Group*. Deutsches Primatenzentrum, 9-12 December 1997.

Altmann, J. Mate choice and intrasexual competition as regulators of the number of males: processes and product. p.12.

Anzenberger, G. The unusual flexibility of callitrichids: a fashionable fallacy. p.12.

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Meetings

Society for Conservation Biology Meeting 1998, 13-16 July, 1998, Macquarie University, Sydney, Australia. For more information: Dr. R. Frankham, School of Biological Sciences, Macquarie University, Sydney, NSW 2109, Australia, Tel: +61 2 850 8186, Fax: +61 2 850 8245.

Foraging/98, 21-24 July, 1998, University of California, Santa Cruz, USA. Organized by Dave Stephens, Marc Mangel, and Don Kramer. Includes sessions on Mechanisms of Foraging (organized by Sara Shettleworth), Individual Foraging Behavior (Ronald Ydenberg), Social Foraging and Foraging Games (Luc-Alain Giraldeau), and Foraging Ecology (Michael Rosensweig). For further information: Foraging/98, Department of Ecology, Evolution and Behavior, University of Minnesota, 100 Upper Buford Circle, St. Paul, MN 55108, USA, e-mail: <foraging@nash.cbs.umn.edu>; web: <http://nash.cbs.umn.edu/foraging>.

VII International Congress of Ecology, New Tasks for Ecologists after Rio 92, 19-25 July 1998, Centro Affari & Palazzo Internazionale Congressi, Florence, Italy. Organized by the International Association for Ecology (INTECOL) in conjunction with the Italian Ecological Society (SItE). Themes include: Perspectives in global ecology; Perspectives for the ecological management of natural resources; Problems and perspectives in Mediterranean ecosystems; Diversity concepts at different scales; Perspectives in ecological theory and modeling; Key issues in aquatic ecosystems; Perspectives in landscape ecology; Perspectives in sustainable land use; Key issues in microbial ecology; Patterns and interactions in populations and communities; Perspectives in environmental chemistry and ecotoxicology; Integrating ecology into economic and social development; Ecological engineering; Progresses in ecological education. Contact: Almo Farina, Vice-President INTECOL, Secretariat VII International Congress of Ecology, Lunigliana Museum of Natural History, Fortezza della Brunella, 54011 Aulla, Italy, Tel: +39 187 400252, Fax: +39 187 420727, e-mail: afarina@tamnet.it, web site: http://www.tamnet.it/intecol.98.

Euro-American Mammal Congress, 20-24 July, 1998, University of Santiago de Compostela, Galicia, Spain. Organized under the auspices of the American Society of Mammalogists (ASM), Societas Europea Mammalógica (SEM) and the Sociedad Española para la Conservación y el Estudio de los Mamiferos (SECEM). Also participating: University of Santiago de Compostela (USC) through its Colleges of Sciences and Pharmacy as well as the Consejeria de Agricultura, Ganaderia, y Montes of the local government (Xunta de Galicia) through the intermediacy of its Dirección General de Montes y Medio Ambiente Natural. The meeting will emphasize the cutting edge and little known aspects of scientific knowledge of mammalian species, and communities and ecosystems of the Holarctic. However, contributions of interest relating to mammals from other regions will also be welcomed. Contributions will be grouped in sessions that will cover general subjects, symposia or workshops. General matters currently projected: Behavioral Ecology, Biogeography, Community Ecology, Conservation, Development, Molecular Systematics, Morphology and Morphometrics, Natural History, Paleontology, Parasites and Diseases, Physiology, Population Dynamics, Population Genetics, Systematics and Evolution, and Wildlife Management. The organizers request that electronic mail be used for contact whenever possible. For more information, all queries and requests: *galemys@pinarl.csic.es*. Circulars will also be sent by electronic mail, and distributed through a variety of distribution lists and list servers. Postal address: Euro-American Mammal Congress, Laboratorio de Parasitologia, Facultad de Farmacia, Universidad de Santiago de Compostela, 15706 Santiago de Compostela, Spain, Fax: (34) 81 593316.

