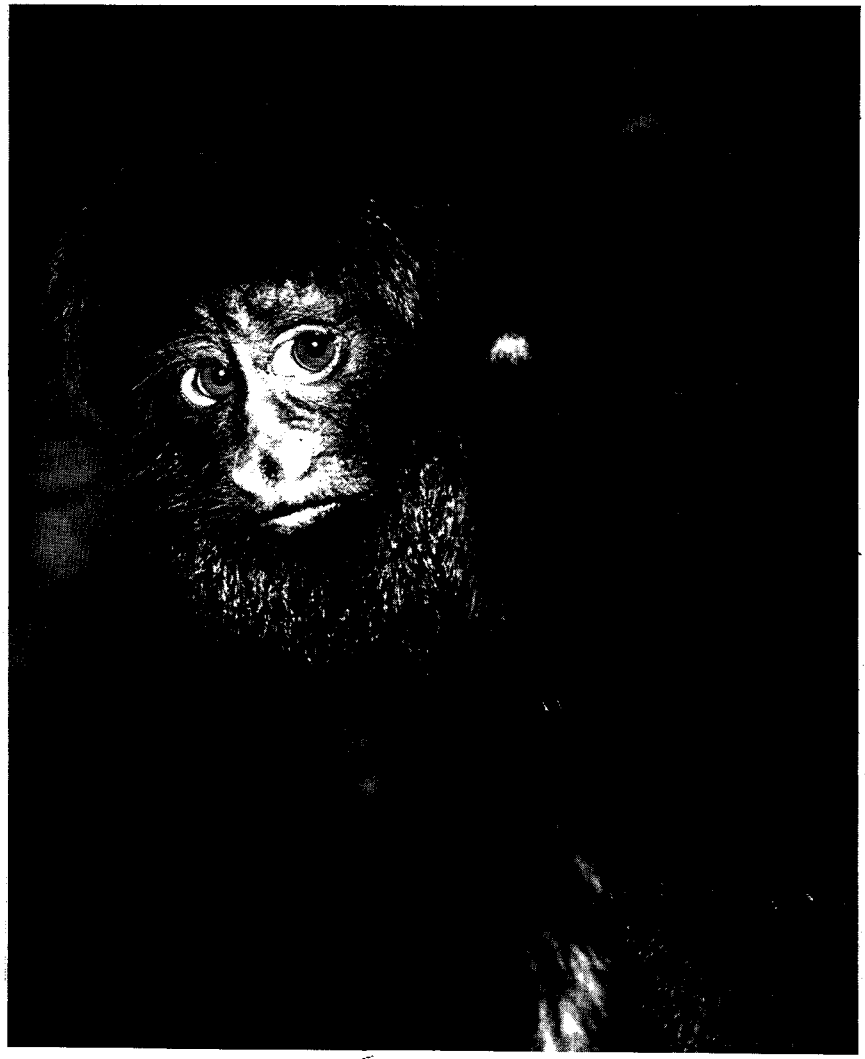
NEOTROPICAL PRIMATES

VOLUME 1, NUMBER 4
DECEMBER, 1993

A Newsletter of the Neotropical Section of the IUCN/SSC Primate Specialist Group



CONSERVATION INTERNATIONAL

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Articles

SOUTH AMERICAN PRIMATES AND THE IUCN RED LIST OF THREATENED ANIMALS

The World Conservation Union (IUCN) Species Survival Program, led by Simon N.Stuart (IUCN, Gland), is preparing a revision of the *1990 IUCN Red List of Threatened Animals*, as reported in *Neotropical Primates* 1(2):1-2. This listing, is put together by the World Conservation Monitoring Centre (Cambridge, UK), in collaboration with the SSC Specialist Groups and BirdLife International (formerly the International Council for Bird Preservation, based in Cambridge, UK). It complements the IUCN Red Data Books and IUCN Species Action Plans, both of which contain more detailed information on the conservation status of the species involved. A number of improvements will be made for the 1993 edition. In contrast to the 1990 edition, it will include full country distributions, as well as summary tables and thematic maps. The 1993 list will be published by Chapman and Hall, London, following discussion and review of the proposals at the IUCN General Assembly in January 1994.

The preliminary proposal for a revision of the South American primates (excluding Mexico and Central America), drawn up as an official contribution from the Neotropical Section of the Species Survival Commission (SSC) Primate Specialist Group (PSG), was published in *Neotropical Primates* 1(2):1-2. This and the justifications for the changes were submitted for comment to over thirty PSG members active in the field. Here we publish the final listing which resulted, and which was sent to Dr Simon Stuart and Dr Brian Groombridge (WCMC) in September 1993. A full report justifying the changes followed in October 1993 (Rylands, Encarnación and Mittermeier, 1993). Compared with the 1990 List, the following modifications are being proposed. Change in status: *Callithrix chrysoleuca* from K to V; *Callithrix intermedia* from K to V; *Saguinus imperator imperator* from I to V; *Alouatta fusca fusca* from V to E; *Lagothrix lagotricha lugens* from V to E; *Ateles belzebuth hybridus* from V to E. Additions: *Callithrix kuhli, Callithrix geoffroyi, Callithrix nigriceps, Saguinus fuscicollis leucogenys, Saguinus tripartitus, Alouatta palliata aequatorialis, Aotus brumbacki, Aotus lemurinus griseimembra, Aotus miconax, Callicebus torquatus lucifer, Cebus albifrons yuracus, Cebus albifrons cuscinus, Cebus apella xanthosternos, Cebus apella robustus, Cebus kaapori, Chiropotes satanas utahicki, Pithecia aequatorialis*, and *Saimiri vanzolinii*. Removals: *Saguinus bicolor ochraceus, Saguinus bicolor martinsi*, and *Saguinus imperator subgrisescens*. Some taxonomic changes were also suggested. They include: 1) that all recognized *Callithrix* forms should be listed as species; 2) that *Ateles paniscus chamek* should be regarded as subspecific to *Ateles belzebuth* (see Froehlich *et al.*, 1991), and *Ateles paniscus*, therefore, lacks subspecies; and 3) that *Saguinus geoffroyi* and *Saguinus oedipus* should be recognized as distinct species (see Rylands, 1993). The proposal provides a listing of 19 callitrichid species and subspecies, and 43 cebid species and subspecies (see next page).

