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Articles

PRELIMINARY FIELD OBSERVATIONS OF GOLDEN-MANTLED TAMARINS, *SAGUINUS TRIPARTITUS*, IN EASTERN ECUADOR

Little is known about the natural history and behavior of the golden-mantled tamarin, *Saguinus tripartitus*. Published accounts of golden-mantled tamarins in the wild are limited to short reports on geographic distribution and group sizes observed during brief censuses (Albuja 1994; de la Torre, 1996; Aquino and Encarnación, 1996). Golden-mantled tamarins occur in lowland humid forest in eastern Ecuador and northern Peru, inhabiting a limited geographic range, thought to be bounded by the Río Napo and the Río Putumayo in the north and the Río Curaray in the south (Albuja, 1994; Aquino and Encarnación, 1996). In Ecuador, most, if not all, of the range of the golden-mantle tamarin lies within the boundaries of the Parque Nacional Yasuní and the Reserva Indígena Huaorani, areas that, until recently, were remote and largely inaccessible to researchers.

Between July 1994 and September 1996, I spent a total of five months locating and observing wild golden-mantled tamarins in eastern Ecuador: 1) six weeks in July-August 1994, as part of a survey of primate communities along the Pompeya Sur - Río Iro road in the Parque Nacional Yasuní, 2) eight weeks in July-September 1995, at the Proyecto Primates Study Site in the Parque Nacional Yasuní (near 76°33'W, 0°48'S, A. DiFiore, pers. comm.), and 3) six weeks in August-September 1996, at the Universidad San Francisco de Quito's Tiputini Biodiversity Station (76°20'W, 0°40'S), which lies on the north bank of the Río Tiputini and immediately north of the Parque Nacional Yasuní.

Study methods involved searching for golden-mantled tamarins while walking along trails and waiting for tamarins near specific trees, usually fruit or nectar sources or resting/sleeping trees, where tamarins had been previously observed. When groups were encountered, they were followed, both on and off trails, for as long as possible. Data on tamarin behavior were collected *ad libitum*. During longer follows, scan sampling at 5-minute intervals was used to record the behavior of all visible individuals. However, the number and temporal distribution of samples were insufficient to provide a meaningful description of the time budgets of golden-mantled tamarins at this time.

During the 1994 study period, golden-mantled tamarins were encountered on two of 20 days spent exploring the forest at various locations along the Pompeya Sur - Río Iro road. I also followed and observed a specific group of golden-mantled tamarins residing near kilometer 37 of the Pompeya Sur - Río Iro road on seven different days. At the Proyecto Primates Study Site in 1995, I encountered golden-mantled tamarins, belonging to at least three

different groups, on 15 (45%) of 33 search days. These encounters were usually brief, as the tamarins were unhabituated and often fled into areas of dense liana growth where they could not be followed. At the Tiputini Biodiversity Station, I encountered the tamarins on 25 (81%) of 31 study days. The tamarins observed at this site comprised at least five different groups. Several of them were already partially habituated to the presence of human observers, and I was able to follow them for extended periods of time. The four longest continuous follows, involving three different groups, were 2, 2½, 7, and 9 hours.

Groups of *S. tripartitus* for which I obtained reliable group counts ranged in size from four to seven individuals (N = 9), with a mean size of 5.8 individuals. These data are consistent with group sizes reported for *S. tripartitus* by Albuja (1994) and de la Torre (1996) and with those reported for other tamarin species in general (Sussman and Kinzey, 1984).

On one occasion during the 1995 study at the Proyecto Primates Study Site, I encountered a group of 10 *S. tripartitus* individuals that traveled together for a few minutes and then split into two groups of five individuals each, which fled in different directions. Since only groups of five individuals were seen in this area both prior to and subsequent to this observation, I concluded that the group of 10 was a temporary association. During the observed period of association, I did not see any aggression between individuals. This incident is of interest because most tamarins, like most primates, have aggressive intergroup relationships (Goldizen, 1987; Garber, 1993; Peres, 1989). Tolerant intergroup relationships and the formation of temporary, non-aggressive associations (also called "large groups"), where two or more neighboring groups travel and feed together, have been reported to date in only two other tamarin species: *S. nigricollis* (see Izawa, 1978; de la Torre *et al.*, 1995) and some populations of *S. fuscicollis* (see Izawa, 1976; Castro and Soini, 1977).

In my observations of golden-mantled tamarins, the temporary association described above was the only intergroup interaction observed. Thus, there is not yet sufficient information to determine whether intergroup tolerance and the formation of temporary associations between groups is a general feature of the social organization of golden-mantled tamarins, or whether the observed incident represents a rare occurrence of this behavior in this species. If intergroup tolerance proves to be the norm in golden-mantled tamarins, a study of the relationship of this unusual trait to other features of golden-mantled tamarin social organization and ecology would increase our understanding of the ecological causes and the social and reproductive consequences of different patterns of intergroup relationships in tamarins and other primates.

My observations of *S. tripartitus* suggest that its diet is qualitatively similar to those reported for other tamarin species (Sussman and Kinzey, 1984; Garber, 1993), including fruits, insects, and nectar. During all three study

years, subjects were observed feeding at the flowers of *Sterculia* sp. and/or *Matisia* (formerly *Quararibea*) spp., including *M. longiflora* and *M. obliquifolia*. The fact that tamarins did not remove or visibly damage flowers during feeding suggests that they were engaged in nectar (and/or pollen) extraction from these sources. Nectar feeding has been reported in numerous studies of other tamarin species, though the species of plants used as sources of nectar vary between study populations (e.g., *S. fuscicollis*: Terborgh, 1983; Peres, 1993; *S. imperator*: Terborgh, 1983; *S. mystax*: Peres, 1993). With respect to *Sterculia* and *Matisia*, Anne Savage (pers. comm.) has observed *S. oedipus* feeding from *Sterculia* sp. flowers in Colombia, and Terborgh (1983) reported seasonal nectar feeding by *S. fuscicollis* and *S. imperator* from several plant sources, including *Matisia* (formerly *Quararibea*) *cordata*, at Cocha Cashu in Manu National Park, Peru.

For the tamarins at Cocha Cashu, *M. cordata* nectar is a major food source during late July and August, Cocha Cashu's dry season, when fruit availability is low (Terborgh, 1983; Terborgh and Stern 1987). The time of year, July through September, in which I observed nectar feeding by golden-mantled tamarins in eastern Ecuador coincides with the period of heavy use of nectar resources by tamarins at Cocha Cashu. However, since the feeding behavior of golden-mantled tamarins has not been studied at other times of the year, no conclusions can yet be drawn about the extent to which nectar feeding is seasonal, nor about potential relationships between nectar feeding and seasonality in fruit availability for golden-mantled tamarins.

My observations of golden-mantled tamarins to date reveal that this previously unstudied species resembles other tamarins in general characteristics of its group size, diet, and behavior, at least during the months of July through September, and that this species may show the relatively uncommon characteristic of non-aggressive intergroup relationships. A long-term study of golden-mantled tamarins in the wild is necessary to further determine the extent to which this species resembles and differs from other tamarin species, including its well-studied and closely-related congener *S. fuscicollis* (e.g., Soini, 1987; Garber, 1988; Goldizen *et al.*, 1996). Further study of golden-mantled tamarins will expand our knowledge of the extent of variation in social behavior and ecology among callitrichids and may reveal novel combinations of traits that would allow us to test hypotheses about the ultimate and proximate factors underlying the unusual features of social organization, such as cooperative breeding and variability in mating patterns, that characterize these primates.

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METHODS OF ASSESSING DIETARY INTAKE: A CASE STUDY FROM WEDGE-CAPPED CAPUCHINS IN VENEZUELA

Introduction

Many socioecological models are founded upon variance in foraging success (see, for example, Wrangham, 1980). It is widely recognized that what an animal eats may have a profound impact upon other facets of its ecology and social behavior, such as ranging patterns (Isbell, 1991), group size (Janson, 1988; Terborgh and Janson, 1986), rates of aggression (Janson, 1985; Whitten, 1983), and frequency of allomothering (McKenna, 1979).

Despite their importance, precise measures of food intake tend to be elusive. A few studies have successfully used analyses of fecal samples (Goodall, 1977; Tutin and Fernandez, 1993) or stomach contents (Charles-Dominique, 1974; Gautier-Hion, 1980; Hladik, 1977). However, most investigations have relied solely upon observations to estimate intake. Two methods are commonly employed. First, researchers have assessed the proportion of total feeding time that subjects devote to ingesting different types or species of foods (Chapman and Fedigan, 1990; Chivers, 1977; Garber, 1993; Hladik, 1977; Janson, 1985; Kinzey, 1977; Klein and Klein, 1977; Milton, 1980; Norconk, 1996; Richard, 1977; Robinson, 1986; Rodman, 1977; Strier, 1991; Terborgh, 1983). Second, studies have noted the proportion of feeding bouts in which subjects exploit different species or types of foods (Defler and Defler, 1996; Fossey and Harcourt, 1977; O'Brien and Kinnaird, 1997; Oates, 1977; de Ruiter, 1986; Sussman, 1977; Waser, 1977).

While these methods provide an initial assessment of diet, they may not accurately indicate the quantity of different foods ingested (Clutton-Brock, 1977; Durland and Gaulin, 1987; Hladik, 1977). Those foods that are consumed rapidly may be underestimated; those that require more time to gather and process may be overestimated. For example, five minutes of gathering and feeding on ripe fruits will likely result in greater food intake than will five minutes of foraging for insects. Even different animals feeding in the same tree may have different rates of harvest and therefore intake. Such disparities are rarely accounted for in simple measurements of time spent feeding. Only under the most auspicious viewing conditions can measures of gross food intake be made (Gaulin and Gaulin, 1982; Hladik, 1977; Miller, 1996; Stacey, 1986; Watts, 1988). Without them, however, inter- and intraspecies comparisons are likely to be flawed (Baron, 1992).

The work presented here provides a case study of three methods of dietary assessment. Based upon a two-year investigation of a population of wedge-capped capuchins (*Cebus olivaceus*), diet was estimated by three different methods. (1) Daily activity budgets were used to indicate the proportion of time devoted to foraging for plant ver-

sus animal matter. (2) Feeding records showed the frequency with which subjects fed on plant versus animal matter. (3) Estimates were made of the actual volume of plant versus animal food consumed. A comparison of results will demonstrate the disparate pictures of diet that these three measures provide.

Methods

The Subjects

Wedge-capped capuchin monkeys (*Cebus olivaceus*) are small-bodied platyrrhines native to Venezuela, the Guyanas, Surinam, and northern Brazil (Wolfheim, 1983). They are opportunistic foragers, relying heavily upon ripe fruit and invertebrate matter, but also occasionally exploiting young leaves, seeds, and vertebrate prey (Robinson and Janson, 1987; see also Miller, in press). Group size is variable, with assemblages as small as eight and as large as 50 (Robinson, 1988a, 1988b; Miller, 1991, 1992). The species is best known from studies by John Robinson and his colleagues at Hato Masaguaral (Fragaszy, 1990; O'Brien, 1991; Robinson, 1981, 1984, 1986, 1988a, 1988b; de Ruiter, 1986; Srikosamatara, 1987; Valderrama *et al.*, 1990). More recent research at Hato Piñero, which lies some 60 km northwest of Hato Masaguaral, has supplemented our understanding of this species' socioecology (Miller, 1996, 1998, in press, and in review, a and b). The subjects for this investigation were two groups of capuchins, one large (LG = approximately 36 animals) and one small (SG = approximately 16). Both were fully habituated to observer presence within three meters. (For greater detail on this species or these groups, see Miller, 1992, 1996.)

The Study Site

The research was carried out at Hato Piñero, a nature reserve in the *llanos* of Venezuela, owned and operated by the Fundación Branger. Because the capuchins have experienced no molestation (e.g., through hunting or habitat destruction) for nearly 50 years, they were easily habituated. The vegetation is a mosaic of open grassland and semideciduous dry tropical forest. The climate is seasonal, with approximately 200 mm per month of rainfall during the wet season (May through October) and 30 mm per month during the dry season (November through April). Many tree species drop their leaves in the dry season, and so viewing during these months is excellent. In the wet season, however, the foliage is dense, making accurate observation more difficult. The study site is a 270 ha plot in the middle of several thousand hectares of contiguous forest. There are approximately 45 km of trails forming a grid of 125 x 125 m sections. (For greater detail on the study site, see Miller, in press.)

Data Collection and Analysis

Preliminary observations were made from April 1989 to May 1990. During this time, focal groups were chosen, and subjects were habituated and identified. Intensive data collection took place from June 1990 to June 1991. The

study groups were followed on an opportunistic basis, with efforts made to gather data during all months of the year and all hours of the day. Data were collected in focal animal samples of 30 s duration. All samples in which viewing was obscured or interrupted were discarded. No subject was observed more than once per half-hour. Observations focused on adult females, but efforts were made to sample all age-sex classes. The emphasis on the activities of adult females might introduce a bias to accurate measures of mean food intake per individual. However, the same data set was used for all three methods of dietary assessment, and thus the analysis presented here should be largely unaffected by this inequity. This study is based upon 485 hours of observation, 265 with the large group and 220 with the small group. In this time, 3841 behavior samples were obtained.

Among the data collected with each focal animal sample, the following are pertinent to this analysis: (1) the time, (2) the subject's activity, operationally defined as *feeding* (gathering and ingesting plant matter), *foraging* (actively searching for and ingesting animal matter), *moving* (moving from one place to another without also foraging or engaging in some other activity), *moving and foraging* (moving along while also searching for prey), *resting* (e.g., sitting, lying down, sleeping), or *social behavior* (e.g., playing, fighting); (3) the type of any food item ingested (plant or animal, and species if known); and (4) the number of items ingested (e.g., of individual fruits, or bites of a very large fruit). (For greater detail on data collection and analysis, see Miller, 1996.) These data were used to assess diet in the following ways.

Daily activity budgets: The proportion of time subjects devoted to feeding on plant matter was indicated by the percentage of time spent *feeding*. Ingestion of animal matter occurred during both *foraging* and *moving and foraging* time, therefore these categories were combined. Daily activity budgets were assessed as mean values, averaging across groups, subjects, days and times, with analysis controlling for the influence of diurnal activity patterns. (For greater detail, see Miller, 1996.)

Frequency of use: Each focal animal sample included an assessment of the food type consumed, which allowed estimation of the frequency with which subjects exploited each different species (Miller, in press). For the purposes of this analysis, all data points (for all subjects over all days and times of observation) were grouped and simply stratified by plant versus animal matter.

Volume ingested: Data collection included precise evaluation of the quantity of food items each subject ingested during each sample (in numbers of fruits or numbers of bites). From there, simple estimates of volume ingested per sample were made. These data were then used to extrapolate the mean volume (averaged across subjects, days and times of observation) of plant and animal food eaten per day.

The volume of each plant food item was estimated from

its dimensions, minus any large seeds which were known to be discarded. Animal foods were more difficult to identify and quantify. Their volumes were estimated based upon the category into which they fell: Small prey items were those which were eaten in a single bite, such as termites licked off of a tree limb or small grubs picked out of a twig; medium items were those which were eaten in one to two bites, such as spiders or flying arthropods; large items, such as cicadas or grasshoppers, could usually be identified and their volumes were estimated accordingly. (For greater detail, see Miller, 1996 and in review, a.)

Results

Data analysis required considerable averaging (e.g., across subjects, group sizes, seasons) and therefore the following values must be considered as approximations. Nevertheless, it is clear that the three means of assessing dietary composition yielded three significantly different results.

Daily activity budgets: Based upon the proportion of time spent *feeding*, the subjects devoted approximately 17% of their daily activity budgets to collecting and ingesting plant matter. The time engaged in *foraging* was 19%, and *moving and foraging* was 22%, for a total of 41% of the day spent seeking, capturing and consuming prey items. Another way to look at these data is that, of total time spent feeding, 29% was devoted to plant matter and 71% to animal matter. For further reference, mean time spent *moving* was approximately 15% of the day; *resting*, 25%; and *social behavior*, 2%.

Frequency of use: Of the samples accumulated, 1312 recorded the subject feeding, 673 (51%) on plant food and 639 (49%) on animal matter.

Volume ingested: The subjects consumed, on average, approximately 2000 cc of food per day. Of this, roughly 1300 cc (65%) were plant matter and 700 cc (35%) were animal matter.

Discussion and Conclusions

This analysis clearly demonstrates that different methods of dietary evaluation can yield dramatically different results. The percentage of feeding time exploiting different food types suggests that these subjects consumed 29% plant matter and 71% animal matter. However, as a quantitative measure of food intake, this method is weak. *Feeding* represents only the time spent actually harvesting and ingesting plant food, but does not indicate the time spent moving from tree to tree. Conversely, *moving and foraging* includes not only harvesting and ingesting animal foods, but also travel time between "patches". Thus, this method tends to underestimate the intake of plant foods and overestimate animal foods. In order to make the measures more congruent, the time spent acquiring plant foods might also include time traveling between patches. In this case, *moving* might be added to *feeding*, for a total of 32% of the daily activity budget, or 44% of total feeding time (leaving 56% of feeding time to animal matter). However,

moving surely serves purposes other than food location, such as traveling to water sources or sleeping sites, and thus, this simply introduces further error.