7th International Behavioral Ecology Congress, 27 July - 1 August, 1998, Asilomar Conference Center, Monterey Peninsula, California, USA. For further information contact: Walt Koenig, e-mail: <wicker@uclink.berkeley.edu>, or Janis Dickinson, e-mail: <sialia@uclink2.berkeley.edu>. International Society for Behavioral Ecology web site: <http://socrates.berkeley.edu/~isbe98/>.

XVII Congress of the International Primatological Society, 10-15 August, 1998, University of Antananarivo, Antananarivo, Madagascar. The theme of the Congress is: Taking Responsibility for our Future through Conserving Biological Diversity such as Primates". Deadline for registration and free communications abstracts is 1 February 1998. Materials must be received by this date. Deadline for abstracts for symposia, workshops and roundtable discussions: 31 October 1997. Registration fees are US$300 for regular IPS members, US$100 for IPS student members, US$350 for non-members, and US$100 for accomanying persons. Registration includes the opening and closing receptions, as well as the program and abstract booklets, lunches and shuttles. After 1 February 1998, all rates will increase by US$50. On site registration will be more. The official languages will be French and English. Two plenary lectures will be given on topics relevant to human responsibilities for World Survival and to the significance of primate conservation. Contact: Secretariat XVII IPS Congress, Madame Berthe Rakotosamimanana, Faculté des Sciences, Batement P, Porte 207, BP 906, Antananarivo 101 Madagascar. Tel: 261 20 22 26991 ext.24, Fax: e-mail: <ralaiari@syfed.refer.mg>. Development Committee: Marlene Rakotomalala, Tel: 261 20 22 26991 ext.13, Scientific Committee: Hantanirina Rasamimanana, e-mail: <hrasamim@syfed.refer.mg>. Coordinator and for information: Soava Rakotoarisoa, Tel: 261 20 22 26991 ext.24.

Common fax: 261 20 22 31398.

Measuring Behavior '98, 2nd International Conference on Methods and Techniques in Behavioral Research, 18-21 August, 1998, Center for Biological Sciences, University of Groningen, Haren, The Netherlands. The Conference host is Prof. Dr. J.M. Koolhaas. The program will consist of oral papers, poster sessions, demonstrations, training sessions, user meetings, scientific tours, post-conference excursions, and a pleasant social program. All presentations will deal with innovative methods and techniques in behavioral research. Validation of a new technique is an acceptable subject for a paper or poster. However, papers discussing applications of proven techniques do not belong at Measuring Behavior '98. Presentations on physiological techniques are welcome, as long as there is a clear link with behavior. Contributions are welcome on the following topics: Behavioral Recording, Behavior and Physiology, Behavioral Analysis, and Behavioral Models. "Measuring Behavior '98" will devote special attention to the integration of advanced behavioral research with physiological measurements. Deadline for submission of abstracts: 1 April 1998. Notification of acceptance of abstracts: 1 June 1998. Deadline for early registration (reduced fee): 15 June 1998. For further information: The Conference Secretariat, Measuring Behavior '98, Attn: Rosan Nikkelen, P.O. Box 268, 6700 AG Wageningen, The Netherlands, Tel: +31 (0)317 497677, Fax: +31 (0)317 424496, e-mail: <mb98@noldus.nl>. Web: <http://www.noldus.com/events/mb98/mb98.htm>.