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IUCN Red List of Threatened Animals - 1993
SSC/PSG Neotropical Section Proposal for South American Primates

FAMILY CALLITRICHIDAE

R	*Callimico goeldii*	Goeldi's monkey
E	*Callithrix argentata leucippe*	Golden-white bare-ear marmoset
E	*Callithrix aurita*	Buffy-tufted-ear marmoset
V	*Callithrix chrysoleuca*	Golden-white tassel-ear marmoset
E	*Callithrix flaviceps*	Buffy-headed marmoset
V	*Callithrix geoffroyi*	Geoffroy's tufted-ear marmoset
V	*Callithrix intermedia*	Aripuanã marmoset
V	*Callithrix kuhli*	Wied's black-tufted-ear marmoset
V	*Callithrix nigriceps*	Black-headed marmoset
E	*Leontopithecus caissara*	Black-faced lion tamarin
E	*Leontopithecus chrysomelas*	Golden-headed lion tamarin
E	*Leontopithecus chrysopygus*	Black lion tamarin
E	*Leontopithecus rosalia*	Golden lion tamarin
E	*Saguinus bicolor bicolor*	Pied tamarin
V	*Saguinus fuscicollis leucogenys*	Andean saddle-back tamarin
V	*Saguinus imperator imperator*	Black-chinned emperor tamarin
E	*Saguinus leucopus*	Silvery-brown bare-face tamarin
E	*Saguinus oedipus*	Cotton-top tamarin
K	*Saguinus tripartitus*	Golden-mantle saddle-back tamarin

FAMILY CEBIDAE

V	*Alouatta fusca clamitans*	Southern brown howling monkey
E	*Alouatta fusca fusca*	Northern brown howling monkey
E	*Alouatta belzebul ululata*	Red-handed howling monkey
E	*Alouatta palliata aequatorialis*	South Pacific blackish howling monkey
V	*Aotus brumbacki*	Brumback's night monkey
V	*Aotus lemurinus griseimembra*	Night monkey
V	*Aotus miconax*	Andean night monkey
V	*Ateles belzebuth belzebuth*	Marimonda spider monkey
V	*Ateles belzebuth chamek*	Black-faced black spider monkey
E	*Ateles belzebuth hybridus*	Hybrid spider monkey
E	*Ateles belzebuth marginatus*	White-whiskered spider monkey
V	*Ateles paniscus*	Red-faced black spider monkey
E	*Brachyteles arachnoides arachnoides*	Southern muriqui
E	*Brachyteles arachnoides hypoxanthus*	Northern muriqui
E	*Cacajao calvus calvus*	White bald-headed uacari
E	*Cacajao calvus novaesi*	Novaes' bald-headed uacari
E	*Cacajao calvus rubicundus*	Red bald-headed uacari
E	*Cacajao calvus ucayalii*	Ucayali bald-headed uacari
E	*Cacajao melanocephalus melanocephalus*	Humboldt's black-headed uacari
E	*Cacajao melanocephalus ouakary*	Spix's black-headed uacari
V	*Callicebus cupreus ornatus*	Ornate titi monkey
V	*Callicebus oenanthe*	Andean titi monkey
I	*Callicebus olallae*	Beni titi monkey
E	*Callicebus personatus barbarabrownae*	Northern Bahian blond titi
E	*Callicebus personatus melanochir*	Southern Bahian masked titi
E	*Callicebus personatus nigrifrons*	Black-fronted titi
E	*Callicebus personatus personatus*	Northern masked titi
V	*Callicebus torquatus lucifer*	Widow monkey
V	*Cebus albifrons yuracus*	Andean white-fronted capuchin
V	*Cebus albifrons cuscinus*	White fronted capuchin
V	*Cebus apella robustus*	Robust tufted capuchin
E	*Cebus apella xanthosternos*	Yellow-breasted capuchin
V	*Cebus kaapori*	Ka'apor capuchin
V	*Chiropotes albinasus*	White-nosed bearded saki
V	*Chiropotes satanas utahicki*	Uta Hick's bearded saki
E	*Chiropotes satanas satanas*	Black saki
E	*Lagothrix flavicauda*	Yellow-tailed woolly monkey
V	*Lagothrix lagotricha cana*	Geoffroy's woolly monkey
V	*Lagothrix lagotricha lagotricha*	Humboldt's woolly monkey
E	*Lagothrix lagotricha lugens*	Colombian woolly monkey
V	*Lagothrix lagotricha poeppigi*	Poeppig's woolly monkey
V	*Pithecia aequatorialis*	Equatorial saki
V	*Saimiri vanzolinii*	Blackish squirrel monkey

CATEGORIES: E=endangered, V=vulnerable, R=rare, I=indeterminate, K=insufficiently known

AVAILABILITY OF RESOURCES TO PRIMATES AND HUMANS IN A FOREST FRAGMENT OF SIERRA DE SANTA MARTHA, MEXICO

Theories of island biogeography and minimum viable populations are used to predict consequences of large versus small protected areas and usually conclude that large reserves protect species, ecosystems, and biodiversity with greater certainty than smaller ones (Soulé & Simberloff, 1986, in Ayres *et al.*, 1991). From our perspective, such a statement implies that efforts to preserve large tracts of forest should never be abandoned. However, in the face of the rapid changes that are transforming the tropical rain forest landscape (e.g., Rylands & Keuroghlian, 1988), our ability to propose conservation measures on behalf of primates may depend on our study of the processes allowing specific taxa to persist in fragmented habitats (Schwarzkopf & Rylands, 1989). This is particularly evident in tropical countries, where protecting a series of forest fragments may represent the only chance to ensure the survival of native primates in a given part of their range.

It may be argued that forest fragments are a poor option to preserve primates in the long run. Nevertheless, if our conservation measures take into account the potential for improvement in the rural inhabitants' quality of life, people may become an integral component of the conservation effort and, with their support, our perception of a fragmented forest may switch from what it is to what it might be. In the meantime, we believe that studies on what a fragment has to offer to primates as well as humans, for example in the form of ecological services and products, are of key importance to examine the ecological and socio-economic values forest remnants may have in a severely transformed landscape. In this paper we present an evaluation of the food resources available to primates in a forest fragment of Sierra de Santa Martha, Veracruz, Mexico, and compare it to the potential forest products available to locals.

In Santa Martha, the expansion of the agricultural frontier, the small scale extraction of wood and wild plants for various uses, along with stochastic events such as forest fires, have transformed large expanses of forest into small, disconnected fragments which remain in the public land lots (*ejidos*) of the south and southeastern slopes (Silva-López & García, 1984). Symptoms more than causes of a situation with deep socio-economic roots, these problems have transformed the landscape in multiple scales and dimensions. The problems are not only threatening the survival of wild species inhabiting the fragments, but also life conditions of the local zoque-popoluca inhabitants, as well as their traditional methods of appropriation, management, and use of natural resources.