Errors such as these can be ameliorated by taking data in very long focal animal samples (Altmann, 1974) or in delineating behavioral categories that allow fine discrimination between activities (Chivers *et al.*, 1984). However, the nature of capuchin foraging, in which various activities are carried out simultaneously, makes it difficult to discern accurately the proportion of the daily activity budget devoted to acquiring different foods. This is probably true for most primate species. Therefore, estimates of food intake via foraging time, while straightforward in principle, are complicated in practice, and are likely to lead to inaccurate measures of intake.

According to the proportion of feeding bouts focused on the major food types, these subjects consumed 51% plant matter and 49% animal matter. However, this method also provides dubious measures of dietary intake, particularly if the data are collected in long samples. Because of different rates of locating and processing food items, one observation of prey consumption represents lower food intake than does one observation of fruit consumption. A five-minute focal animal sample in which a single grasshopper was consumed would count as one use of animal matter; a five-minute sample in which 25 fruits were eaten would count as one use of plant material. The two samples would, however, clearly represent different amounts of food ingested. Thus, this method also tends to overestimate the importance of invertebrate matter and underestimate the proportion of plant matter in the diet. This bias can be ameliorated by collecting data in very short scans (Altmann, 1974).

A volumetric assessment surely provides a more accurate measure of dietary intake, and also serves to support the evaluations of the other two methods. By volume, these subjects consumed approximately 65% plant matter, which is higher than the 29% indicated by time and 51% by frequency of use. Animal matter represented 35% of intake, lower than the 71% by time and 49% by frequency of use.

Volumetric estimates, such as those made here, may also be subject to bias if viewing conditions vary for different activities, for example, if subjects feeding on fruit are easy to see but obscured from view while foraging for prey items (Harcourt and Stewart, 1984). Thus, viewing conditions may play a large role in determining the optimum length of focal animal samples and whether or not accurate estimates of intake can be made.

Volumetric assessments are especially valuable because they facilitate precise analyses of nutrient intake. Various studies have collected samples of foods exploited by their subjects and, by combining accurate data on feeding with chemical analyses of each food's nutritional composition, have been able to produce remarkably detailed profiles of dietary intake (see, for example, Altmann *et al.*, 1987;

Barton *et al.*, 1993; Rogers *et al.*, 1990). This type of analysis is necessary for determining, for example, the role of plant phytochemistry in food choices of different species or individuals (Davies *et al.*, 1988; Mowry *et al.*, 1996). Accurate measures of diet are essential for testing the hypothetical relationships between food intake and social variables such as group size, age and sex class, and social ranking.

In conclusion, quantitative measures of food intake, such as volume or fresh weight, are extremely important. However, a complete assessment of feeding activity is perhaps best obtained by employing several different methods of data collection and analysis simultaneously. Each method offers insight into a different aspect of the subjects' feeding activities. For example, a comparative approach may reveal the relative importance of different food types to the subjects' well-being. As a case in point, the volumetric data alone from this study might indicate that protein (in the form of animal matter) is of lesser importance than is carbohydrate (in the form of plant matter), given that the food volumes were 35% and 65% respectively. However, the majority of feeding time is devoted to foraging for prey. This suggests that protein is an essential component of the diet, so important, in fact, that it receives significant time and energy expenditure. This relationship comes to light only through a comparison of different measures of feeding and diet.

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CAMBIOS EN LA ACTIVIDAD DE JUEGO EN INFANTES Y JÓVENES DE MONO AULLADOR (*ALOUATTA SENICULUS*)

Abstract: Play behavior is an important factor for the normal development of young animals in different species. Some authors argue that the frequency and duration of play depend only on chance. I observed the play behavior of the young members of a howler monkey troop for four months in the Tinigua National Park (Colombia). The results suggest that among the individuals of the same troop there is a pattern in which solitary play always appears before social play. There were no significant differences in the duration of play among individuals of the same age.

Introducción

Juego es cualquier actividad improvisada y compuesta por variaciones de acciones motoras y de comunicación, las cuales se presentan en contextos diferentes a donde estas acciones específicas aumentarían el éxito reproductivo del individuo (Fagen, 1993). El juego así definido, es considerado como una actividad de especial importancia para el desarrollo de las relaciones sociales y de las capacidades motrices y de comunicación de ciertas especies.

En primates y carnívoros el juego es parte importante del proceso de aprendizaje y socialización durante el periodo sensible, que tiene lugar en las edades tempranas de cada individuo (Sackett y Ruppenthal, 1973; Mendl, 1988). Pese a su importancia, parece no existir un patrón rígido en la duración y frecuencia de la actividad de juego dentro de cada una de las especies que lo practican. Según Lee (1983) tanto el tiempo como la frecuencia del juego dependen únicamente de las oportunidades que se le presenten a cada individuo para practicarlos antes de llegar a la edad adulta.

Este trabajo sugiere la existencia de un patrón general en la duración media de las sesiones de juego social y solitario de los infantes (*Alouatta seniculus*) de una misma tropa y en la aparición secuencial de dos condiciones generales

de juego, solitario y social.

Métodos

Entre los meses de junio de 1990 y enero de 1991 observé la tropa MN-3, compuesta por 14 individuos de *Alouatta seniculus*, en un bosque húmedo tropical dentro del Centro de Investigaciones Ecológicas la Macarena (CIEM), Parque Nacional Natural Tinigua-Colombia (2°N 75°O). Gracias a que esta tropa ha sido estudiada desde 1989, pude conocer la edad exacta (en meses) de cada uno de los infantes y juveniles (C.A. Mejía, com. per.). Basándome en esta información agrupé a los individuos por edades, siguiendo un criterio parecido al utilizado por Carpenter (1965) para clasificar los individuos de *Alouatta palliata* que observó en Barro Colorado (Panamá). Tomé como infantes a individuos entre 0 y 12 meses y como juveniles a individuos entre los 13 y 24 meses. La tropa estaba formada por 8 adultos (4 machos, 4 hembras), 2 jóvenes (1 hembra, 1 macho) y 4 infantes (2 hembras, 2 machos).

Durante los meses de octubre de 1990 a enero de 1991, llevé a cabo 228 horas de observaciones focales continuas de una hora, completando 153 horas observando infantes y 75 horas observando jóvenes. Realicé las observaciones desde las 06:00 hasta las 18:00 horas; sin embargo, este periodo no fue continuo, ya que descansaba una hora entre una y otra sesión.

Las categorías de comportamiento que registré fueron: descanso, alimentación, movimiento, juego solitario (balanceo, paseo de exploración) y juego social (persecución y lucha). Para analizar los datos obtuve la duración media por focal por mes de cada una de estas categorías. Luego comparé estas medias por medio de pruebas de Kruskal Wallis (KW) para determinar si existían diferencias significativas en la duración de las diferentes categorías de juego entre los meses de observación.

Resultados y Discusión

Aunque los individuos observados emplearon diferentes proporciones de tiempo en cada una de sus actividades diarias (Tabla 1), el tiempo empleado en cada una de las actividades registradas no cambió significativamente durante los meses de observación, para cuatro de los cinco individuos observados. Sin embargo, para el infante Melian, quien nació en el segundo mes de observación, y era el menor del grupo, cambió significativamente la duración del descanso, el juego solitario y el juego social (KW para descanso = 24.03, $gl = 2$, $p < 0.0001$; KW para juego solitario = 15.71, $gl = 2$, $p < 0.0001$; KW para juego

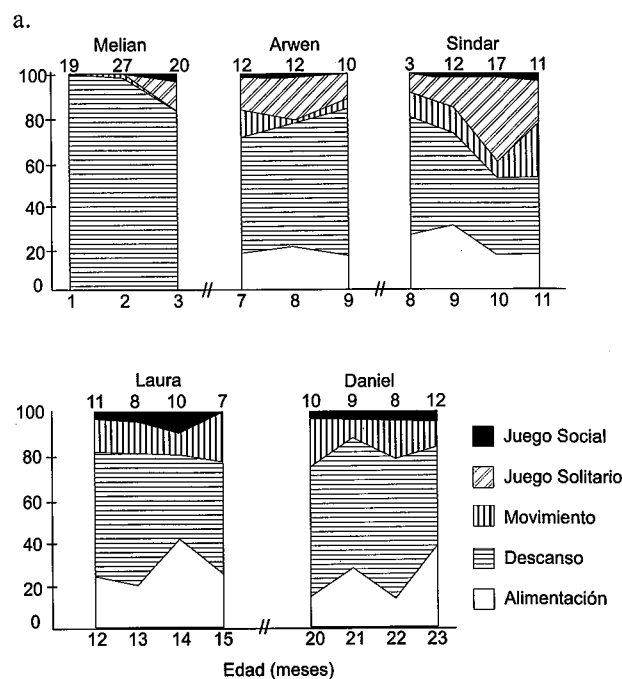


Figura 1. Porcentaje promedio de tiempo empleado en cada actividad, en función de la edad. El número de focales que corresponde al promedio de cada mes está indicado sobre la gráfica. a) Infantes; b) Jóvenes.

social = 7.5, $gl = 2$, $p < 0.05$). Este cambio se manifestó como una disminución en el tiempo dedicado al descanso, que en un principio fue del 100% pero que al segundo mes dió lugar al juego solitario a manera de balanceo y paseos de exploración y a una baja proporción de juego social (Fig. 1a).

Aunque dentro de la tropa existían cuatro infantes, sólo tomé datos de tres de ellos. Al infante Liliput no lo tuve en cuenta debido a que a la edad de 7 meses, después de haberse lesionado un brazo en una caída de un árbol durante una sesión de juego social, disminuyó de manera repentina su desarrollo y el repertorio de actividades diarias. Tres meses después no le volví a ver con la tropa ni fuera de ella. En los demás individuos, dentro de la actividad de juego, la categoría que predominó durante la infancia fue el juego solitario, que paulatinamente va disminuyendo en duración al mismo tiempo que aparece el juego social.

El tiempo empleado en juego social fue aumentando con la edad, aunque nunca superó el tiempo empleado en juego solitario (máximo juego solitario 15.7%; máximo juego social 3.9%), un patrón similar fue observado por Baldwin y Baldwin (1978), en un estudio sobre *A. palliata*. De hecho, durante los cuatro meses de este estudio, el juego

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Individuo	Alimentación	Descanso	Movimiento	Juego solitario	Juego social	Otros	No. horas focales
Melian (inf.)	0	91.0	0.7	3.9	0.05	3.9	65
Arwen (inf.)	16.7	58.8	6.1	15.7	1.5	1.2	34
Sindar (inf.)	22.0	42.9	15.0	18.0	2.1	0	43
Laura (juv.)	28.4	52.1	15.3	0	3.9	0.3	35
Daniel (juv.)	24.4	57.0	15.6	0	2.8	0.2	39



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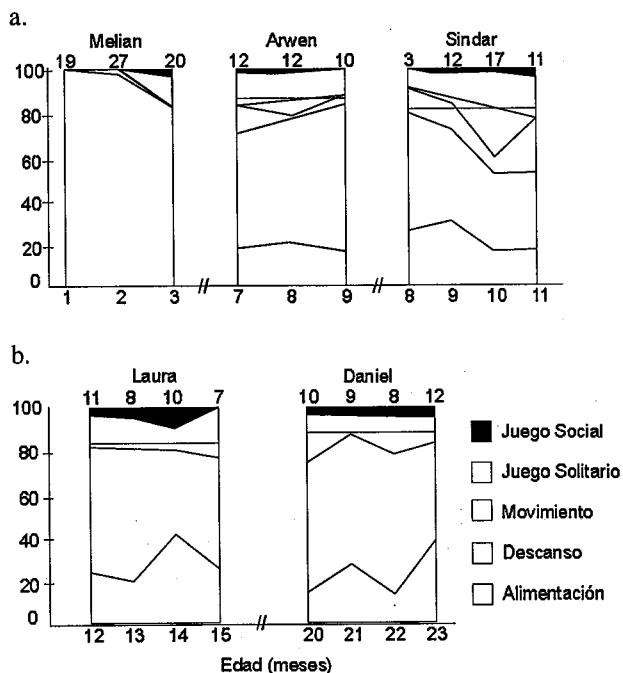


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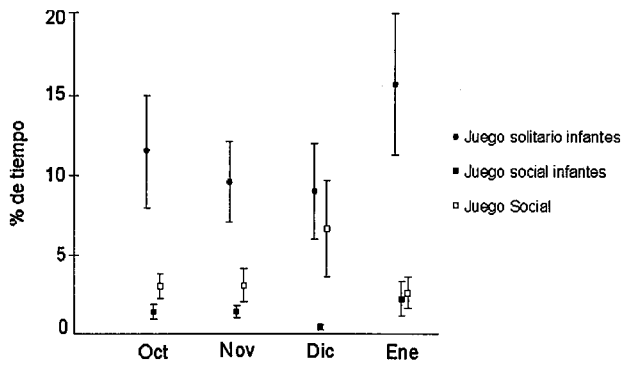


Figura 2. Media y barra de errores estándar de la duración del juego solitario y social de tres infantiles y dos juveniles, para cada mes de observación. Cada punto representa la media de tres o dos valores respectivamente. El juego solitario para jóvenes no se muestra en la gráfica, pues no fue identificable (ver texto).

solitario siempre presentó cerca del triple del tiempo utilizado en juego social por los infantiles (Fig. 2), tal vez debido a que el juego social depende de la casualidad de que un individuo encuentre un compañero de juego cercano al lugar donde se encuentra, lo cual en infantiles depende de la localización de su madre, de quien pocas veces se alejan más de diez metros.

Para los jóvenes no identifiqué la ocurrencia de juego solitario, ya que su balanceo siempre tuvo como objetivo alcanzar algún objeto o comida, de manera que no se ajustaba a la definición de juego según Fagen (1993). Los paseos que observé en jóvenes, tampoco los consideré como juego ya que siempre tenían el objetivo de buscar alimento o un lugar donde descansar. Su actividad de juego se centra entonces por definición, en interacciones sociales que casi siempre fueron iniciadas por infantiles durante sus paseos.

A lo largo del rango de edades que ofrecen los individuos, desde recién nacido (Melian) hasta juvenil de 23 meses (Daniel), se puede observar la siguiente tendencia. Hay una disminución en el tiempo de descanso y un aumento en el tiempo de alimentación y juego (solitario y social) durante los primeros diez meses de vida (Fig. 1a). Más adelante, hacia los 12 meses comienza a disminuir el tiempo de juego y aumenta el de descanso y alimentación (Fig. 1b). Sin embargo, no hubo diferencias notorias en la proporción de tiempo dedicada a las diferentes actividades entre un juvenil de 12 y otro de 20 meses de edad.

La proporción de juego y descanso en cada una de las edades puede guardar cierta relación con la cercanía de la cría con su madre y el tipo de alimentación (leche materna vs. hojas). En los primeros meses de vida, los infantiles sólo se alimentan de leche, la cual les provee gran cantidad de energía fácil de metabolizar y utilizar en actividades con alta demanda energética como el juego. A medida que las crías crecen y se independizan de su madre, su dieta cambia gradualmente a hojas que son un material difícil de digerir y con menos energía disponible (Milton, 1980). Esta condición se ve reflejada en el aumento del descanso y la disminución en el juego solitario después del mes 12 (Fig. 1b). También es posible que las actividades

cotidianas asociadas con la alimentación y descanso independiente de los juveniles reemplacen el ejercicio motriz que representa el juego solitario de los infantiles y a causa de esto, se vea una disminución en el juego solitario.

No existen diferencias significativas entre los tiempos empleados por los infantiles en el juego social ($KW = 3.71$, $gl = 3$, $p > 0.2$) ya que la ocurrencia de esta clase de juego en un infante no es independiente de la ocurrencia de esta misma actividad en los demás infantiles de la tropa. Esta dependencia se debe a que todos los infantiles de una misma tropa son compañeros de juego y se buscan mutuamente para tener sesiones de juego social. Para el juego individual, tampoco encontré diferencias significativas entre los individuos de la misma tropa ($KW = 7.19$, $gl = 3$, $p > 0.05$), debido a que todos los infantiles de una misma tropa tienen las mismas oportunidades de llevar a cabo juegos solitarios (las actividades del grupo están sincronizadas y por lo general todos se encuentran en el mismo árbol a la misma hora). A pesar de estas diferencias, existe un patrón secuencial en el cual primero aparece el juego solitario, que disminuye al mismo tiempo que aumenta el tiempo empleado en otras actividades como juego social y alimentación.