Association for the Study of Animal Behaviour - Intraspecific Variation in Behaviour, 2-4 September, 1998, University of Urbino, Italy. Organized in conjunction with the Societa Italiana di Ethologia, by Giorgio Malacame and Tim Roper. Plenary lectures will address four main themes: the role of social learning and culture in producing intraspecific variation in behaviour; intraspecific variation in social and mating behaviour in vertebrates as a function of population density and other variables; alternative strategies; and individual differences in behaviour. For more information: Prof. Giorgio Malacame, Department of Sciences and Advanced Technologies, Borsalino 54, 15100 Alessandria, Italy, e-mail: <malacam@venere. unial.it>, or Dr Tim Roper, School of Biological Sciences, University of Sussex, Brighton BN1 9QG, UK, e-mail: <t.j.roper@sussex.ac.uk>.

VII Congreso Nacional and IV Congreso Latinoamericano de Etología, 7-10 September, 1998, University of Vigo, Spain. For more information: Dr. Adolfo Cordero, Departamento de Ecología e Biología Animal, Universidad Vigo, EUET Forestal, 36005 Pontevedra, Spain, Tel: +34 (9)86 801-926, Fax: +34 (9)86 801907, e-mail: <etologia@uvigo.es>, web: http://www.uvigo.es/webs/c04/index.html>.

Conservation Breeding Specialist Group (CBSG) Annual Meeting 1998, 8-11 October, 1998, Pacifico Yokohama Conference Center, Yokohama, Japan. Organized by the CBSG, Zoological Gardens of the City of Yokohama, and the Japanese Association of Zoological Gardens and Aquariums. For further information: Secretariat of the 1998 CBSG Annual Meeting, c/o ATEION Co., Ltd., Room #401, Toranomon Sangyo Bldg., 1-2-29 Toranomon, Minato-ku, Tokyo, 105-0001 Japan, Tel:+81 3 3593 2565, Fax: +81 3 3593 1088, e-mail: <atky@tky2.3web.ne.jp>.

IV Congreso Latinoamericano de Ecología, II Congreso Peruano de Ecología, 20-25 de Octubre de 1998, Arequipa, Perú. El IV Congreso Latinoamericano de Ecología y II Congreso Peruano de Ecología son importantes foros científicos en los que los ecólogos y otros profesionales o investigadores relacionados, se reúnen para intercambiar información, ponerse de acuerdo para emprender actividades multinacionales, actualizar conocimientos y discutir los problemas ambientales de la región, para buscarles alternativas de solución. Estos son los propósitos que guiaron a los organizadores del Primer Congreso Latinoamericano de Ecología, que se realizó en Montevideo en 1989 y que han seguido dirigiendo la programación de la Segunda y Tercera versión, realizados en Campinas, Brasil, en 1992 y Mérida (Venezuela) en 1995. El Primer Congreso Peruano de Ecología, se realizó en Marzo de 1997 en Lima, Perú, y la Asociación Peruana de Ecología lo organizará anualmente, para incentivar la investigación y el intercambio de información entre los ecólogos peruanos. En el IV Congreso Latinoamericano de Ecología, seguiremos los lineamientos de los tres congresos anteriores, pero enfocados al análisis de los problemas ambientales más importantes para el Perú y para América Latina, por lo que, los Simposios centrales, tratarán sobre el uso de las neblinas para la recuperación de los ecosistemas degradados de zonas áridas y sobre la conservación y el uso de la diversidad Biológica de América Latina, en el Tercer Milenio. Durante el IV CLAE y II COPE se realizarán las siguientes actividades: *1. Comunicaciones Cientificas* - Bajo la modalidad de exposiciones orales y en paneles, (carteles o "posters"), en los siguientes temas o secciones: Autoecología; Ecología de Poblaciones y Comunidades; Ecología del Paisaje; Ecosistemas Acuáticos; Ecología Teórica y Modelos; Ecofisiología; Ecología del Comportamiento e Interacciones Ecológicas; Cambio Climático Global; Biología de la Conservación; Ecología Urbana, Contaminación y Toxicología; Educación y Legislación Ambiental. *2. Simposios*: "Recuperación y Uso Sostenible de las Lomas del Desierto Costero Peruano-Chileno, Utilizando el Agua de las Neblinas", Proyecto de la Unión Europea-Universidad de San Agustín de Arequipa; "El Niño 97-98. Proyecto RIBEN-OEA-CONCYTEC", Consejo Nacional de Ciencia y Tecnología del Perú; "La Biodiversidad y la Agricultura Sostenible", Red en Alternativas a los Agroquímicos en la Agricultura (RAAA); "El Monitoreo Ecológico en Biodiversidad y Medioambiente", Center for Conservation Biology, Stanford University. *Nota*: Se solicita que se sugieran o propongan Simposios. Los proponentes tendrán apoyo