What resources remain in a forest fragment which are of use to primates and humans? To answer this question, we re-examined the results of a detailed vegetation study, conducted in one of 23 forest fragments of 2-20 ha surveyed by Silva-López (1987; Silva-López *et al.*, 1988). The fragment is approximately circular, and with 10 ha is a little above the 8.37 ha mean recorded in the area. It is inhabited by a group of howlers (*Alouatta palliata*, n=10) and a group of spider monkeys (*Ateles geoffroyi vellerosus*, n=16). The habitat characteristics and feeding habits of both groups were studied by Jiménez-Huerta (1992).

Trees with a DBH equal to or greater than 20 cm and trees with crowns forming part of a continuum in the canopy were the main focus of attention in our original study. We labelled and mapped 1167 trees, 74% of which were identified (38 families and 78 species). The Leguminosae and Moraceae families were the richest in species (with 9 each). *Pseudolmedia oxyphyllaria*, *Guarea glabra*, *Cymbopetalum penduliflorum*, *Inga* sp., and *Sapium lateriflorum* were among the most abundant species in the fragment. The Shannon-Wiener index (H') was 1.59. Species richness and biological diversity in the vegetation remnant are within the ranges reported for other larger tracts of forest in nearby areas (e.g., Jiménez-Huerta, 1992).

In general, forest fragments are left in the campesinos' lots as sources of wood, medicine, food, and firewood (Silva-López and Garcia, 1984; Jiménez-Huerta *et al.*, 1992). However, the fate of the primates is linked not only to the humans' dependence on forest fragments, but also the resources available to them. The mere fact that the howling monkeys and spider monkeys have been inhabiting the fragments for the past 10-15 years (Silva-López *et al.*, 1988) suggests that they are meeting their key nutritional and other requirements. In evaluating the fragment, our

Table 1. Plant species used by *Ateles geoffroyi vellerosus* (AGV), *Alouatta palliata* (AP), and by humans in a 10 ha forest fragment at Sierra de Santa Martha, Veracruz, México. MED = medicine; Fr = fruit; Fl = flower; Frwd = firewood; Const = construction material).

	FRAGMENT	PRIMATES/ FOOD			SPECIES USED BY LOCALS	
SPECIES	No. Ind.	AGV	AP	FOOD	MED	OTHER
Alchornea latifolia	6	X				
Aspidosperma megalocarpon	2				Expectorant	
Belotia mexicana	2	X	X			
Brosimum alicastrum	16	X	X	Fr	Lactogenic	
Bursera simaruba	7		X		Analgesic	Frwd
Calophyllum brasiliense	14					Const
Cecropia obtusifolia	12	X	X	Fr, Fl	Urinary system	
Coccoloba sp.	2	X				
Cordia gerascanthus	3	X	?		Skin	
Cupania dentata	4	X			Anti-inflamatory	
Cymbopetalum penduliflorum	51	X				
Dendropanax arboreus	63	X				
Dialium guianense	8	X	X	Fr		Const
Ficus insipida	4	X	X			
Ficus sp.	19	X	X			
Ficus tecolutensis	1	X				
Gliricidia sepium	1					Frwd
Guarea glabra	66	X				
Inga sapindioides	41			Fr		
Inga sp.	1	X			Diarrhea	
Liquidambar macrophylla	1					Frwd
Manilkara sapota	14	X	X	Fr		Frwd/Const
Miconia argentea	9			Fr	Ofthalmic	
Myrcia sp.	4	X				
Nectandra ambigens	22	X	X			
Piper amalago	3				Anti-crotalic	
Pithecellobium arboreum	2	X	?			
Poulsenia armata	5		X	Fr		
Pouteria campechiana	10	X	X	Fr	Skin	Frwd/Const
Pseudolmedia oxyphyllaria	68	X	X	Fr		
Psychotria chiapensis	4				Gangrene	
Pterocarpus rohrii	4	X	X			
Rheedia edulis	23			Fr		Const
Rollinia jimenezi	5			Fr		
Spondias mombin	12	X	X	Fr	Diarrhea	
Tapirira aff. macrophylla	29	X		Fr		
Terminalia amazonia	25		X			Const
Trichilia havanensis	2				Skin	
Trophis racemosa	9	X	X	Fr		
Vatairea lundellii	1				Anti-crotalic	

estimations and percentages were based entirely on the figures of 78 species and 835 individuals identified. Twenty-eight tree species form part of the monkeys' diet (Jiménez-Huerta, 1992), including some of the most abundant, for example, *G.glabra*, *P.oxyphyllaria*, *C.penduliflorum*, and *D.arboreus*, as well as three fig species (*Ficus* sp., *F.insipida*, and *F.tecolutensis*). The 28 species account for more than 35% of the species' total and almost 60% of the individuals (see Table 1). This large number of potential food sources may help to understand the almost 15-year span in which the monkeys have been inhabiting such a small forest fragment.

A zoque-popoluca family use a broad variety of the resources available in a forest fragment. Based on the studies of Silva-López (1987), Santos-Rodríguez (1988), and González-Rivera (1989), we found that these people may use up to 14 tree

species (25.5.% of the total) for food, 14 species (14.5%) as a source of medicine, and at least 10 species (15.2%) for other purposes such as construction materials, ornaments, and firewood. If we take into account the species that are used for more than one purpose (see Table 1), the data show that the fragment provides at least 27 different tree species (34.6% of the species total), and 329 individuals (38% of the total) of use for the family.

These figures are very conservative if we consider the biological form, DBH, and canopy continuum criteria selected. Table 1, for example, does not include the four *Chamaedorea* palm species used as ornaments by locals, nor the climber, *Vitis popenoi*, and three unidentified Leguminosae tree species consumed by *Ateles*. However, the figures do give us an indication of the large amount of resources that must be protected and managed in these fragments.

To conclude, we provide the following suggestions.

1) A study of the political decisions and socio-economic factors that may alter the people's desire to protect forest fragments is a crucial next step (see SMBC, 1992). Agroecological and socio-economic diagnoses will help us to contextualize what is happening in fragmented areas. It is important to remember that on a large scale, one area of fragmented forests may look the same as another, but the origin and maintenance of the fragmentation processes may be very different between micro-regions. The delimitation of landscape units, including biological, ecological, agroecological, and socio-economic aspects, may be very helpful to promote general actions on a regional level, as well as specific actions at lower levels.

2) It is necessary to emphasize the role forest products may play in the family's domestic economy in the area. Natural resources have been used by rural people such as the zoque-popolucas for a long time. However, they have been rarely included as an integral part of regional development plans. Studies are urgently required which examine the role forest products may play in domestic economies, and to promote them whenever possible.

3) We must always keep in mind the possibility of incorporating the management of forest fragments in our contributions to development plans, but this will not be achieved if our proposals are argued from a purely biological perspective. Besides emphasizing biological diversity, the establishment of vegetation corridors to connect the fragments, for example, should be based on their role in protecting cultivations, and to enable local people to extract useful products of native species in a sustainable way.