Es posible que el juego represente una ventaja evolutiva para aquellos individuos que lo practiquen más frecuentemente (Bekoff, 1981). En los aulladores infantiles existe la tendencia a emplear el tiempo en las actividades de juego solitario y social sin diferencias significativas durante cada una de las edades por mí definidas; asimismo se tiende a seguir un patrón en el que primero aparece el juego solitario. Lo que ocurrió con el infante Liliput, hace pensar que el tiempo empleado en esta clase de juegos solitarios es un buen indicador de estado de desarrollo de las habilidades motoras y de comunicación en el individuo, las cuales son importantes para que éste logre alcanzar la edad adulta.

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AGGRESSIVE RESPONSE TOWARD INTRUDERS BY CAPTIVE MALE *LEONTOPITHECUS CHRYSOMELAS*

Introduction

Among callitrichid primates, aggression between residents and intruders of the same sex has been documented in several studies in captive settings. Usually, the pattern of responses is interpreted in terms of the maintenance of the pair bond and monogamy, territorial defense, and the exclusion of competitors (Anzenberger, 1985; Araújo and Yamamoto, 1994; Epple, 1978; French and Inglett, 1989; French and Snowdon, 1981). In these earlier studies, there was considerable variation in the responses against intruders of the same sex. For example, in *Callithrix jacchus* both males and females attacked an intruder; in *Saguinus oedipus* the male exhibited attack behavior while the female increased rates of marking behavior; and in *Leontopithecus rosalia* the females demonstrated high levels of agonistic behavior and the males exhibited lower levels of aggression in the presence of intruders. These response differences among species may be attributable to differences in the mechanisms of reproductive suppression among subordinates, and, possibly, to differences in the systems of pair-bond maintenance (Araújo and Yamamoto, 1994; French and Inglett, 1991; Snowdon, 1990). Other factors may also regulate the responses to intruders, including kin discrimination (Harrison and Tardif, 1988), familiarity with intruders (Koenig and Rothe, 1994; French *et al.*, 1995), and the size of the group (French and Inglett, 1989; Schaffner and French, 1997). Overall, the factors that are associated with variation in responses to intruders have not been extensively studied.

The work presented in this report describes: (1) cases of strong aggression toward males in golden-headed lion tamarins (*Leontopithecus chrysomelas*), which differ from observations in *L. rosalia*; and (2) differences in the responses of the resident breeding male, and an apparent relationship with the size of the group.

Methods

The data reported in this paper come from observations of the reactions of members of a captive family group to encounters with unfamiliar, reproductively-aged males that had escaped from neighboring groups in *L. chrysomelas*

(Table 1). Two encounters were noted on separate occasions. We used an observation protocol based on *ad libitum* sampling, which continued until the escaped animals were captured. The animals that participated in these events were housed at the Laboratorio Tropical de Primatologia (LTP) of the Universidade Federal da Paraíba. The family group was maintained in a large wire enclosure (2.7 x 2,7 x 5,45 m), with natural branches, platforms, and nest boxes. Visual contact with other social groups in neighboring enclosures was minimal since there was dense foliage blocking visual access. The LTP is situated in the interior of an "island remnant" of the Atlantic coastal forest and the enclosures were subject to normal environmental and climatic conditions.

Table 1. Composition of the family group during the two aggressive incidents. A = Adult, Sa = Subadult, J = Juvenile.

Date	Animals	Sex	Age
19 Oct 1995	Clotilde (Clo)	F	A
	Gorbi (Go)	M	A
	David (Da)	M	A
	Thais (Th)	F	Sa
	Marina (Ma)	F	J
	Mariana (Mr)	F	J
12 Oct 1996	Clotilde	F	A
	Gorbi	M	A
	David	M	A
	Thais	F	A

Results and Discussion

At 09:10 h on 19 October 1995, the adult male *Mi* escaped from his enclosure and approached that containing the focal family group. He hung on to the wire of the enclosure and displayed agonistically toward the animals in the group. The adult-aged son *Da* then attacked *Mi*, and attempted to bite and grab the intruder male through the wire of the enclosure. *Da* continued to attack the intruder even after the daily food rations had been provided. At 09:40 h, the reproductive adult male resident *Go* initiated his participation in the attacks on the intruder, while *Da* continued to attack, displaying vocalizations and arch-displays (see Rathbun, 1979). The breeding *Go* and *Da* attacked the intruder simultaneously, jumping at the wire mesh and attempting to grab him. However, aggression by the son *Da* was more frequent and more intense than that of the adult male. The other animals in the group did not display aggressive interactions towards the intruder. In an attempt to capture the escaped male, we placed his female mate in a small cage near the enclosure of the focal family group. The resident reproductive female *Clo* vocalized and displayed agonistically toward the unfamiliar female, with the apparent intention of attacking her. At 09:55 h, the observations were terminated.

In the second instance of aggression we observed, another adult male (*Aureo*) escaped from a different enclosure at approximately 09:30 h. For 5-10 minutes he remained close to his home cage, and then approached the enclosure containing the focal family group and began to interact aggressively with the resident animals. The reproductive male *Go* and his son *Da* became actively involved in

attacks directed toward the intruder, similar to the behavior we described above. However, in this case the father and son initiated their attacks together. The intruder male ran back and forth on top of the enclosure, attempting to bite both resident males. In this interaction, the females also participated in the aggressive attacks on three occasions, although it was not possible to determine whether the mother, daughter, or both were involved in the attacks. The intruder attempted to chase and fight with both males (*Go* and *Da*) for a total of 10 minutes. In this second agonistic event the adult male *Go* was more active than his son *Da*, and he received serious injuries to his hands during the fight. At 10:00 h the observations were terminated.

In these two opportunities to study a confrontation between intruding males and the residents of a single social group, the resident males responded aggressively, but the responses of the males differed. In the first case, the subordinate male initiated the attack and exhibited higher rates of aggressiveness. In the second case it was the dominant breeding male that exhibited higher aggression, when both males attacked simultaneously. In the two situations, the responses of the individuals may have been influenced by the size of the group, with 6 and 4 animals in the first and second case, respectively. This point will be explored later.

In our observations, the patterns of aggressiveness of the adult male differ from the results reported by French and Inglett (1989) for *L. rosalia*, in which resident males remained tolerant in the presence of intruding males. In our experience with other escapes in our colony, we have also noted male-male aggression. It is possible that in *L. chrysomelas*, male-male competition for reproductive dominance is more intense than it is in *L. rosalia*, a species which is known to reside in stable polyandrous groups in the wild (Baker *et al.*, 1993). Recently, Baker and Dietz (1996) described cases of aggression by resident males against intruders in wild groups of *L. rosalia*, but in some cases the intruder male was tolerated by the resident male. Familiarity of males with the intruder reduces aggressiveness toward the intruder (Koenig and Rothe, 1994; French *et al.*, 1995), a possibility that Baker and Dietz (1996) considered as a reasonable explanation for the low levels of aggression toward intruding males in *L. rosalia* reported by French and Inglett (1989).

It is interesting that the response of the adult breeding male was different in the two occasions that he was confronted with an unfamiliar male. When the size of the group was large, the participation of the adult male was low and the majority of the aggression was carried out by the older son. With a smaller group size, the male was the primary participant in aggressive interactions: Koenig and Rothe (1991, p.192) reported similar observations in *C. jacchus*, and proposed that there is a division of labor among the members of the group with increasing family size. Non-reproductive males in large groups, then, may selectively engage in aggressive interactions that could maintain or increase territory size. However, alternative

interpretations could explain the differences in aggression in the two resident males during the two events reported here.

The reproductive state of the female is an important factor that might regulate the responses of males to intruders, but none of the published studies on captive animals have analyzed the influence of this variable. The reproductive state of the female apparently elevates the level of intrasexual competition in males. In wild groups that are demographically polyandrous (contain at least 2 adult males) in *Cebuella pygmaea* (v. Soini, 1987) *L. rosalia* (v. Baker *et al.*, 1993) and *Saguinus mystax* (v. Heymann, 1996), levels of aggression among males within the group are higher throughout the period of female receptivity. It is possible in the second case we report here that the female was in estrus, which may explain the fact that the reproductive male exhibited higher aggression toward the intruder. This aggression would minimize the opportunity for a sexual encounter between the resident female and the intruding male.

Another aspect worthy of discussion is the behavior of the intruder relative to the residents. In the second case, for example, the intruder appeared to behave more aggressively. This might be the reason that the resident adult male showed higher aggression in this case. It is important to keep in mind that the majority of other studies with the intruder paradigm (e.g., Araújo and Yamamoto, 1994; Epple, 1978) were conducted under different conditions than those reported here. For example, the intruder is typically kept in a small cage, which is not his normal "territory". If, under these conditions, the intruder exhibited exclusively submissive behavior, this would reduce the aggressive behavior of the adult male resident. It is interesting to note, in this light, that in wild groups of *L. rosalia* intruder males can be accepted permanently into groups as subordinates (Baker *et al.*, 1993), which would produce benefits for both residents and intruders.

Dominant females in *L. chrysomelas* only show heightened aggression against other females, as revealed by observations during other escapes at our facility, and judging by the reactions of *Clo* toward male intruders. One interesting observation is the low level of participation of the daughter *Th* in the defense of the group. If a strange male is successful in establishing his territory, then it is possible that the daughter will usurp the reproductive position. Thus, the low levels of aggression toward intruding males by subordinate daughters may be advantageous for them. On the other hand, the intense participation of the son in the defense of the group is more difficult to explain. In accordance with Baker and Dietz (1996) males that disperse together have a higher probability of successfully entering a new territory (but see McGrew and McLuckie, 1986). Thus, why should sons defend family territories? It is possible that in helping their fathers defend the territory, sons are gaining indirect fitness benefits. The size of our sample is small, and does not permit broad generalizations, but it is worthwhile to pose three

questions: 1) What is the nature of the daughter's reaction if the intruder is a female? Since it is possible that the daughter might inherit the reproductive position (Baker and Dietz, 1996) then daughters should show high levels of aggression toward potential female competitors: 2) What is the nature of the son's reaction if the intruder is a female? 3) Does the son also react aggressively in this context?

The majority of research on aggression has dealt principally with aspects of the relationships that deal with mating systems and pair-bond formation (e.g., Anzenberger, 1985; Araújo and Yamamoto, 1994; Epple, 1978; French and Snowdon, 1981). However, the behavioral responses described here indicate the need for further research in this area, especially as regards the influence of group size and composition, reproductive state of the female, and the participation of the sons and daughters in agonistic encounters with intruders.

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A STUDY OF THE BLACK UAKARI, *CACAJAO MELANOCEPHALUS MELANOCEPHALUS*, IN THE PICO DA NEBLINA NATIONAL PARK, BRAZIL

Following preliminary surveys in 1991 (Boubli, 1994), from June 1994 to October 1995, I conducted the first long-term field study of the ecology of the black uakari monkey, *Cacajao melanocephalus melanocephalus*, in the Pico da Neblina National Park (PNNP), Brazil (01°10'N to 00°26'S, 65°03'W to 66°52'W) (Boubli, 1997). Pico da Neblina is the second largest National Park in Brazil, with an area of 2,200,000 ha, and is located on the left bank of the Rio Negro, in the extreme north-western part

of Brazilian Amazonia, on the border of Brazil and Venezuela. Annual rainfall is around 3,000 mm (RADAM, 1978), evenly distributed throughout the year, and there is practically no temperature fluctuation from month to month. Altitudes ranges from 100 to 3,014 m above sea level. The biological diversity protected in Pico da Neblina is believed to be the highest of any of Brazil's National Parks (Gentry, 1986; see also, for example, Brewer-Carias, 1988).

Most of the area of the Park overlaps with the Yanomami Indigenous Reservation which is managed by the Brazilian National Indian Foundation (FUNAI). Inside the reservation, the Yanomami carry out their subsistence activities which include hunting, fishing and clear-cutting of forest for cultivation. More recently, the Yanomamis have begun gold-mining.

For the study of the black uakaris, I established a permanent site on the right bank of the Rio Cauaburi, the main river in the Park, where I opened up a trail system through an area of 483 ha and carried out a detailed botanical inventory. Four forest types were represented in the study site: *chavascal* (swamp forest), terra firma (upland forest), *yuacanã* and *cunuri caatinga* (two forest types on white sand soils). There was no seasonally flooded forest (*igapó*) at the site. Two tree species dominated the forest: *Eperua leucantha* (Caesalpinoideae) and *Hevea* cf. *brasiliensis* (Euphorbiaceae).

The black uakaris traveled fast and ranged over a very large area, often going beyond the limits of the trail system. For this reason, it was difficult to locate them and, when found, to follow them for more than a few hours. The study group consisted of an estimated 70 individuals which traveled together but were generally widely dispersed. They lived in multi-male/multi-female social groups with approximately the same numbers of males and females. Fission-fusion, as observed in the white uakari *C. calvus* (Ayres, 1986), was never seen in the study group. Individual monkeys carried out their daily activities quite independently from one another, but would keep track of the whereabouts of other group members by constant contact calls. In fact, one of the most remarkable features of black uakaris in the wild is their non-stop contact calling in the form of "keeks" and "chirps". Another peculiar feature of black uakaris is that they wag their tails constantly while moving and feeding. This also occurs in *Chiropotes* but the meaning of this behavior is unclear.

During the entire study period, black uakaris were seen to use 120 different tree species for food, the most important being *Micrandra spruceana* (Euphorbiaceae), *Eperua leucantha* (Caesalpinoideae), *Eperua purpurea* (Caesalpinoideae) and *Hevea* cf. *brasiliensis* (Euphorbiaceae). Young seeds were the single most important food eaten by the monkeys (Boubli, 1997). The study group used all four forest types (*yuacanã* and *cunuri caatingas*, *chavascal* and terra firma).

Black uakaris are found throughout the Park, including

the mountains at altitudes of up to 1,500 m (altitude measured with a GPS handheld device). Apart from *C. melanocephalus*, the following primate species are also present: *Ateles belzebuth*, *Aotus* sp., *Alouatta seniculus*, *Callicebus torquatus*, *Cebus albifrons* and *Chiropotes* sp. These species are not under any threat from hunting or habitat destruction in this part of Amazonia, except in the vicinity of the Yanomami village of Maturaca, where all primates have been hunted to near extinction.

With the advent of gold mining by non-indigenous people (*garimpeiros*), serious habitat disturbance is underway on the highlands of the Park (altitudes above 2,000m). Though such activities do not affect the black uakaris directly, the gold miners have recently begun hiring Yanomamis to hunt game animals, including all monkey species, as well as pacas, peccaries, tapir, deer, anteaters, and armadillos. If not halted in the near future, this may represent a serious threat to not only uakaris but all of the game species.

The Pico da Neblina National Park was created in 1979 by the Brazilian Institute for the Environment (formerly IBDF, now Ibama) in order to preserve Brazil's highest mountain (Pico da Neblina, 3,014 m) and its endemic vegetation. Eighteen years after its creation, it remains largely unprotected. The Park still lacks a management plan. Placer gold-mining is rudimentary and destructive. The gold-miners wash off the top soil from the high altitude plateaus, destroying the streams and small rivers, and

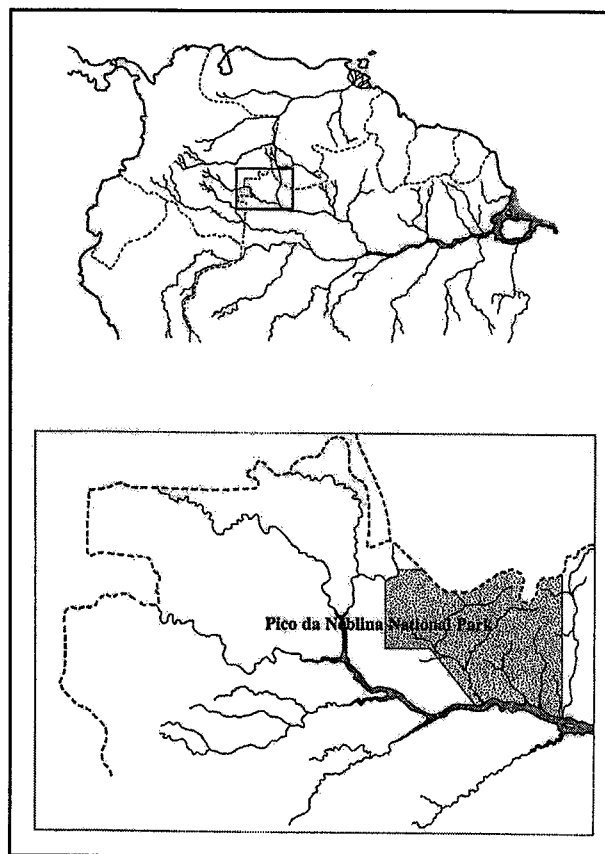


Figure 1. Location of the Pico da Neblina National Park, State of Amazonas, Brazil.

sometimes set fire to the vegetation to facilitate prospecting.