administrativo y logístico para organizarlos. *No ofrecemos apoyo economico*, pero si ayudar en la gestión para obtenerlo. *3. Cursos*: Curso RAP (Conservation International, Washington, D. C.); III Curso Internacional Métodos Cuantitativos para el Manejo de la Diversidad Biológica, Center for Conservation Biology, Stanford University. *4. Mesas Redondas*: "Desarrollo Sostenible", Consejo Nacional del Ambiente del Perú (CONAM) - por confirmar. *Conferencistas Invitados*: Antonio Brack, Tratado de Cooperación Amazónica; Francisco Díaz, Pineda Universidad Complutense; Louise Emmons, Conservation International ; Ramón Folch, Facultad Latinoamericana de Ciencias Ambientales (FLACAM-Argentina); Robin Foster, Conservation International; Carlos Galindo, Center for Conservation Biology, Stanford University; Julio Gutiérrez, Universidad de La Serena; Russell Mittermeier, Conservation International; José Sarukhan, CONABIO, Universidad Nacional Autónoma de México; Tom Schulenberg, Conservation International; Javier Simonetti, Universidad de Chile; José Luis Telleria, Universidad Complutense; John Terborgh, Center for Tropical Conservation, Duke University; Juan Torres, Universidad Nacional Agraria La Molina. *Actividades de Campo* - Se esta contemplando realizar visitas a los principales ecosistemas de los alrededores de Arequipa, bajo programa especial, previa inscripción y pago del costo respectivo. *Actividades Sociales* - Se realizará una recepción en la inauguración. Se están planificando otras actividades sociales que se harán conocer en el segundo anuncio. *Fechas Importantes*: Límite de inscripción con descuento - 31 de agosto de 1998; Recepción de Resúmenes - Hasta el 12 de septiembre de 1998; Aviso de aceptación de resúmenes y tipo de exposición - 28 de septiembre de 1998. *Nota*: Sólo se considerarán resúmenes de estudiantes de pregrado que se acompañen de la recomendación de aceptación, de uno de sus profesores de la especialidad. Sólo los estudiantes ponentes (de pre y postgrado), tendrán derecho a participar en las actividades sociales. *Informes*: IV Congreso Latinoamericano de Ecologia y II Congreso Peruano de Ecologia, Casilla 985, Arequipa, Perú, Telefax: +51(54)288971, e- mail: <ireca@unsa.edu.pe>.

Forest 98 - V Congresso e Exposição Internacional sobre Florestas, 25-28 de novembro de 1998, Centro de Convenções de Curitiba, Paraná, Brasil. Promoção: Sociedade Brasileira para a Valorização do Meio Ambiente - BIOSFERA. Temário preliminar: Silvicultura, manejo, sustentabilidade e conservação da biodiversidade; Industrialização e comercialização de produtos florestais; Ensino, pesquisa e extensão florestal; Políticas, legislação e geopolítica florestal; Arborização urbana, paisagismo e unidades de conservação. Coordenador Geral: Prof. Maurício Balensiefer, Escola de Engenharia Florestal, Universidade Federal do Paraná, Rua Bom Jesus 650, 80035-010 Curitiba, Paraná, Tel: (041) 232 9084 (UPPR), (041) 322-1611 (SEMA), Fax: (041) 232 3636, e-mail: <forest98@pr.gov.br>.