4) Research alone is insufficient to propose realistic conservation measures; community work is also very important. In most cases, primatologists working in a given area may be the only people having a friendly relationship with local authorities and other people whose opinion may influence the decision-making process in a rural settlement. Even on a very small scale, our support and ideas may be of great help for locals to cross from "the potential for natural resource management" to "the management of natural resources in a sustainable way".

Most of these ideas have been expressed before by several authors. Nevertheless, it is in the light of studies such as the one reported here, that they may have a meaning to primatologists facing fieldwork for the first time, to whom these suggestions are primarily intended.

Our sincere thanks to María Elizabeth García Vez (Facultad de Idiomas, Universidad Veracruzana & Summer Hills School) for her review of the English translation of our manuscript. Thanks also to reviewers Mario Vázquez Torres and Enrique Portilla Ochoa, and to Anthony Rylands for his kind invitation to submit our paper to *Neotropical Primates*.

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NEW FIELD RECORDS OF NIGHT MONKEYS, GENUS *AOTUS*, IN NORTHERN BRAZIL

According to Hershkovitz (1983), the night monkeys, *Aotus*, are comprised of nine allopatric species, of two natural groups distinguishable by karyotype, phenotype and geographic distribution. The first group includes the gray-neck species: *A.lemurinus* (*A.l.lemurinus* and *A.l.griseimembra*), *A.trivirgatus*, *A.vociferans*, and *A.brumbacki*. The second group, the derived red-neck species, includes: *A.azarae* (*A.a.azarae* and *A.a.boliviensis*). *A.miconax*, *A.nigriceps*, *A.infulatus*, and *A.nancymai*. In Brazil, night

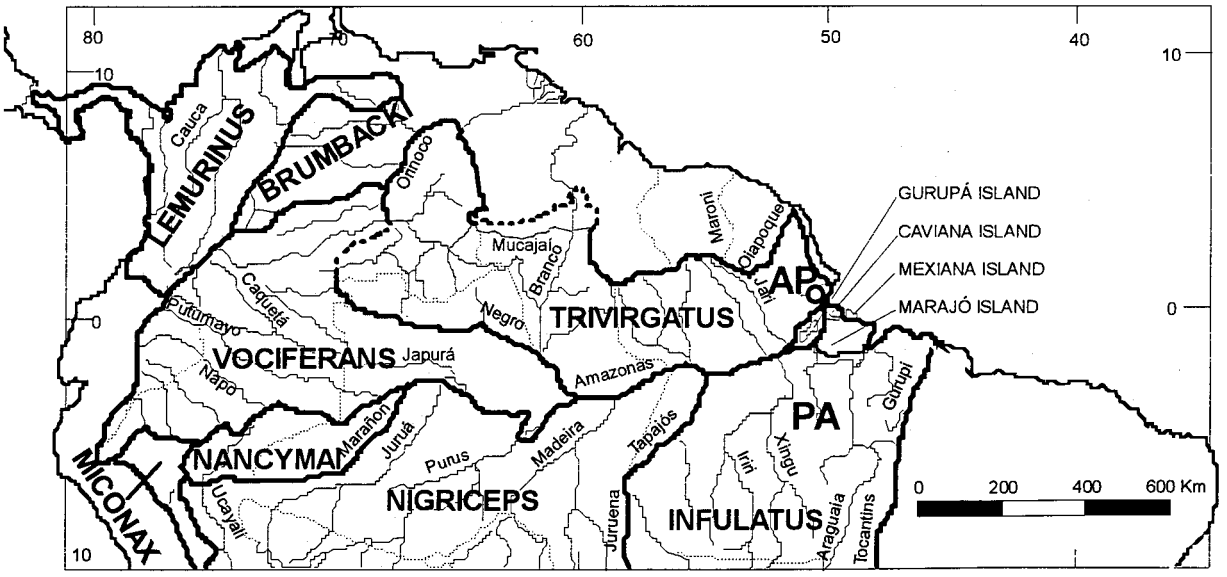

Figure 1. Map showing part of the distribution of the genus *Aotus* according to Hershkovitz (1983). O = Carmo do Macacoari. AP = state of Amapá and PA = state of Pará.

monkeys occur in the Amazon basin, south as far as the state of Mato Grosso (Wright, 1981). Primate surveys in Guyana (Muckenhirn *et al.*, 1975), French Guiana (Roussilhon, 1988), and Suriname (Mittermeier and van Roosmalen, 1981), have suggested that night monkeys do not occur in these countries. In addition, Hershkovitz (1983) was unable to confirm their presence in northern Roraima, northwestern Pará, and the state of Amapá in north and northeastern Brazil. There is, however, no apparent barrier to night monkeys extending their distribution to the east as far as the state of Amapá, and this gap in the geographic distribution may be merely a result of the absence of collecting localities. Here, I report on the presence of night monkeys in the state of Amapá, and present information on their occurrence in the Marajó archipelago, at the mouth of the Rio Amazonas.

Specimens of night monkeys were collected on Caviana Island in the Marajó archipelago, Pará, between 16 July and 4 August 1992, and in the village of Carmo do Macacoari, municipality of Itaubal, eastern Amapá during 5-24 May 1993 (see Fig. 1). They were deposited in the collection of the Museu Paraense Emílio Goeldi (MPEG) except for one (skin and skull) from Carmo do Macacoari which was donated to the Instituto de Estudos e Pesquisas do Estado do Amapá (IEPA). Field collections on the island of Gurupá (Fazenda Mariony) were carried out from 1-10 November 1992, and information from Mexiana Island was provided by L.M.P.Henriques during a survey of the avifauna at the Fazenda Santana, from 19 November to 20 December 1992. Specimens from Marajó Island already in the collection of MPEG were also used in order to delineate the range of *Aotus* in the Marajó archipelago. According to Wright (1981), night monkeys have permanent sleeping areas as well as defined sleeping trees. Information on sleeping trees provided by local people allowed me to locate *Aotus* groups in the late afternoon. The animals were collected between 1700 and 1800 hours, either during diurnal foraging (Carmo do Macacoari) or while they were resting near the sleeping tree (Caviana Island).

Three specimens of *A.trivirgatus* were collected in the municipality of Itaubal, confirming their occurrence in the state of Amapá (see Table 1). The islands of Marajó, Caviana, Mexiana, and Gurupá (= Ilha Grande de Gurupá) were also visited in order to determine the extent of their presence in the Marajó archipelago. Hill (1960) and Hershkovitz (1983) pointed out that *Aotus infulatus* was the night monkey inhabiting Marajó. This was confirmed by five specimens deposited in the zoological collection of MPEG: MG99, MG100, MG8875, MG8876, and MG8877. Two recently collected specimens also confirmed the occurrence of *A.infulatus* on Caviana Island (Table 1). However, no evidence could be obtained for the presence of *Aotus* on the islands of Gurupá and Mexiana.