The high altitude ecosystem of Pico da Neblina is very fragile and cannot recover after the thin layer of soil has been removed (such topsoil was formed over a very long period of time and is solely the result of the decomposition of dead vegetation that accumulates year after year). Many plants and animals present on the tops of these plateaus are endemic and still unknown to science (Gentry 1986); their disappearance will represent a great loss to biodiversity.

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News

MONKEY FOSSILS UNEARTHED IN JAMAICA

A team of scientists from the American Museum of Natural History, New York, and Claremont McKenna College, California, announced the discovery of the only monkey known to have gone extinct in the past 500 years. The fossils, known as *Xenothrix mcgregori*, were recovered during a paleontological expedition to Jamaica led by Donald A. McFarlane, Associate Professor of Biology at Claremont, and Ross D. E. MacPhee, Chairman and Curator of the Department of Mammalogy at the Museum.

The discovery is important for several reasons. It was only recently suspected that Jamaica once supported a native

population of primates. (Monkey species living in the West Indies today are descendants of African or South American monkeys introduced in the 18th century or later). A small group of primate fossils had been discovered in Jamaica in the 1920s, but was not identified as belonging to a new, native species until the 1950s. The researchers discovered a partial skull with several teeth preserved, a piece of an upper jaw and one of the bones of an arm in a cave shaft named Mantrap Hole.

Xenothrix, related to *Cebus*, was an unusual primate. Its limb bones suggest that it was a slow-moving animal with very mobile joints. A startling aspect of the discovery was the age of the fossils. Other fragments of the monkey were found sandwiched between strata bearing jaw bones of the European black rat, first brought to the New World aboard Columbus's ships. *Xenothrix* evidently became extinct after European contact.

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VOCALIZATIONS IN ATLANTIC FOREST MARMOSETS, *CALLITHRIX*

In October 1997, Sérgio Lucena Mendes successfully defended his doctoral thesis "Biogeographic and vocal patterns of eastern Brazilian marmosets, *Callithrix jacchus* group (Primates: Callitrichidae)", at the Campinas State University (UNICAMP), Campinas, São Paulo, Brazil. The thesis was supervised by Dr. Jacques Viellard and Anthony B. Rylands, and financed and supported by the Museu de Biologia Mello Leitão, Santa Teresa, Espírito Santo, the Fundação MB/FUNCAMP, Campinas, and the Brazilian Higher Education Authority (CAPES), Brasília. The following is an abstract of the thesis.

The study presents a revision of the taxonomic data for marmosets of the *Callithrix jacchus* group based on publications over the last 20 years, and discusses the validity and phylogeny of the following taxa: *aurita*, *flaviceps*, *geoffroyi*, *jacchus*, *kuhli*, and *penicillata*. A revised list of localities where these taxa occur is provided on the basis of information derived from the literature along with new field data. The distribution of each taxon, its affinity to different vegetation formations, and the distribution patterns were examined by plotting all localities on a map of Brazilian vegetation types. The available data indicate that the six *Callithrix* taxa studied are valid because they are discrete entities with identifiable morphologies and distinct geographic distributions. The variability within each taxon appears to be related to population polymorphism. On the basis of morphological, genetic, biogeographic, and vocal characters, the *jacchus* group can be separated into two monophyletic subgroups, *aurita* (*aurita* and *flaviceps*) and *jacchus* (*geoffroyi*, *jacchus*, *kuhli*, and *penicillata*). The taxa of the *jacchus* group are typically parapatric, generally replacing each other geographically in zones of ecological transition, where hybridization occurs. The hybridization zones appear to be narrow, sug-

gesting the action of mechanisms that limit the flux of genes between populations. The distributions of *aurita*, *flaviceps*, *geoffroyi*, and *kuhli* are restricted, basically, to the Atlantic Forest region of eastern Brazil. The taxon that predominates in the Cerrado region is *penicillata*, and in the Caatinga region is *jacchus*. The latter also lives in the Northeastern Brazilian Atlantic Forest, and *penicillata* appears to be the only taxon of the *jacchus* group that does not occur naturally in the coastal Atlantic Forest.

The long calls of the six taxa in the *jacchus* group were recorded in the field, and their vocal structures were compared. The acoustic parameters were analyzed with a digital sonograph, and treated statistically using analysis of variance (ANOVA). The acoustic analysis demonstrated that it is possible to differentiate each taxon on the basis of its long call structure, using principally the first note of the call. The vocal structure corroborates the division of the *jacchus* group into two subgroups (*aurita* and *jacchus*). There are temporal and frequency parameters within each subgroup that can differentiate all taxa. The acoustic differences between the taxa of the subgroup *jacchus* are not clearly related to the supposed phylogenetic distances based on morphological data. It is possible that the vocal differences are related to the biogeographic history of the taxa in contact zones. Vocal divergence may be a result of selection pressures on the segregation of populations operating as a mechanism of reproductive isolation. The vocal structure of hybrids and of a specimen housed without acoustic contact with its own taxon suggest a strong genetic role in the structure of vocal communication in *Callithrix*. This study suggests that vocal signals are characters that can supplement the traditional techniques used in deciphering the taxonomy of Callitrichidae, but must be used with care in phylogenetic applications.

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BEHAVIORAL ECOLOGY OF *ALOUATTA FUSCA CLAMITANS* IN A DEGRADED ATLANTIC FOREST FRAGMENT IN RIO DE JANEIRO

In August 1996, the Master's thesis entitled "Feeding Behavior, Activity Patterns and Use of Space by *Alouatta fusca clamitans* (Primates, Platyrrhini) in a Degraded Fragment of Atlantic forest in the State of Rio de Janeiro", was defended by Vania Luciane A. Garcia Limeira at the National Museum/Federal University of Rio de Janeiro. The research was supervised by Dr. Luiz Flamarion B. de

Oliveira of the Department of Vertebrates, Mammal Section, of the National Museum/UFRJ, and sponsored by the Companhia de Lanifício Alto Boa Vista. A summary of the thesis follows.

From March 1993 to August 1994, the behavioral ecology of a group of *Alouatta fusca* (one adult male, one sub-adult male and two adult females) was studied in order to evaluate feeding behavior, activity patterns and ranging behavior in relation to the diversity, availability and distribution of food resources in a fragment of semideciduous forest (Mata Boa Vista) of 80 ha, located in the municipality of Comendador Levy Gasparian, Rio de Janeiro (22° 02'30" S, 43°11'30" W).

The study group was followed from dawn to dusk, five days a month, during 12 uninterrupted months. Behavioral data was collected by scan sampling every seven minutes, with each scan lasting three minutes, recording the identity, activity, location and height of each visible individual of the group. A total of 59 days (700 hours) was spent in direct observation of the animals, and 4,198 scans containing 13,175 registers were obtained. The daily routes of the groups were measured at the end of the day's observation. Data on the structure of vegetation and other ecological variables were obtained between April and August 1994. A phenological study of 320 trees was carried out concurrent with the behavioral observations.

The annual diet of the group was composed of leaves (72%), fruits (12%), and flowers (10%). Significant differences between the percentages of time spent in the consumption of each item and the season were observed only in the consumption of leaves and flowers. Leaves comprised a larger portion of the feeding records in autumn and winter than in spring and summer, while the consumption of flowers was higher in spring and summer. The monthly availability of new leaves was positively correlated with the contribution of new leaves in the diet of the group. Two tree species, *Apuleia leiocarpa* and *Brosimum guianense*, were the most important in the diet. Both represented 55% of the time spent in feeding and were followed by *Platypodium elegans* with 11%. The remainder (34%) was distributed among another 34 species. The importance of *A. leiocarpa* and *B. guianense* could have been a consequence of the loss of plant diversity caused by fragmentation and degradation of the area, the high density of these species in the study area, and probably due to the chemical/fiber content of their leaves, since other plants, although abundant in the home range of the group were seldom used.

The study group spent 73% of their day resting, 13% feeding, 11% moving, 0.5% in social activities, 0.1% drinking, 0.1% vocalizing, and 0.8% engaged in others activities. Although the results give a very similar picture to those of other studies of the species (Mendes, 1989 and Chiarello, 1992), a different behavioral strategy was evident when considering seasonal variation in the time spent in resting, feeding and locomotion. During summer the

group rested less, spent more time feeding and traveled less, while in winter the group ate less and rested and moved more.

The size of the home range of the group was 11.6 ha, the largest observed for the species. During winter and spring, the number of 25 m x 25 m quadrats used was significantly higher than during summer and spring. On average, the distance traveled by the group per day was 608 m, range 235 to 1.527 m. Monthly and seasonal variation in ranging were correlated with the consumption of mature leaves, new leaves and the phenological characteristics of the trees.

This study demonstrated that the availability, distribution and density of some food resources were the main factors influencing the behavior patterns observed. It was suspected that a reduction in the diversity of food species available resulting from the fragmentation of their Atlantic forest habitat, was being successfully compensated by a restricted diet, by changing their activity patterns and adjusting the size of their home range according to the density, distribution, availability and compound chemistry of the food plants.

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A NEW RESERVE IN THE BRAZILIAN AMAZON

A new State reserve in the Brazilian Amazon was announced on the 27th October 1997. The Amanã Sustainable Development Reserve of 2,350,000 ha, decreed by the Amazonas State Government, is the second largest protected area in the Brazilian Amazon: the Roraima National Forest covers 2,664,685 ha. It is about the size of Belgium, and contiguous with (connects) the Mamirauá Sustainable Development Reserve of 1,124,000 ha (see *Neotropical Primates* 4(2): 64-65, June 1996) and the Jau National Park of 2,272,000 ha. In the east, the Jau National Park also connects with the Rio Negro State Park (436,042 ha;), and the Environmental Protection Areas of the Left Bank of the Rio Negro (740,757 ha) and the

Right bank of the Rio Negro (554,334 ha) (see *Neotropical Primates* 3(2): 53-54, June 1995). Together these six areas provide a continuous corridor of protected tropical forest of 7,477,133 ha, stretching west to east from the Rio Japurá, to the east bank of the Rio Negro, north of the Rio Solimões-Amazonas.

It was decreed in connection with the Rainforest Corridors Project of the Pilot Program for the protection of the Rainforest, funded by the G-7 nations, and proposed by biologists linked with the Sociedade Civil Mamirauá, Wildlife Conservation Society (WCS), and the Brazil Program of Conservation International, in collaboration with the Brazilian Ministry of the Environment and the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama). The Reserve was designed by scientists working with Sociedade Civil Mamirauá, an NGO based in Tefé which Conservation International helped to establish in the early 1990's.

The human population in the Amanã Reserve is approximately 2,000 people. The category of the 'Sustainable Development Reserve', created in 1996, allows for the permanence of human populations, and encourages local participation in its management and protection. The Reserve protects a highly significant sample of Amazonian wildlife including such as jaguars, manatees, tapirs, and harpy eagles. Primates with geographic distributions covering the area include: *Saguinus inustus*, *Callicebus torquatus lugens*, *C. t. purinus* (in the west), *Saimiri sciureus cassiquiarensis*, *Aotus vociferans*, *Cebus apella*, *Cebus albifrons*, *Cacajao melanocephalus ouakary*, *Lagothrix lagothricha lagothricha*, and *Alouatta seniculus*.

OLD WORLD PRIMATES - NEW SPECIES AND SUBSPECIES

A number of new taxa of Old World primates have been discovered recently. Paul Honess (1996, 1997) discovered two species of bushbabies or galagos, which were also described and illustrated in *The Kingdon Field Guide to African Mammals* (Kingdon, 1997). The small Rondo galago, *Galagoides rondoensis* Honess, 1996, was found in remnant forests patches on the seaward rim of the Rondo plateau in the Lindi region of eastern Tanzania. The Matundu galago, *Galagoides udzungwensis* Honess, 1996, comes from low-lying secondary growth forest below the Uzungwa Mountains in the Morogoro region, Tanzania. The two species were described by their distinct morphology (cranial and penile), pelage, hair structure, and vocalizations. Honess (1996) also revalidated two other species, Grant's galago, *Galagoides granti* (Thomas and Wroughton, 1907) and the mountain galago, *Galagoides orinus* (Lawrence and Washburn, 1936), also both from Tanzania. A talk given by Simon Bearder at the Winter meeting of the Primate Society of Great Britain (PSGB), "New Perspectives on Nocturnal Primates", held at the Zoological Society of London in December 1997, discussed

the probability that many more nocturnal primate species will be discovered in the near future. Galagos and other lorisooid primates may contain numerous cryptic species identifiable only by such as hair structure, penile morphology, vocalizations, and molecular genetics (Bearder, 1997; Bearder *et al.*, 1995, 1996; Bayes *et al.*, 1997). Also reported at this PSGB meeting was a new species of mouse lemur, *Microcebus ravelobensis*, discovered by Elke Zimmerman in the north-western dry deciduous forest in the area of Ampijoroa, Madagascar (Zimmerman, 1997). Controversy continues over the description of one or even two new species of slow loris, *Nycticebus*. *Nycticebus intermedius* was described by Dao (1960) from the forest of Hoa Binh, north-west Vietnam, but its validity has been questioned (Groves, 1993). Alterman and Freed (1997), however, described a distinct form from Central Laos, which they believe may correspond to the species identified by Dao (1960). A new subspecies of leaf monkey was described by Brandon-Jones in 1995. Wulsin's ebony leaf monkey, *Semnopithecus auratus ebenus* Brandon-Jones, 1995, was described from a skin collected by F. R. Wulsin in 1924 during the National Geographic Central China Expedition, and preserved in the National Museum of Natural History, Washington, D.C. It is known only from its type locality, believed to be the vicinity of Lai Chau, or (more probably according to Brandon-Jones) the Fan Si Pan mountain chain in China. Finally, Tilo Nadler has described a new subspecies of odd-nosed langur, *Pygathrix nemaeus cinereus* Nadler 1997; the grey-shanked douc langur from Play Ku vic, Province of Gia Lai, in the south-eastern part of the Central Highlands of Vietnam.

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THE MONKEY SANCTUARY



The Monkey Sanctuary in Looe, Cornwall (U.K.) is home to a single colony of Amazonian woolly monkeys, *Lagothrix lagotricha*. The Sanctuary was established in 1964 as a reaction against the cruel and prolific pet trade at the time. A large indoor and outdoor territory was provided where woolly monkeys, rescued from lives of isolation as pets, were able to re-establish their natural social groups and relearn foraging, climbing and communication skills.

This process of rehabilitation has continued over the last thirty years; the monkeys have become a successful breeding colony and their social behaviour now closely reflects that of their wild counterparts. As the group has expanded (there are now 22 individuals, all born at the Sanctuary) their territory (comprising a number of large interconnected indoor and outdoor enclosures) has been increased and every effort has been made to provide an environment where the monkeys are able to move and forage in the manner they would in their natural habitat, the canopy of the Amazon rain forest. Female monkeys and their young also have the opportunity to leave the enclosed territory and climb and forage in the trees in the Sanctuary gardens. This also gives family groups the chance of physical and social space from the rest of the colony.

The keepers' interference with the monkeys' social organisation is kept to a minimum. There is a recognition of the importance of the social, physical and psychological needs of each individual and an over-riding awareness of the shortcomings of life in captivity. The territory and daily routines have been designed to minimise the stresses of captivity, to provide a rich and stimulating environment, and to enable each individual monkey to suffer as little as possible of the negative effects of captivity. Healthcare is holistic and tries to be non-invasive wherever possible. Homeopathic and herbal treatments of ailments are preferred.

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Since 1973, the importation of woolly monkeys into Britain has been strongly restricted and for several years there have been no newcomers into the group, resulting in a stable, mature but genetically isolated colony. This fact, together with an ethical disapproval of captivity has encouraged Sanctuary keepers to seek a protected park or reserve in the Amazon rain forest where the monkeys will be able to continue their process of rehabilitation. A suitable site would also be available for the rehabilitation of other primates. The principal aims of the project are as follows:

1. To give the captive-born monkeys the chance of a new life in their natural forest environment.
2. To establish a sanctuary for woolly monkeys confiscated from illegal pet markets. The orphaned monkeys are often scarred psychologically by their experiences and need a great deal of care. We can help to rehabilitate these traumatised wild-born monkeys by providing emotionally stable and socially developed "tutors".
3. To demonstrate to the state authorities the worthiness of enforcing monkey trade laws if confiscated monkeys can be provided with a viable future.
4. To focus on education in order to promote an understanding of cultural traditions and environmental and conservation issues; the project can only succeed with the support of the local population.
5. To work with other conservation groups with related interests.

The project has already received widespread support, publicity and interest, and several preliminary visits to Brazil have been made to present the project and develop contacts and search for potential sites on which to establish a new sanctuary. Keepers are encouraged by the progress that has been made.