Primate Society of Great Britain (PSGB) Winter Meeting - Current Contributions of Zoos to Primate Conservation and Biology, 2 December, 1998, Zoological Society of London, Regent's Park, London, U.K. Includes the Osman Hill Memorial Lecture to be given by Prof. Christopher Stringer on "The Origin of Our Species". Organized by Dr Miranda Stevenson and Dr Bryan Carroll. Contact: Dr Miranda Stevenson, Marwell Zoological Park, Colden Common, Winchester, Hants SO21 1JH, England, U.K. Tel: 01962 777407, Fax: 01962 777511, e-mail: <mirandast@email.msn.com>.

Association for the Study of Animal Behaviour - The Genetic Analysis of Behaviour, 3-4 December, 1998, Zoological Society of London, London. Organized by Mike Ritchie and Bambos Kyriacou. For more information: Dr M. G. Ritchie, Environmental & Evolutionary Biology, Bute Medical Building, University of St. Andrews, Fife KY16 9TS, UK, Fax: +44 (0)1334 463600, e-mail: <mgr@st-andrews.ac.uk>, or Dr Bambos Kyriacou, Department of Genetics, Adrian Building, University of Leicester, Leicester LE1 7RH, UK, Fax: +44 (0)1162 523378, e-mail: <cpk@leicester.co.uk>.

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Association for the Study of Animal Behaviour, Easter Meeting, 29-31 March, 1999. University of Newcastle, UK. Organized by Sue Healy and Marion Petrie. A general meeting with no specific theme. Invited speakers include: Naomi Pierce (Harvard University), Margo Wilson (McMaster University) and John Krebs (Oxford University). A workshop "Advice to Postgraduate Students" will be held in conjunction with the meeting, on 29 March 1999. For more information: Dr Sue Healy, Department of Psychology, University of Newcastle, Newcastle-upon-Tyne NE1 7RU, UK, Fax: +44 (0)191 2225622, e-mail: <s.d.healy@ncl.ac.uk>.

II International Wildlife Management Congress "Wildlife, Land and People: Priorities for the 21st Century", 28 June- 2 July 1999, Gödölló, Hungary. Organized by The Wildlife Society with the Hungarian co-sponsor and host, the University for Agricultural Sciences in Gödölló, Hungary. Deadline for proposals of one-half-day workshops, symposium, and special poster session proposals: 30 June 1998. Workshops, symposia, and special poster sessions should focus on topics of wildlife science, management, sustainable development, education and outreach, or laws and policy within the broad theme of the Congress. Each day will begin with a morning plenary session followed by related concurrent sessions, symposia and workshops in the afternoon. Themes for the five-day congress are (1) Sustainable Development and Wildlife Conservation; (2) Landscape Linkages: Ecosystem Science and Management; (3) Issues in Wildlife-Human Conflicts; (4) Education, Outreach, and Human Dimensions in Wildlife Conservation; and (5) Techniques for Monitoring Wildlife Populations. Symposia, and, where appropriate, workshop presentations will be considered for publication in a Congress proceedings; organizers will be re-

quired to provide an initial edit and evaluation of submitted papers. The proceedings will be published in English; oral presentations will be in English or possibly Hungarian depending on the availability of translators. More information on preparing proposals for workshops, symposia, and special poster sessions can be found in the March-April 1998 issue of *The Wildlifer*, and on The Wildlife Society website <http://www.wildlife.org/index.html>, or guidelines may be requested from Co-Chair of the Program Committee, W. Daniel Edge at his e-mail address. Deadline for submission of papers and posters: 15 October 1998. Electronic (e-mail or internet form) submissions are preferred. Electronic submissions of contributed papers and posters should be sent to the Program Co-Chair at the e-mail address below. Please, no telephone inquiries related to abstract submission or acceptance. Direct all other inquiries to The Wildlife Society office at Tel: (301) 897-9770, Fax: (301) 530-2471, e-mail: <tws@wildlife.org>. Decisions concerning acceptance of papers and posters will be made by 30 November 1998. The abstract submission form can be found on the TWS webpage <http://www.wildlife.org/abstract.html>. Dr. W. Daniel Edge, Co-Chair, Program Committee, Department of Fisheries and Wildlife, Oregon State University, 104 Nash Hall, Corvallis, Oregon 97331-3803, USA, e-mail - <daniel.edge@orst.edu>, <edged@netten.net>, also <http://www.wildlife.org>.