Regarding the occurrence of *Aotus* in northern Roraima, Nunes *et al.* (1988) were unable to confirm its presence, although local people reported it for the island of Maracá (Rio Uraricoera) and the Rio Apiaú. Its presence in the northeastern part of the state is unlikely due to the predominance of savanna vegetation. Night monkeys do, however, inhabit the dry upland forests (*terra firme*) in the municipality of Mazagão, Amapá, where they are considered common, and it would seem likely that they inhabit the majority of forested areas in the state of Amapá, except for mangrove forests.

L.M.P. Henriques kindly provided information

Table 1. Measurements of night monkeys, *Aotus*, recently collected in the states of Amapá and Pará. (Deposited in the Museu Paraense Emilio Goeldi, Belém, Pará, except for PC066 donated to IEPA).

Specimens	Head & Body (mm)	Tail (mm)	Hindfoot (mm)	Forefoot (mm)	Ear (mm)	Weight (g)	Sex/Age
Pará (Caviana)							
MG22039	320	420	100	70	30	1240	F/Ad
MG22040	320	420	100	70	30	1190	M/Ad
Amapá (Itaubal)							
MG22522	310	400	100	70	35	1000	F/Ad
MG22523	310	400	100	70	35	1200	M/Ad
PC066*	220	340	90	60	30	700	F/Juv

*Field number of individual donated to the Instituto de Estudos e Pesquisas do Estado do Amapá (IEPA).

from Mexiana Island, and I thank M.Morelli (Caviana), Ms.Teté and J.Lima (Gurupá), and F.Lobato (Mexiana) for giving permission and logistic support to work on their ranches. Field research in Amapá was supported by the Museu Paraense Emílio Goeldi (MPEG/CNPq) and the Instituto de Estudos e Pesquisas do Estado do Amapá (IEPA).

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PRIMATE CONSERVATION IN EASTERN BRAZILIAN AMAZONIA

The recent dicovery of the Ka'apor capuchin (*Cebus kaapori* Queiroz, 1992) has put a very different light on primate conservation in eastern Brazilian Amazonia, defined here as the region to the east of the Rio Tocantins (eastern Pará and western Maranhão). In addition to five relatively widespread species (*Alouatta belzebul*, *Aotus infulatus*, *Cebus apella*, *Saguinus midas* and *Saimiri sciureus*), this region's primate fauna includes the endemic southern bearded saki, *Chiropotes satanas satanas*. This pitheciine was considered by Johns and Ayres (1987) to be Amazonia's most endangered primate taxon, given both its vulnerability to habitat degradation and hunting pressure, and the degree of deforestation within its geographical range.

Queiroz (1992) restricted the present-day range of *Cebus kaapori* to the western portion of Maranhão, a much smaller area than that of *Chiropotes s.satanas*, although recent fieldwork[1] (Lopes, 1993; Lopes and Ferrari, submitted) has shown that this species is found as far west as the Rio Tocantins, in the state of Pará. The lack of records from the region of Tucuruí (Mascarenhas and Puorto, 1988) nevertheless indicates that the geographical distribution of *Cebus kaapori* is smaller than that of *Chiropotes s.satanas*. Surveys at five sites in Pará and Maranhão also indicated that *Cebus kaapori* is significantly rarer locally than *Chiropotes*. The presence of both primates was reported by residents at all five sites, although *Cebus kaapori* was recorded just three times over a total of 1404 km of trails censused, while bearded sakis were observed on forty-two occasions. Although data are limited, group size also appears to be significantly smaller in *Cebus kaapori*, in comparison with *Chiropotes*. These findings appear to leave little doubt that the situation of *Cebus kaapori* is even more precarious. The study also revealed that populations of *Alouatta belzebul* are being decimated by hunting at many sites.

With its long history of colonisation, eastern Brazilian Amazonia is not only the basin's most densely-populated region, but has also suffered its highest rates of deforestation (Johns and Ayres, 1987). In the present day, little more than half of the original forest cover may survive (Lopes, 1993). Much of this remaining forest is subject to selective logging, and hunting is almost universal. The region's only protected area, the Gurupí Biological Reserve (GBR), receives little or no fiscalisation and is regularly encroached by squatters and loggers (Oren, 1988; Queiroz, 1992; per.obs.). Such encroachment is also frequently a serious problem on both indian reservations and private land.

Nevertheless, adequate protection of the contiguous area of more than 1,000,000 ha encompassed by the GBR and adjacent indian reservations (Alto Turiaçú, Awá, and Carú) in western Maranhão will be crucial for the conservation of the region's primates. Extrapolating cautiously from the results

of the 480 km census at the GBR, this area alone may hold viable populations (*v.*Mackinnon *et al.*, 1986) of up to 50,000 *Chiropotes s.satanas* and 3-10,000 *Cebus kaapori*. Hunting cannot be prohibited in indigenous areas, although Queiroz and Kipnis (1991) found that the traditional exploitation of fauna (including *C.kaapori*) by local Guajá indians is probably sustainable over the long term.

Both hunting pressure and habitat disturbance are greater in other areas (Lopes, 1993), but the evidence suggests that the total number of *Chiropotes s.satanas* existing in the wild ranges in the tens of thousands, perhaps even surpassing a hundred thousand individuals, given that at least 100,000 km^2 of the original forest cover may still remain in Maranhão alone. Similarly, the total population of *Cebus kaapori* is likely to exceed 10,000 individuals. While both these primates are among the most highly endangered of the Amazon region, surviving populations appear to be significantly larger than those of Atlantic forest forms such as *Brachyteles* (*v.*Mittermeier *et al.*, 1987) and *Leontopithecus* (*v.*Rylands *et al.*, 1993). However, the long-term situation of *Chiropotes s.satanas* and *Cebus kaapori* cannot be seen as promising, especially because the region's timber industry continues to expand (see, for example, Uhl *et al.*, 1991).

Ironically, major landowners, or *latifundiários*, may play an increasingly important role in the conservation of the region's flora and fauna (Lopes, 1993), given the lack of effective government protection. Many *latifundiários* not only control the use of relatively large tracts of native forest habitat big enough to support viable populations of medium-sized primates such as *Cebus* and *Chiropotes*, but are also aware of the importance of preserving this habitat and have the resources to do so. The study revealed, in addition, that hunting pressure may be reduced significantly where residents are paid employees (for example, ranch hands), rather than smallholders dependent on local resources (Lopes, 1993).