The Monkey Sanctuary is owned and run by the group of long-term keepers as a non-profit-making co-operative company. It is financed through the admission charges of summer visitors and there is a strong emphasis on education covering animal welfare and conservation issues. The Sanctuary grounds are managed to provide rich foraging for the monkeys but also as a natural habitat for Cornwall's native wildlife. Many schools, students and conservation groups also spend time at the Sanctuary. An associated registered charity, the Monkey Sanctuary Trust, has been established to promote the conservation and welfare of all primates and, in particular, woolly monkeys.

For more information, please write to: The Monkey Sanctuary, Looe, Cornwall PL13 1NZ, UK, Tel/Fax: 01503 262532, e-mail: <monkey_sanctuary_uk @ compuserve.com>, Home Page: <http://ourworld.compuserve.com/homepages/monkey_sanctuary_uk/>.

Jordi Casamitjana, The Monkey Sanctuary, Looe, Cornwall PL13 1NZ, UK.

REVIEW OF LITERATURE AND INFORMATION ON THE BIOLOGY OF THE UAKARIS, GENUS *CACAJO*

I am preparing a review of the biology of all members of the genus *Cacajao*. It is intended as a compilation of all current information on the genus (including natural history, social organisation and ecology, diet and feeding ecology, anatomy, physiology, phylogeny and biogeography). Data on captive and wild animals is being included. It will not revise the taxonomy of the genus. If you have any unpublished information or observations on wild or captive uakaris then I would be very grateful to receive it. Similarly, I would welcome copies of unpublished reports or small circulation documents (any language) dealing with these animals. If you have uakaris on your field study site, I would be very pleased to know. All participants will be fully acknowledged. Thank you. *Please send correspondence to:* Adrian Barnett, 114 Petrie Avenue, Bryn Mawr, PA 19010, USA. Tel: 610-525-8077, Fax: 610-525-2539, e-mail: <infovore@op.net>.

Adrian Barnett, School of Life Sciences, The Roehampton Institute, West Hill, London SW15 3SN, England, UK.

WORLD DIRECTORY OF PRIMATOLOGISTS WDP

The Wisconsin Regional Primate Research Center WRPRC, University of Wisconsin - Madison, has converted the Primate-Talk Directory into the World Directory of Primatologists. People currently in the Primate-Talk Directory have been automatically moved to the new location. Everyone who has an entry please check the accuracy of information in the WDP: <<http://www.primate.wisc.edu/pin/wdp/>>. There are currently 1300 entries.

The purpose of the World Directory of Primatologists (WDP) is to provide a convenient Internet source of contact information for people in the field of primatology. The WDP and other outreach programs of the Wisconsin Regional Primate Research Center (WRPRC) are funded under grant RR00167 from the National Institutes of Health, National Center for Research Resources.

Who should place an entry in this Directory? Those whose career interests involve or relate to primate research, conservation, education or veterinary medicine should submit an entry. It is necessary to have an e-mail address. *How does this Directory work?* To place an entry in the directory click on the ENTRY FORM link and fill in all pertinent information. Once the entry information is entered correctly, click on the SUBMIT ENTRY button. You are also offered the options of revising or removing an entry. The directory entries have a "species of interest" field. You can fill this in to indicate which primates you're interested in, which may be of use for people trying to find those of like mind. If you already have an entry but want to add this field, you can submit an entry revision

using the Web form. (Just fill in your name and e-mail address, and the species field.). To look for someone in the directory, click on SEARCH DIRECTORY. You may search names alphabetically by clicking on the corresponding letter. You may search on areas of interest (such as anatomy), location, species, or any other keyword. *Is there a cost to participating in the directory?* There are no costs involved in participating in the directory. Note it is not a listserv, i.e., it will not generate mail messages.

Participants are expected to keep their entries current and should alert the WDP Administrator to any listing problems. The Wisconsin Regional Primate Research Center assumes no responsibility for the accuracy of information submitted by participants. Contact information: Larry Jacobsen, WDP Coordinator, e-mail: <jacobsen@primate.wisc.edu>, Paul DuBois, WDP Administrator, e-mail: <ptadmin@primate.wisc.edu>.

The WDP is intended as a convenient Internet source of contact information for people in the field of primatology and we would encourage those not currently in the WDP to create an entry for themselves. The scope of the P-T directory was unnecessarily limiting, i.e., listing only people who joined Primate-Talk. The WDP is open to anyone whose career or work involves or relates to non-human primates. You can view the directory using the URL printed below or by clicking on People, a hot button on the Primate Info Net home page <<http://www.primate.wisc.edu/pin>>. While Larry Jacobsen is coordinating the WDP, the principal person on this project is Paul DuBois who has developed the Web interface and will handle questions relating to entries. We will send periodic reminders about WDP to Primate-Talk. This is an opportunity to create a very useful communications tool and we would urge all of you to take five minutes to become part of the directory.

Larry Jacobsen, WDP Coordinator, and Paul DuBois, Primate-Talk Administrator, Wisconsin Regional Primate Research Center, University of Wisconsin, 1220 Capitol Court, Madison, Wisconsin, 53715-1299, USA.

ANNUAL COURSE "BIODIVERSITY MEASURING, MONITORING, AND RESEARCH CERTIFICATION" - SI/MAB BIODIVERSITY PROGRAM

The Smithsonian Institution/Man and the Biosphere (SI/MAB) Biodiversity Program will hold its annual course, "Biodiversity Measuring, Monitoring, and Research Certification" from 10 May-12 June 1998 at the Smithsonian Conservation and Research Center, Front Royal, Virginia. This intensive five-week course provides a unique opportunity for professionals to gain expertise in current methodology for developing, carrying out, and maintaining long-term biodiversity inventory, monitoring, and research programs. To date, over 110 participants from 45 countries have been trained through this course. The training will assist the participant to incorporate his work and ideas

with the measuring and monitoring framework established by SI/MAB. In addition, techniques and examples of other biodiversity monitoring programs will be discussed. For more information, contact: SI/MAB Biodiversity Program, Smithsonian Institution, S. Dillon Ripley Center, 1100 Jefferson Drive S.W., Washington, D. C. 20560, USA. Tel: 202-357-4792, Fax: 202-786-2557, e-mail: <ic.simab@ic.si.edu>, see <<http://www.si.edu/organiza/museums/ripley/simab>>.

BREEDING AND CONSERVATION OF ENDANGERED SPECIES - JWPT SUMMER SCHOOL



The Summer School "Breeding and Conservation of Endangered Species", of the Jersey Wildlife Preservation Trust, Jersey, will be held from 20 July to 7 August 1998. It is suitable for students, zoo and veterinary staff and others with an interest in conservation and captive breeding. The course offers an overview of how the JWPT and other organisations have integrated conservation in captivity and the wild; lectures; study projects; practical instruction and workshop sessions; and other demonstration sessions by zoo staff and invited experts. The Course Directors are the Trust Training Officer, Dr. John E. Fa, and two internationally recognised scientists. The course tutor is Dr. Anna Feistner, Trust Research Officer, and the coordinator is Mr Chris Clark, Assistant Training Officer. Closing date for applications: 31 January 1998. For application forms please write to: The Summer School Co-ordinator, Jersey Wildlife Preservation Trust, Trinity, Jersey JE3 5BP, Channel Islands, British Isles, or Tel: +44 1534 864666, Fax: +44 1534 865161.

THE L. S. B. LEAKEY FOUNDATION - GRANTS AWARDED IN 1996-1997

The L. S. B. Leakey Foundation awarded 59 grants in the fiscal year 1996-1997, divided amongst the categories: Cultural Anthropology (1); Primatology (15); Fossil-Recover (4); Morphology (12); Prehistory (16); Publications, Geology and Paleocology (3); and the Franklin Mosher Baldwin Memorial Fellowships (8). A number of the grants in Primatology were particularly concerned with Neotropical primates. They included: Natal dispersal and reproductive strategies in *Callicebus moloch* in Manu National Park - Francis Bossuyt; Reproductive biology of the black-handed spider monkey: Integrating behavior and endocrinology - Christina Campbell; The role of learning in *Pithecia pithecia*'s foraging strategy - Elena Cunningham; Food-associated calls in tufted capuchin monkeys (*Cebus apella*) - Mario Di Bitetti; and Competition and bonding among male white-faced capuchin monkeys, *Cebus capucinus* - Susan Perry.

For further information (note new address): The L. S. B. Leakey Foundation, P. O. Box 29346, Presidio Building

1002A, O'Reilly Avenue, San Francisco, California 94129-9911, USA. Tel: (415) 561-4646, Fax: (415) 561-4647. For membership information, please call (415) 561 4646 or e-mail: <leakeyem@aol.com>.

CHICAGO ZOOLOGICAL SOCIETY SMALL GRANTS

Every June, the Chicago Zoological Society awards small grants to a number of field conservation projects. The proposals are considered by the Society's Chicago Board of Trade Endangered Species Fund Advisory Committee and approved by its Board of Trustees in July. This year, the Committee is requesting proposals from Specialist Groups for projects that are contained in final or draft Action Plans. While projects not found in Action Plans will be considered, the proposal would need to document that the project is a formal priority of the Specialist Group.

Grants will be in the range of US\$1000 - US\$3000. Preference will be given to complete projects of this size, but the Committee will consider proposals that are part of a larger project (\$10,000 range). Groups should only submit projects where there is a high likelihood that they will be implemented within one or two years if they were to receive support from this fund.

Proposals should be just one page in length, and should describe the research project, including the budget and a brief background description. The proposal should clearly demonstrate that the project is a priority for the Specialist Group, referencing an Action Plan where appropriate, and be submitted on behalf of the Group. If additional background material on the project is available, please provide that as well. The Committee makes the grants available in the middle of July and would like a progress report, if not a final report, on the project by the following June. Proposals are due May 1, 1998. Please submit proposals to Elizabeth McCance, preferably by e-mail <iucnss@igc.apc.org>. Address: Chicago Zoological Society, Brookfield, IL 60513, USA, Tel: +1 708 485 0263 x 304, Fax: +1 708 485 6320.

EL FONDO NEOTRÓPICO SCOTT DEL ZOOLOGICO LINCOLN PARK

El Fondo Neotrópico Scott fue fundado en el año 1986 por la Sociedad Zoológica y el Zoológico Lincoln Park para apoyar los esfuerzos en el campo de la conservación del medio ambiente en Latinoamérica y el Caribe. El fondo emplea el apoyo de los biólogos jóvenes dedicados a la conservación en sus propios países como instrumento para asistir a la nueva generación de investigadores a convertirse en los arquitectos futuros de la política del medio ambiente. De esta manera el fondo fortalece el liderazgo central en el campo de la conservación del medio ambiente a lo largo y ancho de las Américas. El fondo enfatiza el apoyo de nuevas iniciativas en el campo de la conservación, prestando atención en especial a los proyectos que muestren las características siguientes:

- un impacto directo en la conservación del medio ambiente o en la biología de la conservación,
- la participación directa de estudiantes que estén por graduarse, y/o de estudiantes de posgrado,
- la participación de estudiantes y/o auxiliares de campo latinoamericanos,
- o vínculos con la colección de animales del Zoológico Lincoln Park o con los intereses del personal administrativo del mismo en el campo de la conservación.

Conservación a través de las Américas: Desde su establecimiento, el Fondo Neotrópico Scott del Zoológico Lincoln Park ha otorgado más de 86 becas en diecisiete países de Latinoamérica y el Caribe. Cada año, el fondo apoya entre cinco y quince proyectos, si se incluyen los proyectos que son reanudados por un segundo año. Los premios rara vez sobrepasan 7,500 dólares, y por lo general el monto de las becas otorgadas se encuentra entre 3,000 y 5,000 dólares. La duración máxima de la ayuda inicial es doce meses desde la fecha en que se otorga el premio, y la duración máxima de ayuda total es dos años.

Algunos de los proyectos becados en los años 1992-1993:

En Argentina

- Los efectos de la intervención humana en poblaciones murciélagos en la selva subtropical
- Evaluación de condición de la especie de Ioro Tucumán Amazonas, que está en riesgo de extinción
- El uso de tierras privadas y públicas como refugio para la zorra culpea en la Patagonia.

En Belice

- La protección del hábitat ribereño de los monos ayudadores negros.

En Bolivia

- Un proyecto de estudio y entrenamiento para la conservación de la Pampa Puna en Bolivia, Perú, y Argentina

En Brasil

- Una reseña de los mamíferos terrestres y acuáticos en la Estación Ecológica Caetetus de São Paulo
- El uso del hábitat por parte de los mamíferos carnívoros en el Parque Nacional de Iguazú
- La evaluación de los programas de educación comunitaria de apoyo al tamarín-león de cabeza dorada

En Chile

- El impacto de la depredación de las zorras indígenas en las últimas poblaciones naturales de chinchillas
- La medición de la densidad de aves rapaces y del uso del hábitat a lo largo del río Bio-Bio.

En Colombia

- El manejo y la cosecha de pacas en fragmentos de selva tropical en el norte de Colombia

- El desarrollo de un programa educativo en la conservación del medio ambiente para el Zoológico de Cali

En Ecuador

- El comportamiento reproductivo de los flamings en las islas Galápagos

En México

- La evaluación de la distribución de aves y habitats en el Bosque Lacandona
- La evaluación de la distribución de mamíferos grandes y habitats en el Bosque Lacandona
- Estudios a largo plazo de la fragmentación forestal en Veracruz

En Venezuela

- La distribución de los osos andinos y la interacción entre los osos y el hombre en los parques nacionales de Venezuela.

Los proyectos son solicitados y evaluados anualmente por medio de un pedido de propuestas que es mandado por correo a aquellas instituciones, organizaciones e individuos que tengan interés en la flora y fauna latinoamericana; por medio de avisos en boletines y diarios profesionales; y a través de la intervención directa por parte del personal administrativo del zoológico con personas que trabajan en Latinoamérica.

Criterios de Evaluación y Métodos para la Presentación de Solicitudes. 1) *Evaluación de propuestas:* Los proyectos debèn hacer contibuciones directas a la conservación de una especie o habitat individual, a la educación en conservación, a la biología aplicada de la conservación o al apoyo de políticas conservacionistas. El rigor científico y la probable aplicación de los resultados tienen la mas alta importancia. Cada propuesta será evaluada a base de sus métodos investigativos, factibilidad y en términos de su importancia como contribución en el campo de la biología de la conservación. Se prefieren proyectos que se relacionen con la colección del Parque Zoológico Lincoln. Cada propuesta será evaluada en términos de su mérito y calidad con respecto a todas las propuestas en gestión. La alocación de fondos debe centrarse en el apoyo de académicos, estudiantes, y ayudantes de campo latinoamericanos y también en el apoyo logístico brindado por estudiantes Norteamericanos. Aunque ciertos costos de campo pueden ser franqueados, el fondo por lo general no paga salarios o compra equipo permanente. 2) *Fecha de entrega:* Las solicitudes deben estar mataselladas con fecha anterior al primero de septiembre. Los propuestas tardías no serán gestionadas sino que serán devueltas para que puedan ser presentadas nuevamente. 3) *Cómo Presentar Solicitudes.* Se requiere que 15 copias de la propuesta sean enviadas a: Lincoln Park Zoo Scott Neotropic Fund, Director of Conservation and Science, 2001 North Clark Street, Chicago, IL 60614 U.S.A. 4) *Cada Propuesta Debe Contener:*

- Una página titular con el nombre del aplicante, su dirección completa, su afiliación, su cargo, el título académico que desea alcanzar o título académico mas avanzado que haya obtenido, su número de cédula de seguro social, nacionalidad, número de teléfono, número de fax y su dirección de correo electrónico.
- Literatura citada
- Un curriculum vitae no técnico de una página, estableciendo su propósito, objetivos, procedimientos, resultados anticipados, factibilidad y la importancia global del proyecto con respecto a la conservación del medio ambiente en Latinoamérica. También debe incluir el título del proyecto, nombre del solicitante, afiliación institucional y su cargo/título en la parte superior de la página. Al pie de la misma debe contener la fecha en que se propone empezar, el presupuesto total y la cantidad que se solicita del Fondo Neotrópico Scott del Zoológico Lincoln Park.
- Una breve introducción al proyecto, que explique su razonamiento fundamental y su hipótesis, que liste los resultados anticipados y que exponga la importancia global del proyecto con respecto a la conservación del medio ambiente en Latinoamérica.
- Una sección narrativa, que defina metas y objetivos específicos para el proyecto, los fundamentos para el desarrollo de hipótesis, y aplicaciones específicas de los resultados en la conservación del medio ambiente en general y/o en la conservación del medio ambiente en general y/o en la conservación biológica en Latinoamérica; que justifique y describa el diseño del estudio proporcionando los siguientes detalles: 1) número de muestras, 2) análisis de estadísticas, 3) duración del estudio, 4) metodología general, 5) adecuacia de los métodos, 6) pruebas de la factibilidad de obtener las metas deseadas con la metodología propuesta, y 7) planes para la implementación de los resultados a través de la política o la acción.
- Una sección de métodos y materiales, que explique en detalle 1) el uso de y el contacto con animales, 2) los detalles de cualquier método para la recaudación de datos que sea único y/o inusualmente complejo, 3) la manera en la cual el personal del Zoológico Lincoln Park será involucrado, si esto es pertinente y 4) nombres y direcciones de todos los estudiantes, colaboradores y patrocinadores académicos.
- Un programa de trabajo para el proyecto, incluyendo 1) fecha de iniciación del proyecto, 2) un programa para la colección y análisis de información, 3) la fecha en que se completa el proyecto, y 4) la fecha en que se anticipa obtener la licenciatura o el doctorado, si esto es pertinente.
- Un sumario del presupuesto de operaciones para el proyecto entero, que no incluya los fondos solicitados del Fondo Neotrópico Scott de Zoológico Lincoln Park.
- Un presupuesto detallado, que incluya justificaciones para cada cantidad requerida del Fondo Neotrópico Scott del Zoológico Lincoln Park en cada categoría presupuestaria. Los costos asignados a el alojamiento,

la tarifa aérea, al alquiler de vehículos, la gasolina, las provisiones y el equipo permanente deben ser identificados individualmente.