IV Congreso de Manejo de Fauna Amazonica, 4 al 8 de octubre de 1999, Asunción, Paraguay. Este importante evento, iniciado en 1992, resume en breves dias los resultados de todos los esfuerzos aplicados en pos de la conservación de la fauna de toda la región amazonica. En esta oportunidad se fortalecera la pluriparticipación, la discusión de estrategias y la elaboración de planes de acción apuntando a una conservación protagonizada por los pobladores rurales, beneficiarios directos de un uso sostenible del recurso faunistico. La organización de este evento es el resultado de un esfuerzo conjunto entre la Oficina CITES-Py, La Gobernación del Departamento Central y la organizacion ambientalista Fundación Moises Bertoni para la Conservación de la Naturaleza. Misión: Trabajar en forma pluriparticipativa y en acción coordinada para la optimización de las politicas de uso, tecnicas y estrategias de manejo de la vida silvestre amazonica para fomentar el desarrollo socio-economico sostenible y la conservación de la naturaleza. Los trabajos seran recibidos hasta el 1 de marzo de 1999. Se podran enviar por correo electronico, o en impresion en papel blanco tamano carta con una copia archivada en diskette. Unicamente se recibiran los siguientes formatos: WP5.1, Microsoft Word 6.0 o textos en ASCII (DOS IBM). Invitación a eventos: La comisión organizadora desearia recibir propuestas para la organización de simposios, talleres, cursos, mesas redondas y otras reuniones relacionadas a la tematica propuesta para el Congreso. Los interesados en organizar o en participar de algunos de estos eventos pueden comunicarse con el Comite Organizador. Inscripciones: Hasta el 31 de marzo de 1999, estudiantes: US$30, profesionales: US$60; Hasta el 30 de setiembre de 1999, estudiantes: US$50, profesionales: US$100; Inscripciones tardias (durante el Congreso), estudiantes: US$60, profesionales: US$120. Los idiomas oficiales del Congreso seran Espanol y Portugues, no se haran servicios de traducción simultanea. Comisión Organizadora, IV Congreso de Manejo de Fauna Amazonica, Fundación Moises Bertoni, C.C. 714, Asunción, Paraguay, Tel: (595-21) 608 740, 600 855, Fax: (595-21) 608 741m, e-mail: <congreso@fmbert.una.py>. Visitenos en internet (a partir de julio): <www.mbertoni.org.py>.

Contributions

We would be most grateful if you could send us information on projects, research groups, events (congresses, symposia, and workshops), recent publications, activities of primatological societies and NGOs, news items or opinions of recent events and suchlike. Manuscripts should be double-spaced and accompanied by the text in diskette for PC compatible text-editors (MS-Word, Wordperfect, Wordstar). Articles, not exceeding six pages, can include small black-and-white photographs, high quality figures, and high quality maps, tables and references, but please keep them to a minimum.

Please send contributions to: **Anthony Rylands**, c/o Conservation International do Brasil, Avenida Antônio Abrahão Caram 820/302, 31275-000 Belo Horizonte, Minas Gerais, Brazil, Tel/Fax: +55 (31) 441 17 95 or **Ernesto Rodríguez-Luna**, Parque de La Flora y Fauna Silvestre Tropical, Instituto de Neuroetología, Universidad Veracruzana, Apartado Postal 566, Xalapa, Veracruz 91000, México, Fax: 52 (28) 12-5748.

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