[1]Supported by the Brazil Science Council-CNPq, the Brazilian National Environment Fund-FNMA, Conservation International (CI), and the A.H.Schultz-Stiftung.

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FIELD STUDIES ON TAMARINS, *SAGUINUS MYSTAX* AND *SAGUINUS FUSCICOLLIS*, IN NORTHEASTERN PERU

The German Primate Center (DPZ) has maintained a link with the Centro de Reproducción y Conservación de Primates (CRCP) in Iquitos, Peru, as from 1981. Since then, Peruvian scientists have visited DPZ to make use of its facilities, for data analysis, and to learn new techniques, and scientists and students from DPZ have likewise visited the CRCP for behavioural, ecological and pathological/parasitological studies. My own work on tamarins in Peru started with a behavioural study of moustached tamarins (*Saguinus mystax*) and saddle-back tamarins (*Saguinus fuscicollis*) in an outdoor enclosure of the CRCP. The focus of this study was on social behaviour and communication, and on interspecific relations between the two species. The work in the outdoor enclosure helped me to become familiar with the behavioural repertoire of the two tamarins and provided an excellent starting point for my field work.

The first field study was conducted between June 1985 and July 1986 at two different study sites in northeastern Peru. The first site was located on the right bank of the Quebrada Blanco (4°40'S 73°W), the Estación Biológica Quebrada Blanco 2 (EBQB 2), which had been established by Rogério Castro in 1984 (see Castro, 1991) and was close to the field site of Marleni Ramirez, Marilyn Norconk and Paul Garber on the left bank of Qda. Blanco (Estación Biológica Quebrada Blanco 1). The study site is characterized by lowland tropical rainforest of the "bosque de altura" type, according to the scheme provided by Encarnación (1985). A grid of trails covers an area of about 1 km^2 which facilitated observations. The primate species found in the study area of the Estación Biológica Quebrada Blanco 2 are listed in the box.

Primates of the Estación Biológica Quebrada Blanco 2 ("p" denotes permanent residents, "v" species that visit the area occasionally)

- *Saguinus fuscicollis* - saddle-back tamarin (p)
- *Saguinus mystax* - moustached tamarin (p)
- *Cebuella pygmaea* - pygmy marmoset (v)
- *Saimiri sciureus* - squirrel monkey (v)
- *Callicebus cupreus* - titi monkey (p)
- *Aotus nancymae* - night monkey (p)
- *Pithecia monachus* - saki monkey (p)
- *Cacajao calvus ucayalii* - red uakari (v)
- *Cebus albifrons* - white-fronted capuchin (v)
- *Cebus apella* - brown capuchin (v)
- *Lagothrix lagotricha* - woolly monkey (v)
- *Alouatta seniculus* - red howler monkey (v)

The second field site was located on Padre Isla, a small island on the river Amazon near Iquitos (3° 44'S 73°14'W), where wild-trapped moustached tamarins had been released in 1977, 1978, and 1980. No other primate species live on Padre Isla. The island is subject to complete or nearly complete inundation during the height of the rainy season between March and May. The vegetation is characterised by young primary and secondary forests, by currently used plantations, and by abandoned plantations in different stages of regeneration.

One group was selected for observation at each site. At EBQB 2, the study group had been habituated by R. Castro, whereas on Padre Isla the study group was already accustomed to man due to the continuous presence of people living on the island. The focus of the study was intraspecific social behaviour and communication in moustached tamarins, but additional studies were carried out as EBQB 2, on the interspecific relations between the two tamarin species which frequently form stable mixed-species troops in areas of sympatry.

Ursula Bartecki joined the project during the 1985/86 field study. She conducted a privately-financed study on activity patterns and scent-marking behaviour of the saddle-back tamarins (Bartecki & Heymann 1990). A second field study was carried out at EBQB 2 between May and September 1990. Quite surprisingly, a tame, habituated group of moustached tamarins and saddle-back tamarins was encountered upon arrival at the site, although nobody had been studying tamarins there since July 1986. The focus of the 1990 study was on social behaviour, scent-marking and the use of sleeping sites in moustached tamarins.

The high degree of habituation of the tamarins to the presence of human observers during both studies allowed observation at close range (within 5 m and occasionally even within 2 m in the case of saddle-back tamarins). Individual recognition (without marking the animals) was possible in the moustached tamarins on the basis of size and pigmentation of the genitals and of individual characteristics (e.g., tail with a kink, stiff finger,

hole in ear etc.). This was important for the collection of data on interactions and communication. The tameness of the tamarins also provided the opportunity to watch rare but significant events that had not been documented for callitrichids so far: predation on a moustached tamarin by a snake (Heymann 1987), snake-mobbing by saddle-back tamarins (Bartecki & Heymann 1987a), and geophagy, the consumption of soil, by moustached tamarins (Heymann & Hartmann 1991). Results of the studies have been partially published (Heymann 1990a, Heymann 1990b, Heymann 1990c, Heymann 1992 and references above), but part of the data is still in the process of analyses or writing-up (e.g., on scent-marking behaviour, long calling, and use of sleeping sites).

Both during the 1985/86 and 1990 studies, chance encounters with red uakaris (*C. c. ucayalii*) were used to collect information on group size and diet of this very little known species (Bartecki & Heymann 1987b; Heymann 1993). Field work will be continued in 1994 by a PhD student, Christoph Knogge, with a study on the role of the two tamarin species as seed dispersal agents. The field studies were supported by the Deutsche Forschungsgemeinschaft (Ku 131/8-[1-3]) in 1985/86 and by the German Primate Center in 1990. The forthcoming field study will be supported by a grant from the Deutsche Forschungsgemeinschaft (He 1870/3-1). Field work would not have been possible without the friendly help and support from the colleagues of the CRCP and the Ministry of Agriculture in Iquitos, especially from Drs. Jaime Moro, Filomeno Encarnación, and Luis Moya, to whom I would like to express my most sincere gratitude.