Los artículos siguientes son de gran importancia y deben ser presentados como parte de la solicitud:

- Pruebas de que todos los permisos necesarios, como visas y permisos de investigación, han sido o pueden ser obtenidos para la duración del proyecto.
- Un curriculum vitae de dos páginas para cada uno de los investigadores principales.
- Por lo menos dos cartas de recomendación por parte de biólogos dedicados a la conservación del medio ambiente que se hayan familiarizado con la propuesta y quienes conozcan a los solicitantes.

La propuesta entera, excluyendo cifras, tablas y los curriculum vitae, no debe exceder quince páginas escritas a máquina en espacio sencillo y con un máximo de cinco letras por centímetro.

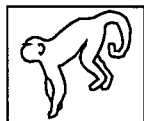
Primate Societies

INTERNATIONAL PRIMATOLOGICAL SOCIETY AWARDS 1997



The M. J. Galante Conservation Fellowship is an annual award given to a member of IPS from a developing country, and provides around US\$2,500 for training in conservation. In 1997, it was awarded to Ariel Rodríguez Vargas, a Panamanian studying Wildlife Conservation and Management at the Universidad Nacional, Heredia, Costa Rica. He has been working with *Aotus* and *Saguinus* in Costa Rica and will carry out his Master's thesis work with *Saimiri oerstedii*. The *International Journal of Primatology* Subscription Awards were given to Mukesh Kumar Chalise (Nepal) and Carmen Alonso (Federal University of Paraíba, Brazil). From: *IPS Bulletin*, 24(2): 2, December, 1997.

SOCIEDADE BRASILEIRA DE PRIMATOLOGIA



A Sociedade Brasileira de Primatologia (SBPr) tem o novo endereço da homepage: <<http://www.geocities.com/RainForest/Vines/6444/sbpr.htm>>. Por favor, não deixe de visitá-la. Além de encontrar um boletim sobre a reunião da nova diretoria e notícias, há também um formulário para cadastramento na Sociedade. O preenchimento desse formulário é muito importante, pois não temos sequer endereço de contato com um grande número de sócios. Se você conhecer o e-mail de algum sócio que não está em contato com a SBPr, por favor, entre em contato com <sbpr@geocities.com>. Se você não tiver acesso à rede, não se preocupe, pois enviaremos os mesmos comunicados para os sócios pelo correio.

Foi publicado o livro *A Primatologia no Brasil - 5*. Os

anais do VI Congresso Brasileiro de Primatologia, realizado na Universidade Federal do Rio de Janeiro, Rio de Janeiro, 24-29 de julho de 1994, editados pelos Drs. Stephen F. Ferrari e Horacio Schneider, ambos da Universidade Federal do Pará, Belém. *A Primatologia no Brasil - 5* inclui artigos completos em Inglês e Português, e resumos de outros trabalhos apresentados no Congresso (todos com versões em Inglês e Português) (ver "Recent Publications"). Para obter um exemplar do livro, entre em contato com: Stephen F. Ferrari, DEGE/UFPa, Caixa Postal 8607, 66.075-150 Belém, Pará, Brazil, Fax: +55 (0)91-211-1662, e-mail: <ferrari@cuxiu.cbio.ufpa.br>. Preço R\$20,00 (+R\$2,00 postagem nacional; R\$5,00 postagem internacional).

Alcides Pissinatti, Presidente da SBPr, Centro de Primatologia do Rio de Janeiro (CPRJ), Fundação Estadual de Engenharia do Meio-Ambiente (FEEMA), Rua Fonseca Teles 121/1624, Caixa Postal 23011, São Cristóvão, 20940-200 Rio de Janeiro, Rio de Janeiro, Brasil.

FIELD STUDIES SUPPLEMENT - PRIMATE SOCIETY OF GREAT BRITAIN



Julia Casperd is preparing the next issue of the *Current Primate Field Studies Supplement* to the PSGB newsletter *Primate Eye*.

We urge all those who are currently carrying out field studies, or completed a field study during 1996-1997, to send the following information for inclusion in the listing:

Name: Director of Research Project: Research Project Title: Field Site: Country: Research Team: Correspondence address: e-mail: Status (Current/Concluded/Planned): Date field work started: Duration: Species studied: Project aims: (A sentence only).

Please send the information to: Julia M. Casperd, Department of Psychology, University of Liverpool, P. O. Box 147, Eleanor Rathbone Building, Liverpool L69 3BX, UK, e-mail: <jasperd@netcomuk.co.uk>.

IVTH WINTER WORKSHOP EUROPEAN MARMOSET RESEARCH GROUP



The European Marmoset Research Group (EMRG) held their IVth Winter Workshop in Paris, December 1-3, 1997. The organisers were Dr. Leah Scott, and Dr. Christian Schnell. The meeting focused on

the world-wide problem of availability of common marmosets for research and the means to resolve it, on the appropriateness of common marmosets superseding the macaques as the major primate in biomedical research (currently happening in Europe), and on the future development of the EMRG. The meeting had several productive outcomes. (1) The distribution of the publication *Handbook of Marmosets and Tamarins in Biological and Bio-*

medical Research, edited by Christopher Pryce, Leah Scott and Christian Schnell, and published by DSSD Imagery, Salisbury, UK, 1997 (see "Recent Publications"). (2) The establishment by EMRG of a new Internet discussion network for those with interests in callitrichid research. This new network is called "calli-talk" and you can subscribe to it by sending the message: subscribe calli-talk <your Email address> to the e-mail address: <ListProc@gwdg.de>. Jens Kerl from GWDG in Göttingen, Germany is the calli-talk administrator. His personal e-mail is: <jkerl@gwdg.de>. Copies of the abstracts for the Paris 1997 meeting of EMRG should be available electronically from Jens Kerl shortly. (3) An international meeting on callitrichid biology was proposed for Paris in the autumn of 1999. (4) A reminder of the web site location of EMRG's home page, access to which is available through the sub-directories of the home pages of the German Primate Centre or the Wisconsin Regional Primate Research Center, or directly via: <http://134.76.248.10/eupren/emrgcons.htm>.

Information supplied by Dr. David Abbott, Physiological Ethology Research Group, Department of Obstetrics and Gynecology, Wisconsin Regional Primate Research Center, Madison, on the WRPRC Primate-Talk.

JUNTA DIRECTIVA DE LA APE - ASOCIACIÓN PRIMATOLÓGICA ESPAÑOLA

Presidente Honorario: Jordi Sabater Pi, Departamento de Psiquiatría y Psicobiología Clínica, Facultad de Psicología, Universidad de Barcelona, Passeig de la Vall d'Hebron 171, 08035 Barcelona. Tel/Fax: (93) 4021080-3058. **Presidente:** Fernando Colmenares, Departamento de Psicobiología, Facultad de Psicología, Universidad Complutense de Madrid (Somosaguas), 28223 Madrid, Tel: (91) 3943075, Fax: (91) 3943189. email: ppspc06@sis.ucm.es. **Vicepresidente:** Joaquim Veà Baró, Departamento de Psiquiatría y Psicobiología Clínica, Facultad de Psicología, Universidad de Barcelona, Passeig de la Vall d'Hebron 171, 08035 Barcelona, Tel: (93) 4021080-3057, Fax: (93) 4021584. email: jvea@psi.ub.es. **Secretario General:** Fernando Peláez, Area de Psicobiología, Facultad de Psicología, Universidad Autónoma de Madrid, 28049-Madrid, Tel: (91) 3974658, Fax: (91) 3975215, email: fpelaez@uam.es. **Tesorero:** Carlos Gil-Bürmann, Area de Psicobiología, Facultad de Psicología, Universidad Autónoma de Madrid, 28049-Madrid, Tel: (91) 3974115, Fax: 3975215, email: cgil@uam.es. **Vocales de Conservación y Manejo:** Anna Omedes Regas, Passeig Sant Joan 81-83, 08009-Barcelona, Tel: (93) 4590869; Fax: (93) 3104999, y Carmem Maté, Departamento de Psiquiatría y Psicobiología Clínica, Facultad de Psicología, Universidad de Barcelona, Passeig de la Vall d'Hebron 171, 08035-Barcelona. Tel: (93) 4021080, Fax: 4021584, email: cmate@psi.ub.es. **Vocales de Educación:** Federico Guillén Salazar, Facultad de Veterinaria, Centro

Universitario San Pablo (CEU), 46113 Moncada, Valencia. Tel: (96) 1391616 (255), Fax: (96) 1395272, e-mail: fguilleneu.upv.es, y Mateo Escobar, Departamento de Psiquiatría y Psicobiología Clínica, Facultad de Psicología, Universidad de Barcelona, Passeig de la Vall d'Hebron 171, 08035 Barcelona, Tel: (93) 4021080-3054, Fax: (93) 4021584, email: mescobar@psi.ub.es. **Vocales de investigación:** Maribel Baldellou, c/ Guillermo Tell, 20, 08066-Barcelona, Tel: (93) 2197897, y Marta Martín, Departamento de Psicobiología, Facultad de Psicología, Universidad Complutense de Madrid (Somosaguas), 28223 Madrid, Tel: (91) 3943075, Fax: (91) 3943189, email: ppspcz3@sis.ucm.es.

Recent Publications

BIOLOGY AND CONSERVATION OF NEW WORLD PRIMATES - A SPECIAL EDITION OF FOLIA PRIMATOLOGICA

Folia Primatologica (Editor, R. H. Crompton, Liverpool University, UK), is the Official Journal of the European Federation of Primatology, and as such publishes abstracts of the meetings of Federation's Societies and, on occasion, the full proceedings. This was the case for a special edition of *Folia Primatologica*, Volume 68, numbers 3-5, which is dedicated to the "Biology and Conservation of New World Primates"; the result of a most successful one-day meeting of the Primate Society of Great Britain (PSGB) held at the Zoological Society of London, on 29 November 1995. The Guest Editors were Hilary O. Box (Reading University, UK, President of the PSGB) and Hannah M. Buchanan-Smith (Stirling University, UK, Honorary Secretary of the PSGB), who organised the meeting. This special edition of *Folia* contains original and excellent papers on a wide range of conservation and research areas, including captive and field studies. Contents: Editorial - H. O. Box and H. M. Buchanan-Smith, p.117-119; Mate preferences of wild muriqui monkeys (*Brachyteles arachnoides*): Reproductive and social correlates - K. B. Strier, pp.120-133; Conservation of Neotropical primates: Threatened species and an analysis of primate diversity by country and region - A. B. Rylands, R. A. Mittermeier and E. Rodríguez-Luna, pp.134-160; Geographic distribution of the golden-headed lion tamarin, *Leontopithecus chrysomelas*: Implications for its management and conservation - L. P. de S. Pinto and A. B. Rylands, pp.161-180; Uncertain conservation status of squirrel monkeys in Costa Rica, *Saimiri oerstedii oerstedii* and *Saimiri oerstedii citrinellus* - S. Boinski and L. Sirot, pp.181-193; Feeding behaviour and predation of a bat by *Saimiri sciureus* in a semi-natural Amazonian environment - L. L. Souza, S. F. Ferrari and A. L. C. B. Pina, pp.194-198; Effects of habitat quality and hunting pressure on arboreal folivore densities in Neotropical forests: A case study of howler monkeys (*Alouatta* spp.) - C. A. Peres, pp.199-222; The ecology, biogeography and conservation of the

uakaris, *Cacajao* (Pitheciinae) - A. A. Barnett and D. Brandon-Jones, pp.223-235; Experimental field study of spatial memory and learning in wild capuchin monkeys (*Cebus capucinus*) - P. A. Garber and L. M. Paciulli, pp.236-253; Can spider monkeys (*Ateles geoffroyi*) discriminate vocalisations of familiar individuals and strangers - P. Teixidor and R. W. Byrne, pp.254-264; Social memory in saddle-back tamarins (*Saguinus fuscicollis*) - G. Epple and H. Niblick, pp.265-271; Tamarin mixed-species groups: An evaluation of a combined captive and field approach - H. M. Buchanan-Smith and S. M. Hardie, pp.272-286; The relationship between body size and mixed species troops of tamarins (*Saguinus* spp.) - E. W. Heymann, pp.287-295; Foraging strategies among male and female marmosets and tamarins (Callitrichidae): New perspectives in an underexplored area - H. O. Box, pp.296-306; Autonomic balance in *Saimiri sciureus* and *Callicebus moloch*: Relation to life-style - S. P. Mendoza and W. A. Mason, pp.307-318. For information on how to obtain a copy: S. Karger AG, P. O. Box, CH-4009, Basel, Switzerland, Fax: +41 61 306 12 34, e-mail: <karger@karger.ch>, <<http://www.karger.ch>>. The journal's home page is at: <<http://www.karger.ch/journals/fpr/fprdes.htm>>.

A NEW PRIMATE JOURNAL - PRIMATOLOGIE

A new interdisciplinary primate journal in primatology was recently created under the auspices of the Soci t  Francophone de Primatologie (SFDP). The main objectives of *Primatologie* are to develop contacts between French-speaking primatologists from around the world, and to promote the development of primatology in general. *Primatologie* will be published yearly. Each issue will be devoted to empirical and theoretical papers from various fields of primatology, including physical anthropology, behavioral sciences, biological and biomedical sciences, cognition, conservation, ecology, neuroscience, paleontology, and welfare. Papers will be published mainly in French, including, however, an abridged version of 2-3 pages in English. Papers in English will be published occasionally. For more information, there is a "Primatologie" web page: <<http://Inf.cnrs-mrs.fr/lnc/primatologie.html>>, which provides information on the journal, its scope, and the editorial board. The editor is Dr. Joel Fagot, CNRS-LNF 1, Un. de Neurosciences Cognitive, 31 Chemin Joseph Aiguier, Marseille cedex 09, 13402 France, Tel: 33 91 164 306, Fax: 33 91 774 949, e-mail: <fagot@inf.cnrs-mrs.fr>.

NATURAL RESOURCES AND DEVELOPMENT - TROPICAL FORESTS

The journal *Natural Resources and Development* is a bi-annual collection of recent German contributions concerning the exploration and exploitation of natural resources. It is edited by the Institute for Scientific Co-operation (Institut f r Wissenschaftliche Zusammenarbeit) in conjunction with the Federal Institute for Geosciences and Natural Resources (Bundesanstalt f r Geowissenschaften

und Rohstoffe), Hannover, and numerous members of German universities. ISSN 0340-2797. The editors are W. Ernst, J. H. Hohnholz and A. Bittner, in conjunction with K.-H. Jacob, Berlin, and W. Gocht, Aachen. The aim of the series is to keep earth scientists, administrative officers, and relevant institutions in other countries informed on German studies in the field of applied geology. Volume 45/46, 1997, has the title *Focus: Tropical Forests*. Contents: Introduction: Aspects of the focal theme - Alfred Bittner; Biodiversity and sustainable management of tropical forests - Karl E. Linsenmair; Structure, function and diversity of Central Amazonian ecosystems - Ernst J. Fittkau; Gene conservation in tropical forests - Hans H. Hattemer; A study of forest dynamics and wood production in flooded forests (*v rzea*) in the Amazon basin, Brazil, using growth ring analyses for developing sustainable management systems - Martin Worbes; Early regeneration and recolonization of cultivated areas in the shifting cultivation system employed in the eastern Amazon region, Brazil - Gudrun Clausing; Effects of selective logging on the diversity of tree species in a tropical moist deciduous forest in Venezuela - Ludwig Kammesheidt; Enrichment planting in the tropical rain forest of Sumatra - a silvicultural challenge - Uwe Muuss; Protection of the rainforest in eastern Zaire: The Kahuzi-Biega National Park - G nter Merz. For more information: Institut f r Wissenschaftliche Zusammenarbeit, Vogtshaldenstrasse 24, D-72074 T bingen, Germany. Information kindly provided by PSG member Eckhard W. Heymann of the Deutsches Primatenzentrum, G ttingen, Germany.

BOOKS

Handbook: Marmosets and Tamarins in Biological and Biomedical Research, edited by Christopher Pryce, Leah Scott and Christian Schnell, 1997. European Marmoset Research Group (EMRG), Salisbury. 216pp. Spiralbound. Price:  15.00 + postage and packaging. The proceedings of the EMRG Workshop held in Paris in December 1994. This handbook provides researchers, technicians, and veterinarians with a comprehensive overview of the biology, housing and husbandry, nutrition and health, and physiology and behaviour of callitrichids, as well as some varied examples of their successful application in biomedical research. Twenty authors, with a broad and in-depth collective experience of research with callitrichids, contributed to the chapters. Contents: The Callitrichidae: a biological overview - A. B. Rylands, pp. 1-22; *Housing and Husbandry*. Current practice in maintaining marmosets: results of a UK survey - R. C. Hubrecht, pp.24-38; Integrating marmoset husbandry and research - C. R. Pryce and N. A. Samson, pp.39-46; Environmental control: an important feature of good captive callitrichid environments - H. M. Buchanan-Smith, pp.47-53; Physical environment and its influence on behaviour in captive common marmosets - A. Dettling, pp.54-59; Response to a novel object by socially-housed common marmosets - A. Vitale, F. Santamaria and A. Queyras, pp.60-64. *Nutrition and Health*. Experimental development of the com-

plete marmoset diet - A. M. Thornhill, pp.66-69; A comparative summary of the nutritional adaptations and needs of callitrichids and application to captive management - J. B. Carroll, pp.70-77; Veterinary care of callitrichids - T. J. Gatesman, pp. 78-101; Comparative pathological-clinical aspects of captive callitrichids at the Jersey Wildlife Preservation Trust - N. Robert and J. B. Carroll, pp.102-109. *Physiology and Behaviour*. Callitrichid social biology and its significance for captive management - H. O. Box, pp. 111-118; Evolutionary and comparative biology: their significance for callitrichid research - C. R. Pryce, pp.119-127; Circadian rhythms in the marmoset: their significance for fundamental and applied research - H. G. Erkert, pp.128-144; Quantitative analysis of marmoset vocal communication - B. S. Jones, pp.145-151; Application of urinary oestrogen in monitoring and control of reproduction in captive common marmosets - C. Nievergelt, pp.152-156; Neurotransmission in the common marmoset - J.-P. Hornung, pp.157-162. *Applications*. Behavioural conditioning in marmosets - L. Scott, pp.164-169; Haemodynamic measurements by telemetry in conscious unrestrained marmosets, and responses to stress events - C. R. Schnell, pp.170-180; The relative merits of the marmoset in toxicological testing - P. A. McAnulty, pp.181-191; The relative merits of the marmoset as a model in reproductive medicine - S. F. Lunn, pp. 192-207. Index and author's addresses. Available from: Leah Scott, Biology Division, CBD Porton Down, Salisbury, Wiltshire SP4 0JQ, UK, Tel: +44 (0) 1980 613392/613093, Fax: +44 (0)1980 613741.

A Primatologia no Brasil - 5, edited by Stephen F. Ferrari and Horacio Schneider, 1997. Sociedade Brasileira de Primatologia and the Universidade Federal do Pará, Belém, Brazil. Articles in Portuguese and English. 364pp. ISBN 85 247 0173 0. Price US\$20.00 (+ postage and packing US\$2.00 in Brazil, US\$5.00 elsewhere). The proceedings of the VI Congresso Brasileiro de Primatologia, held at the Federal University of Rio de Janeiro, Rio de Janeiro, 24-29 July 1994. All articles in Portuguese have English summaries. The abstracts are also in Portuguese and English. Contents: *Seção 1 - Trabalhos de Campo*. A relação espacial entre mãe-infante como medida do processo de independência do filhote muriqui (*Brachyteles arachnoides*) - A. Odalia-Rímoli & E. Otta, pp.15-27; Comportamento agressivo em um grupo de bugios-pretos, *Alouatta caraya* (Primates, Cebidae) - C. Calegari-Marques & J. C. Bicca-Marques, pp.29-38; Estratégias de forrageamento de um grupo de muriquis (*Brachyteles arachnoides*, Primates, Cebidae) da Estação Biológica de Caratinga - MG - J. Rimoli & C. Ades, pp.39-57; Estudo dos ritmos biológicos da catação no sagüi comum (*Callithrix jacchus*) em ambiente natural; C. S. S. de Castro, A. A. L. Menezes, J. W. de Queiroz & L. F. S. Moreira, pp.59-70; Mudanças no tamanho e na composição de grupos sociais de *Callithrix jacchus* em ambiente natural - M. A. O. Monteiro da Cruz & C. Scanlon, pp.71-80; Os índios Guajá e os primatas da Amazônia maranhense:

Um caso de sustentabilidade de caça? - H. L. Queiroz & R. Kipnis, pp.81-94; Padrões de interação vocal do muriqui (*Brachyteles arachnoides*) - F. D. C. Mendes, pp.95-118; Reintrodução do sagüi-de-cara-branca (*Callithrix geoffroyi*) em fragmentos da Mata Atlântica no Sudeste do Brasil - M. Passamani, S. L. Mendes, A. G. Chiarello, J. A. Passamani & R. R. Laps, pp.119-128; Vocalizações de *Alouatta caraya* (Primates, Cebidae) - C. Calegari-Marques & J. C. Bicca-Marques, pp.129-140. *Resumos*. Activity patterns, diet and social behavior in howler monkeys in Corrientes, Argentina - A. M. Giudice, pp.141-142; Alometria em *Callithrix jacchus* silvestres: Uma aplicação da teoria dos grafos - M. A. O. Monteiro da Cruz & T. Sato, pp.142-143; Aspecto de conteúdo nutricional da dieta e comportamento alimentar de *Brachyteles arachnoides* no Parque Estadual de Carlos Botelho - SP - M. T. Gomes, pp.143-144; Aumento na área de uso e diversificação da dieta em *Callithrix jacchus*: um estudo comparativo - C. C. Figueiredo Filho, M. L. C. B. Campelo, M. A. O. Monteiro da Cruz & L. C. O. Melo, pp.144-145; Como os muriquis (*Brachyteles arachnoides*) usam o seu espaço: os efeitos do tamanho do grupo e as implicações de suas preferências de habitat para sua conservação - L. P. Oliveira, pp.145-146; Comportamento social e conservação do muriqui (*Brachyteles arachnoides*) - F. D. C. Mendes, pp.146-147; Densidade e biomassa de primatas na Amazônia Oriental - M. Aparecida Lopes, p.148; Diferenças sazonais no comportamento dos carregadores de um grupo de sagüis-da-serra (*Callithrix flaviceps*) na Estação Biológica de Caratinga (EBC) - MG - V. H. Diego & S. F. Ferrari, p.149; Disponibilidade alimentar e padrões de distribuição espacial de espécies utilizadas pelo muriqui no Parque Estadual de Carlos Botelho, São Paulo - P. L. R. Moraes, pp.150-151; Ecologia e comportamento de fêmeas de muriqui (*Brachyteles arachnoides*) em diferentes estágios reprodutivos - C. P. Nogueira, pp.151-152; Ecologia e comportamento do mono-carvoeiro (*Brachyteles arachnoides*) na Fazenda Intervalles, Serra de Paranapiacaba, São Paulo - L. M. Petroni, p.152; Ecologia e comportamento do mono-carvoeiro, *Brachyteles arachnoides*, no Parque Estadual Carlos Botelho (PECB) - SP - O. de Carvalho Jr., p.153; Evaluación de la estacionalidad reproductiva en el mono aullador negro (*Alouatta caraya*, Primates, Cebidae) en el noreste de la Argentina - G. E. Zunino, pp.153-154; Habitat and population characteristics of the black howler monkey (*Alouatta caraya*) in northern Argentina - G. E. Zunino; S. Bravo; F. M. Ferreira & C. Reisenman, p.155; Levantamento das populações de *Brachyteles arachnoides* (muriqui) na parte norte de sua distribuição geográfica - L. P. de S. Pinto; C. M. R. Costa & L. I. Tavares, p.156; Novas perspectivas sobre a ecologia, comportamento e taxonomia dos sagüis do gênero *Callithrix* (Simpósio) - S. F. Ferrari, p.157; O filhote muriqui: Aspectos gerais do seu desenvolvimento - A. O. Rímoli, pp.157-158; O forrageamento dos muriquis (*Brachyteles arachnoides* Geoffroy, 1806): O papel de sua organização social na dispersão e sementeira de espécies arbóreas da Mata

- Atlântica - J. Rímoli, pp.159-160; O uso de "play-back" para o levantamento de populações de mico-leão-dourado (*Leontopithecus rosalia*), M. C. M. Kierulff; D. G. Kleiman & E. M. dos Santos, pp.160-161; Padrões da dieta de *Alouatta fusca* em período seco e úmido em um fragmento da floresta estacional semidecidual do vale do Rio Paraíba do Sul, Rio de Janeiro - V. L. A. G. Limeira & L. F. B. Oliveira, pp.161-162; Primatas das áreas litorâneas da Região Norte do Brasil (Primates, Platyrrhini) - S. Iwanaga & J. S. Silva Jr., pp.162-163; Simpósio sobre as pesquisas e conservação do miquiqui (*Brachyteles arachnoides*) - K. B. Strier, pp.163-164. *Seção II - Trabalhos de Cativeiro/Laboratório*. A comparative analysis of dental anomalies in three species of *Leontopithecus* Lesson, 1840 in captivity (Callitrichidae, Primates) - C. H. F. Burity, M. U. Alves, A. Pissinatti & J. B. da Cruz, pp.167-173; Adenoma of the mammary gland in *Cebus apella* - J. T. Borda, J. C. Ruiz & M. S. Negrette, pp.175-178; A simulacrum of *Saguinus bicolor ochraceus* Hershkovitz, 1966, obtained through hybridising *S. b. martinsi* and *S. b. bicolor* (Callitrichidae, Primates) - A. F. Coimbra-Filho, A. Pissinatti & A. B. Rylands, pp.179-184; Aspectos clínicos, patológicos e tratamento de miquiquis, *Brachyteles arachnoides*, em cativeiro (Ceboidea - Primates) - A. Pissinatti, J. B. da Cruz & A. F. Coimbra-Filho, pp.185-194; As primeiras sete semanas de coabitação em casais recém-formados de *Leontopithecus chrysomelas* (Primates: Callitrichidae) - C. Alonso, J. C. L. Leite & N. Schiel, pp.195-204; Back-crossing and the preservation of the buffy-headed marmoset, *Callithrix aurita flaviceps* (Callitrichidae, Primates) - A. F. Coimbra-Filho, A. Pissinatti & A. B. Rylands, pp.205-215; Benign prostatic hyperplasia in the nonhuman primate *Leontopithecus* (Lesson, 1840), Callitrichidae - Primates - B. R. Ferreira, G. H. Bechara, A. Pissinatti & J. 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Schneider, p. 351; A radiação adaptativa dos atelídeos vista sob uma abordagem molecular: concordâncias e controvérsias - I. Sampaio, M. P. C. Schneider, A. Pissinatti, A. F. Coimbra-Filho, M. Goodman & H. Schneider, p.352; Bibliografia sobre primatas da Amazônia (Primates, Cebidae) - A. D. R. P. Azevedo & S. Iwanaga, p.353; Body size growth in three marmosets of the genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates) - C. H. F. Burity, C. A. Mandarim-de-Lacerda & A. Pissinatti, p.353-354; Carcinoma hepatocelular em *Saimiri boliviensis* (Primate) - J. T. Borda, J. C. Ruiz & M. S. Negrette, pp.354-355; Compartilhamento de alimento entre *Leontopithecus chrysomelas* e *Saguinus midas midas* no cativeiro - A. C. de A. Moura & C. Alonso, pp.355-356; Crianza manual de *Saimiri boliviensis* (Primate) en CAPRIM - E. M. Patiño, J. C. Ruiz & J. T. Borda, pp.356-357; Cuidado parental em *Saguinus midas midas*, *Callithrix kuhli* e *Leontopithecus chrysomelas* nas seis primeiras semanas de vida - C. Alonso & S. H. M. Silva, pp.357-358; Dimorfismo sexual en las relaciones materno-filiales de *Saimiri boliviensis* durante los primeros 5 meses de edad - A. S. Milani & J. C. Ruiz, pp.358-359; Factors affecting captive breeding performance in lion tamarins, genus *Leontopithecus* - J. A. French, A. Pissinatti & A. F. Coimbra-Filho, pp.359-360; Radiação e especiação do gênero *Ateles* analisadas sob o ponto de vista cromossômico - M. A. A. Medeiros, M. Ponsá, M. Garcia, F. Garcia, J. C. Pieczarka, C. Y. Nagamachi, J. Egozcue & R. M. S. Barros, pp.361-362; Variabilidade cromossômica em quatro espécies de *Alouatta* (Primates, Cebidae) - M. Lima, I. Sbalqueiro, M. Pinheiro & E. H. Oliveira, pp.362-363; Variação crânio-dental em populações naturais e de cativeiro do *Leontopithecus rosalia* Linnaeus, 1766 (Primates, Callitrichidae) - T. M. L. Sant'Anna & L. M. Pessôa, pp.363-364. Available from: Stephen F. Ferrari, DEGE/UFPa, Caixa Postal 8607, 66.075-150 Belém, Pará, Brazil, Fax: +55 (0)91-211-1662, e-mail: <ferrari@cuxiu.cbio.ufpa.br>.
- Primates: The Amazing World of Lemurs, Monkeys, and Apes*, photography by Art Wolfe, text by Barbara Sleeper, 1997. Chronicle Books, San Francisco. 176pp. ISBN 0 8118 1434 3. Price: \$24.95 paper (200 full-color photographs). Foreword by Dr. Russell A. Mittermeier. The 73 species presented in the book are grouped according to the four geographic areas in which they live: Madagascar, Africa, Asia, and the Neotropics. Within each region, the species are listed from the most primitive - lemurs, lorises, pottos, bushbabies, and tarsiers - to the more

evolutionarily advanced monkeys, gibbons, and apes. The 200 full-color photographs were selected to show the great diversity in size, coloration, habitat preference, and social structure of the Order Primates. All of the photos are new for this book, including some species rarely captured by the camera. The accompanying natural history text gives an overview of the fascinating social behavior, ecology, and critical habitat requirements that characterize non-human primates around the world. "What a treat! *Primates: The World of Lemurs, Monkeys, and Apes* not only illustrates more than one hundred species in two hundred superb photos, but reveals some of the most recently discovered and extremely rare. It is both fascinating and moving to gaze at so many strange, often strangely beautiful, faces and figures built to the same general plan as our own. That this is the first book on primates so richly illustrated reflects the exceptional difficulty of finding and photographing our disappearing kin." - William Conway, President, Wildlife Conservation Society (Publisher's press release). "World populations of nonhuman primates are in trouble in all of the ninety-two countries in which they live," writes Russell Mittermeier. "Primates are threatened by the destruction of their forests (90% of all primates are found in the world's tropical rain forests) and other natural habitats, by hunting as food (especially severe in West and Central Africa and part of Amazonia), and by live capture for export. A lot of work needs to be done if primates in countries such as Madagascar are to continue to enrich our lives and teach us about ourselves. More books like this one are urgently needed to stimulate interest in conservation both in the United States and in the tropical countries where so many of this planet's animals and plants live" (From the Foreword). Available from: Chronicle Books, 85 Second Street, 6th Floor, San Francisco, California 94105, USA, Tel: +1 415 537 4257, Fax: +1 415 537 4470.