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AN UPDATE ON THE BLACK-HEADED MARMOSET, *CALLITHRIX NIGRICEPS* FERRARI AND LOPES 1992

At the time of its description, the black-headed

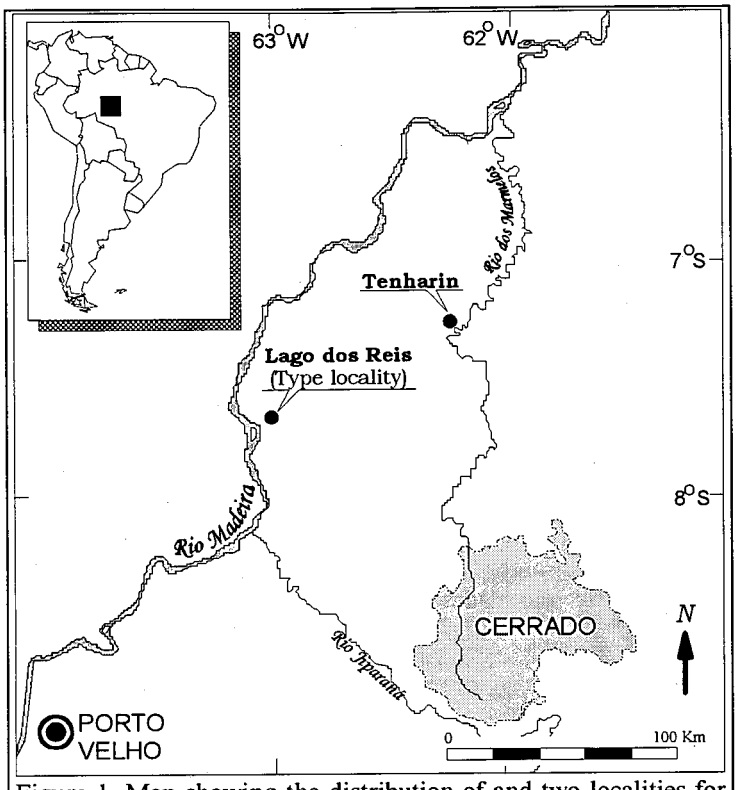

Figure 1. Map showing the distribution of and two localities for *Callithrix nigriceps*.

marmoset (*Callithrix nigriceps* Ferrari and Lopes 1992) was known from only two localities in the Brazilian states of Amazonas and Rondônia (Figure 1). Given the known distribution of the region's other callitrichid taxa (Hershkovitz, 1977; Vivo, 1991; Ferrari and Lopes, 1992b), there is little doubt that the western limit of the species' range is defined by the Jiparaná/Madeira river system. The eastern limit remained uncertain, although the occurrence of *Callithrix emiliae* on the left, or west, bank of the Rio Aripuanã (Vivo, 1991) implies that *C.nigriceps* does not occur this far east. Ferrari and Lopes (1992a) thus suggested that the eastern extreme of the range of *C.nigriceps* may coincide with the largest river in the region between the Jiparaná/Madeira and Rio Aripuanã, the Rio dos Marmelos (Figure 1). A second factor supporting this hypothesis was the presence of an area of *cerrado* or savanna vegetation covering the region between the upper reaches of the Rio dos Marmelos and the Rio Jiparaná (Brazil, Projeto Radambrasil, 1978).

A more precise definition of the geographical range of *C.nigriceps* was one of the primary aims of a second expedition to the region in March/April 1993, supported by the John D. and Catherine T.Macarthur Foundation, the Federal University of Pará (UFPA), and the National Indian Foundation (FUNAI). Marmosets were collected on both banks of the Rio dos Marmelos in the vicinity of the Tenharin Indian settlement, located at 07°57'S, 62°03'W (see Figure 1). Two adult males captured west of the Marmelos were typical *C.nigriceps*, whereas an adult female collected on the east bank was identified as *C.emiliae*, easily distinguished from the former by the lack of pigmentation of the facial skin.

The blackwater Rio dos Marmelos is 50-100 m wide at the Tenharin settlement, and relatively fast flowing. Approximately 15 km further south, *terra firme* forest was found to give way to almost treeless *campo* vegetation, which according to local informants extends as far as the Rio Jiparaná, confirming the findings of Projeto Radam (Brazil, Projeto Radambrasil, 1978). It seems likely that the combination of these features forms an effective barrier to regular migration between the marmoset populations, and that the southern and eastern limits of the geographical range of *C.nigriceps* are defined by this unforested habitat, in conjunction with the Jiparaná and Marmelos rivers. Given the evidence, it seems reasonable to assume that *C.nigriceps* does not occur east of the Rio dos Marmelos downriver (north) from the Tenharin settlement. This would make the species' geographical range one of the most precisely defined of any Amazonian primate (Figure 1), with an area of approximately 24,500 km^2. This evidence also implies that *C.nigriceps* is no more than parapatric with any other marmoset taxon, supporting its species' status.

Body size data collected during the study provide additional support. Mean body weight and head/body length for three males captured were 380 g and 210 mm, respectively; values extremely close to those recorded for the male holotype and paratypes (Ferrari and Lopes, 1992a). Mean body weight and head/body length for the six male specimens now available are 375.0 g and 208.2 mm. These values reconfirm the robustness of *C.nigriceps* in comparison with its geographically closest congener, *C.emiliae*, for which Ferrari and Lopes (*ibid.*) recorded mean values (for males only) of 313.3 g (N = 12) and 220.6 mm (N = 16). Ferrari *et al.* (1993) also found differences in gut

morphology between the two species, although their significance remains unclear.

The systematics of the callitrichids is still highly controversial (Rylands *et al.*, 1993), although the zoogeographical and morphological evidence now available on the *nigriceps* form would seem to favour its classification as a true species. Whatever its status, however, there are already a number of reasons for concern with regard to its conservation. Foremost is the Trans-Amazon highway, which bisects the southern half of *nigriceps*' range. Roads are the principal channels for colonisation in this region (Fearnside, 1990), and large-scale cattle-ranching is already well established everywhere along the Trans-Amazon between the Rios Marmelos and Madeira, with the exception of the Tenharin reservation (where it is incipient). A second problem is the lack of protected areas within the species' distribution (see Rylands and Bernardes, 1989), although the region of the Rio dos Marmelos has been designated top priority for the preservation of Amazonian diversity (Wetterberg *et al.*, 1976). Whether this will result in any more practical measures remains to be seen, but in the meantime it would seem essential to analyse the long-term prospects for the species' conservation in more detail.

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La Primatologia de Campo en Argentina

Es el objetivo de esta reseña informar sobre los estudios de campo con primates de Argentina y abrir un canal de comunicación con otros grupos de investigación interesados en esta temática. En nuestro país, los estudios con primates cubren una gama de temáticas amplia, que incluye estudios de citogenética, fisiología reproductiva, investigaciones biomédicas y paleontológicas. Una revisión de las distintas lineas de investigación desarrolladas pueden encontrarse en Arditi *et al.* (1989). Los investigadores argentinos que desarrollamos trabajos de campo en primatología, nos nucleamos en el Grupo Argentino de Especialistas en Primates (GADEP). Este grupo edita desde 1985 el *Boletín Primatológico Argentino* y desde 1989 el *Boletín Primatológico Latinoamericano*, únicas revistas de primatología en idioma castellano. En esta contribución, nos referiremos exclusivamente a las investigaciones de campo que se han realizado en nuestro país.