Roteiro Metodológico para Elaboração de Listas de Espécies Ameaçadas de Extinção, Contendo a Lista Oficial de Fauna Ameaçada de Extinção de Minas Gerais, por Livia Vanucci Lins, Ângelo B. M. Machado, Cláudia M R. Costa and Gisela Herrmann, 1997, 50pp. Fundação Biodiversitas, Belo Horizonte. ISBN 85 85401 10 9. Preço: US\$10,00. *Publicações Avulsas da Fundação Biodiversitas No. 1*. Em 1995, a Fundação Biodiversitas recebeu do Instituto Estadual de Florestas de Minas Gerais, a solicitação de elaborar a lista de espécies da fauna ameaçada de extinção do estado. Para isso criou uma metodologia envolvendo um grande número de especialistas, tendo como etapa fundamental a formação de uma base de dados sobre as espécies candidatas à lista, de modo a subsidiar a decisão final por especialistas reunidos em um workshop. Mais recentemente, esta mesma metodologia foi também adotada pela Biodiversitas na elaboração da lista de espécies ameaçadas de extinção da flora do estado de Minas Gerais, atualmente em tramitação nos órgãos ambientalistas do governo para aprovação final. O roteiro metodológico desenvolvido pela

Biodiversitas na elaboração dessas listas e apresentado nesta publicação, que marca o número 1 da série *Publicações Avulsas da Fundação Biodiversitas*, na qual a Fundação pretende divulgar os trabalhos que vem realizando em sua área de atuação. Incluída também é a Lista Oficial de Espécies Ameaçadas de Extinção da Fauna do Estado de Minas Gerais (Deliberação Copam 041/95), juntamente com a lista de espécies presumivelmente ameaçadas. Embora esta última não seja oficial. Maiores informações: Fundação Biodiversitas, Av. Contorno 9155, 11º Andar, Prado, 30110-130 Belo Horizonte, Minas Gerais, Brasil, Tel: (0)31 291 9673, Fax: (0)31 291 7658, e-mail: cdcdb@gold.horizontes.com.br.

The Conservation Atlas of Tropical Forests: The Americas, edited by Caroline S. Harcourt and Jeffrey A. Sayer, 1996. Simon and Schuster, New York, pp.335. ISBN 0 13 340886 8. Price: £70.00. An excellent and vital reference, this volume, covering the Caribbean, Central America (including Mexico) is the third and final one in the series *The Conservation Atlas of Tropical Forests*, with *Asia and the Pacific* having been published in 1991, and *Africa* in 1992. The threats to the forests of tropical America have been the center of international concern for some years, with the 1992 United Nations Conference on the Environment and Development in Rio de Janeiro highlighting the complexities of factors that lead to deforestation throughout the tropics. Although the forests in the Americas are by far the most extensive remaining in the humid tropics, with large areas of forest in the Amazon and Orinoco basins being more or less intact, other areas have suffered devastating deforestation in recent decades. In particular, the Pacific coasts of Colombia and Ecuador and many parts of Central America and Caribbean have lost much of their natural habitat this century, while the Atlantic forest of Brazil was depleted even earlier. As in other volumes, this Atlas is divided into two parts, the first dealing with subjects that are relevant to the region in general and the second examining each country in detail. It is evident from chapters in part one that knowledge exists of many of the sites and management regimes needed to conserve biodiversity in the Americas and overall many of the authors are optimistic about the prospects for the conservation and rational use of the forests in the region. Nevertheless, the detailed analysis of each country makes it evident that in many cases, in spite of the sophisticated technology available, there is still considerable controversy about the areas of forest present and the rate at which deforestation is occurring. Much more research is evidently needed and data of the sort provided here are unavoidably out of date almost as soon as they are produced, but waiting for the definitive answers will mean that many solutions come too late. It is hoped that the facts and analysis within this Atlas will ultimately assist with the conservation and sustainable management of the remaining forests with the Americas and that this vital resource can be preserved for future generations. Available from IUCN Publications Services Unit, 219c

Huntingdon Road, Cambridge CB3 0DL, UK, Tel: +44 1223 177894; Fax: +44 21223 277175; e-mail: iucn-psu@wcmc.org.uk.

Centres of Plant Diversity, Volume 3: The Americas. A Guide and Strategy for their Conservation, edited by S. D. Davis, V. H. Heywood, O. Herrera-MacBryde, J. Villa-Lobos, and A. C. Hamilton, 1997, 562pp. The World Wide Fund for Nature (WWF) and IUCN - The World Conservation Union. IUCN Publications Unit, Cambridge. ISBN 2 8317 0199 6. Price: £45.00. This volume, dealing with the Americas, was prepared (with the exception of the Caribbean) under the co-ordination of the Smithsonian Institution, National Museum of Natural History, Department of Botany. Volume 3 contains six sites in North America, 20 in Middle America, 46 in South America, and three in the Caribbean. The sites were selected partly on the basis of floristic studies, but especially with reference to the detailed knowledge of over 100 botanists familiar with this region. The Data Sheet for each site is set within a regional context, outlining wider patterns of plant distributions, threats and conservation efforts. Additional sites are mentioned in each of the regional overviews. The introduction includes very useful tables giving information on species richness and endemism, floristic diversity and endemism by region, and degree of threat to CPD sites. The rationale for the ten-year project, which has so far also included Europe, the Atlantic Islands, Africa and the islands of the Western Indian Ocean (*Vol. 1 - Europe, Africa, South West Asia and the Middle East*), and the rest of Asia, Australasia and the Pacific Islands (*Vol. 2 - Asia, Australasia and the Pacific*) is the concern about the rapid global loss and degradation of natural ecosystems and the urgent need to highlight areas of pristine botanical importance, with the hope that these will receive adequate levels of resources to ensure their protection. This work is essential reading for all those concerned with planning land use strategies for conservation and appropriate development. It is WWF and IUCN's hope that this global assessment will be followed by further assessments at the local level, so that the vital tasks of conservation of plant diversity can be well integrated in detail into national and regional conservation and development strategies. To order: If ordering from the U.S. and Canada - Island Press, Box 7, 24850 East Lane, Covelo, CA 95428, USA, Tel: +1 800 828-1302, Fax: +1 707 983-6414, e-mail: ipwest@igc.apc.org; for other countries - IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge CB3 0DL, UK, Tel: +44 1223 177894; Fax: +44 21223 277175; e-mail: iucn-psu@wcmc.org.uk.

Uma Estratégia Latino-Americana para a Amazônia, editado por Crodowaldo Pavan, 1996, em três volumes. Fundação Memorial da América Latina e Fundação Editora da UNESP, Sao Paulo. *Vol. 1*. ISBN 85 85373 11 3, 348pp., *Vol. 2*. ISBN 85 85373 14 8, 382pp., *Vol. 3*. ISBN 85 85373 15 6, 332pp. Os três volumes desta série reproduzem na íntegra as palestras, os depoimentos e os documentos científicos debatidos na conferência

internacional do mesmo nome, promovida pelo Memorial da América Latina em marco de 1992. Representam valiosa contribuição às instituições governamentais e privadas interessadas no futuro da Amazônia, servindo de alerta sobre as possibilidades e dificuldades que programas ou projetos de desenvolvimento da região devem enfrentar. *Volume 1* reúne textos sobre os seguintes temas: biodiversidade; unidades de conservação; a ciência dos Índios e caboclos no manejo dos recursos naturais; e a educação ambiental e as ciências ambientais. *Volume 2* reúne textos sobre os seguintes temas: colaborações científicas; clima e vegetação; recursos minerais da Amazônia e sua problemática; cooperação institucional; e o papel da iniciativa privada no desenvolvimento da Amazônia. *Volume 3* reúne textos sobre os seguintes temas: colaborações científicas; a importância estratégica da Amazônia sul-americana; os significados político e econômico da Amazônia para a América Latina; e conservação, preservação e desenvolvimento: propostas integradas. Maiores informações: Fundação Memorial da América Latina, Departamento de Publicações, Avenida Mário de Andrade 664, Barra Funda, 01156-060, São Paulo, Brasil, Tel: (011) 823 9611, Fax: (011) 825 7545.

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Meetings

Spring Meeting of the Primate Society of Great Britain (PSGB), 23-24 March, 1998, Bristol, UK. Day 1 will be on the "The Impact of Bushmeat Hunting on Primates in Africa" and day 2 is for more general papers. The event is being organized by John Fa, Elizabeth Rogers and Ian Redmond. For more information: Dr John Fa, Jersey Wildlife Preservation Trust, Les Augrès Manor, Trinity, Jersey JE3 5BP, British Isles, Tel: (0)1534 864666 ext.233, Fax: (0)1534 864592, e-mail: itc@itl.net.

Association for the Study of Animal Behaviour - Easter Meeting, 2-3 April 1998, University of Glasgow, Scotland. Organized by Felicity Huntingford and Neil Metcalfe. Invited speakers include Geoff Parker (Liverpool University), Liselotte Sundström (Helsinki University), and Heinz Richner (Bern University). For more information: F. A. Huntingford, Division of Environmental & Evolutionary Biology, Graham Kerr Building, Glasgow University, Glasgow G12 8QQ, UK, Fax: +44 (0)141 330 5971, e-mail: <f.huntingford@bio.gla.ac.uk>.

European Federation for Primatology - Workshop 1998, 16-18 April, 1998, at the Station Biologique de Paimpont, Université de Rennes, France. Organisers: Bertrand L. Deputte (Chair), Robin Crompton, Annie Gautier-Hion and Nelly Menard. Theme: "Diet, foraging behavior and time-budgets in nonhuman primates: how field studies may help improving the welfare of captive primates?". The aim

of this workshop is to provide the European Commission and the Council of Europe with sound advice to improve the welfare of captive primates in European primate laboratories, with special reference to feeding and time-budgets. This workshop will review evidence from field studies about diet, foraging behavior and time budgets in different primate species especially those, or closely related to those, commonly used in laboratory experiments. Other issues include food processing, food palatability and attractiveness, and digestibility. Social constraints on feeding behavior and feeding devices designed to provide environmental enrichment will also be discussed. Field studies on a large number of primates species outline the diversity of diets among species, the flexibility of feeding and foraging behavior at a specific level related to differences in vegetation composition between sites and to seasonal variations in food availability at a given site. In captivity such wildlife constraints are absent, leading to a considerable reduction in the importance of foraging behavior within primate time-budgets. Although management in laboratories generally provides primates with their basic energetic requirements and leads to a normal, or even supra-normal, growth whether in groups, paired or single, captive primates might show physiological and psychological impairments which relate to a highly modified and routine time-budget and standardized and monotonous diet. The Workshop will include oral presentations by invited speakers, and oral communication and posters from participants. Provisional list of invited speakers: R. Crompton (UK), R. Dunbar (UK), A. Gautier-Hion (Fr), D. Hill (UK), H. Kummer (Ch), N. Ménard (Fr), L. Scott, (UK), E. Sterck (The N), P. Teubner (Ger), C. Tutin (UK), A. Vitale (It). For further information, registration and abstract forms please contact: Workshop EFP'98 - Station Biologique, 35380 Paimpont, France, e-mail: <mcquris@univ-rennes1.fr> or <deputte@univ-rennes1.fr>.

New World Primate Symposium, 26 April 1998, in conjunction with The Eastern Regional Conference of the AZA in Boston, Massachusetts. This year's topic is "Cebid Conservation and Management." Registration for the one-day symposium is US\$30.00. Please contact: Lee Nesler, General Curator, Pittsburgh Zoo, Tel: (412) 665-3651, Fax: (412) 665-3925, e-mail: <nesler@zoo.pgh.pa.us> to secure registration and abstract/poster submission forms or other information.

21st Annual Meeting of the American Society of Primatologists, 28 June - 1 July, 1998, Southwestern University, Georgetown, Texas. Co-hosted by the Southwestern University and The University of Texas M. D. Anderson Cancer Center, Science Park, Bastrop, Texas. For further information: Steven Schapiro, University of Texas M.D Anderson Cancer Center, Department of Veterinary Research, Rte 2, Box 151-B1, Bastrop, Texas 78602, USA., Tel: 512 321-3991, Fax: 512 322 5208, or Evan Zucker, Chair - ASP Program Committee, Department of Psychology, Loyola University, New Orleans, LA 70118, USA,

Tel: 504 865-3255, e-mail: <zucker@loyno.edu>. Web site: <<http://www.asp.org>>.

1998 Meeting of the Society for Conservation Biology, 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.

Animal Behavior Society Annual Meeting, 18-22 July, 1998, Southern Illinois University, Carbondale, Illinois. For further information: Dr Lee Drickamer, Department of Zoology, Southern Illinois University, Carbondale, IL 62901, USA. Web site: <<http://www.clarku.edu/~rking/abs.html>>.

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 (SIE). 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, Lunigiana 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 Mammalogica (SEM) and the Sociedad Española para la Conservación y el Estudio de los Mamíferos (SECEM). Also participating: University of Santiago de Compostela (USC) through its Colleges of Sciences and Pharmacy as well as the Consejería de Agricultura, Ganadería, 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. Those interested in organizing a symposium should contact a member of the Steering Committee. Deadlines for proposals 11 March 1997. The organizers request that electronic mail be used for contact whenever possible. For more information, all queries and requests: galemys@pinar1.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 Parasitología, Facultad de Farmacia, Universidad de Santiago de Compostela, 15706 Santiago de Compostela, Spain, Fax: (34) 81 593316.

XVII Congress of the International Primatological Society, 9-14 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 accompanying 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, Faculte des Sciences, Batement P, Porte 207, BP 906, Antananarivo 101 Madagascar. Tel: 261 2 26991 ext.24, e-mail: <ralaiari@syfed.refer.mg>. Development Committee: Marlene Rakotomalala, Tel: 261 2 26991 ext.13, Scientific Committee: Hantanirina Rasamimanana, e-mail: <hramamim@syfed.refer.mg>. Coordinator and for information: Soava Rakotoarisoa, Tel: 261 2 26991 ext.24. Common fax: 261 2 31398.

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/>>.

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. Offers of talks or posters relevant to these or other aspects are invited. Posters on any other aspect of animal behaviour are also welcomed. 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>.

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>.

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.

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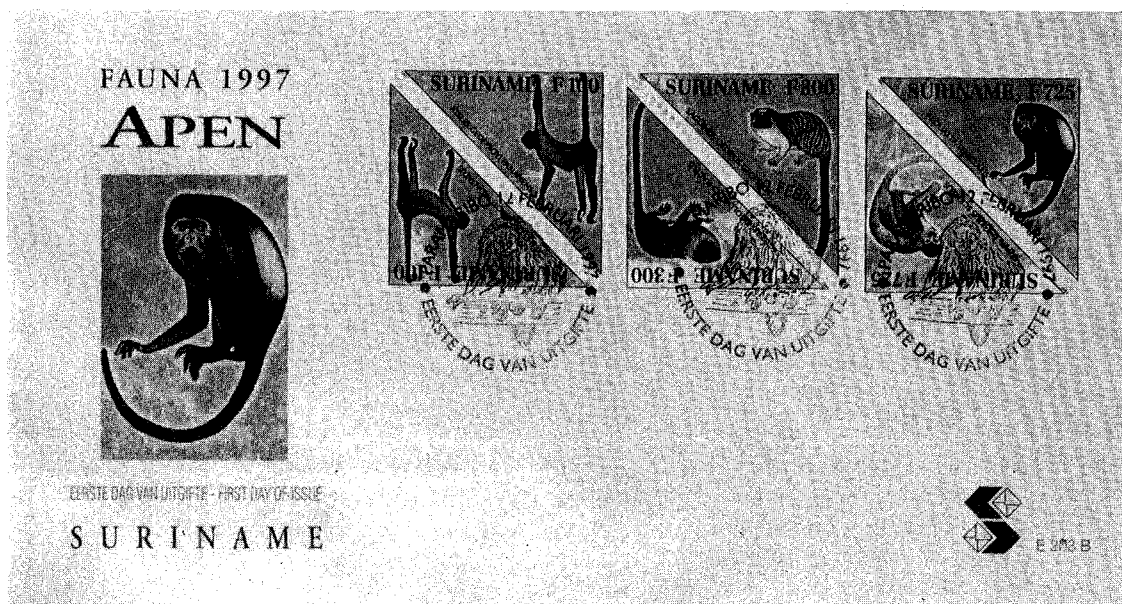
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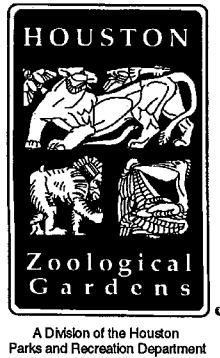
SURINAME STAMPS PRODUCED IN 1997, WITH THE ILLUSTRATIONS OF STEPHEN NASH, ONE OF THE WORLD'S FOREMOST NATURAL HISTORY ARTISTS, DEPARTMENT OF ANATOMICAL SCIENCES AT THE STATE UNIVERSITY OF NEW YORK - STONY BROOK.



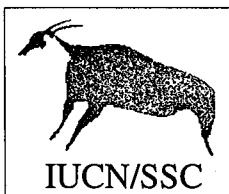
From left to right: *Cebus nigrivittatus*, *Cebus apella apella*, *Ateles paniscus*, *Saguinus midas midas*, *Cacajao calvus calvus* and *Lagothrix flavicauda*.



From left to right: *Ateles geoffroyi panamensis*, *Ateles geoffroyi frontatus*, *Saguinus bicolor ochraceus*, *Saguinus oedipus geoffroyi*, *Saimiri sciureus sciureus* and *Alouatta seniculus*.



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