Los hábitats extremos y marginales, como son los bosques subtropicales de Argentina, son sitios ideales para estudiar la plasticidad adaptativa y el rango de tolerancia de las especies de primates, que muchas veces evidencian comportamientos no encontrados en áreas tropicales (Brown y Zunino,

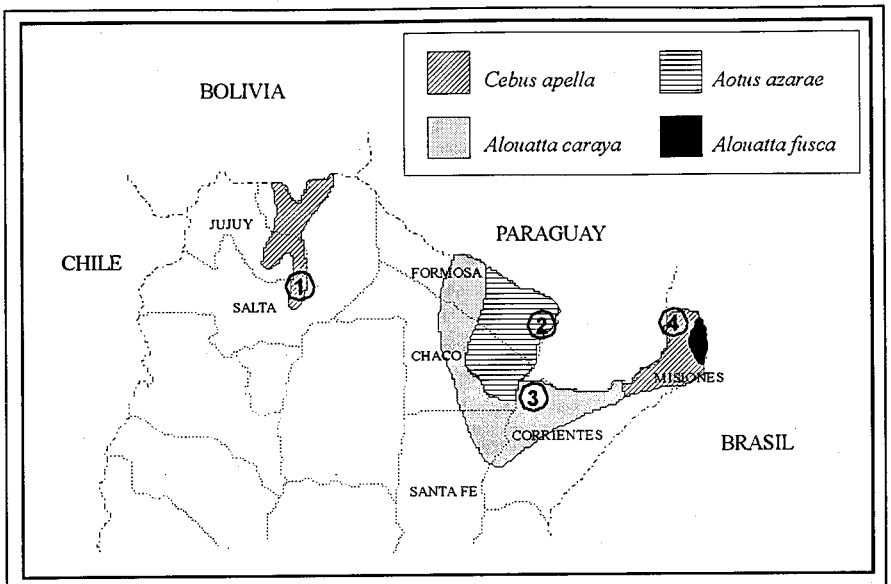

Figura 1. Distribuición de las cuatro especies de primates presentes en Argentina y ubicación de los lugares en donde se realizaron o realizan estudios de campo a largo plazo:(1) Parque Nacional "El Rey", (2) Estancia "Guaycolec" (Privada), (3) Centro Argentino de Primates CAPRIM (CONICET), (4) Parque Nacional "Iguazú".

1990). En nuestro país existen cuatro especies de primates no humanos: *Cebus apella*, *Alouatta caraya*, *Alouatta fusca* y *Aotus azarae*. Su distribución y estado de conservación han sido revisados recientemente (Brown *et al.*, 1993). Estas cuatro especies habitan los bosques subtropicales del norte del país y los estudios de campo se han llevado a cabo en las tres grandes unidades ambientales que éstos representan, las Selvas de Montaña del Noroeste (Yungas), el Chaco húmedo y la Selva Paranense de Misiones (Fig. 1).

Alouatta caraya (mono aullador negro o carayá). Habita las selvas de inundación y bosques chaqueños húmedos del N.E. del país y en la provincia de Misiones. Cabrera (1939) y Cabrera y Yepes (1940) son los primeros que reunen notas sobre primates en Argentina, con aspectos de su comportamiento, morfología y distribución. Pope (1968) analiza datos poblacionales en base a la captura de más de 300 carayá, colectados en Corrientes, para estudios médicos. Los primeros estudios sobre comportamiento se realizaron a partir de la creación del Centro Argentino de Primates (CAPRIM), en Corrientes, en 1972. Estudios sobre alimentación y preferencias de habitat fueron realizados por Colillas y Coppo (1978), mientras que los primeros muestreos cuantitativos fueros realizados por Milton (1980). El primer estudio poblacional fue realizado por Thorington *et al.* (1984), en tanto que Piantanida *et al.* (1984), publicaron datos sobre ecología y comportamiento de esta especie. Así mismo en el CAPRIM, fueron realizados trabajos de campo a largo plazo, que generaron las tesis doctorales de Rumiz (1985) sobre demografía y dinámica poblacional y de Zunino (1986), sobre alimentación, ritmos de actividad y etología de esta especie, como así también numerosas publicaciones sobre estos temas (Rumiz, 1983, 1990; Rumiz *et al.*, 1986; Zunino *et al.*, 1986; Zunino y Rumiz, 1986; Zunino, 1987, 1989). Recientemente, A.Giudice comenzó estudios sobre relación materno-infantil en este mismo centro. No existen estudios de campo sobre las poblaciones de la selva de Misiones. Desde 1989, S.I.Arditi y L.G.Placci estudian el hábitat, patrones de actividad y dieta del carayá en las selvas del este de Formosa, donde habita en simpatría con *A.azarae* (Arditi, 1992; Arditi y Placci, 1990, 1993).

Alouatta fusca (mono aullador rojo). Esta especie fue citada por primera vez para Argentina por Crespo (1954), para un ejemplar capturado en la provincia de Misiones, en un área de selva paranense dominada por *Araucaria angustifolia*. Posteriormente, el mismo autor confirma su presencia para un sitio muy cercano al anterior, por tres ejemplares muertos por una epidemia de fiebre amarilla que ocurrió en Misiones en 1966 (Crespo, 1974). La ausencia de citas posteriores y la intensa actividad forestal realizada en el área hicieron pensar en la posible extinción de esta especie en nuestro país. Por esta razón, en enero de 1992 realizamos con apoyo de *Program for Studies in Tropical Conservation (PSTC)*, Universidad de Florida, un viaje de prospección y se pudo localizar un pequeño núcleo poblacional en una reserva provincial de aproximadamente 450 ha (Brown *et al.* datos no publicados). Consideramos necesario realizar un estudio más detallado de la situación poblacional de esta especie en nuestro país.

Aotus azarae (miriquiná o mono de noche). Habita las selvas en galería y montes altos del este de la provincia de Formosa y noreste de Chaco, en simpatría con *A.caraya*. Estudios sobre distribución y densidad poblacional del miriquiná han sido realizados por Rathbun y Gache (1980) y Zunino *et al.*(1985). Los estudios que han realizado S.Arditi y G.Placci sobre disponibilidad de recursos y estrategias adaptativas de *A.azarae* y *A.caraya* en Formosa, han brindado abundante información sobre densidad, patrones de actividad y dieta del miriquiná (Arditi, 1992; Arditi y Placci, 1990, 1993). La actividad diurna de *Aotus* en su área austral de distribución (Paraguay y Argentina) brinda una oportunidad única para realizar observaciones directas sobre esta especie en condiciones silvestres.

Cebus apella (caí). Está presente en Argentina con dos subespecies que han sido motivo de recientes revisiones sistemáticas (Mudry *et al.*, 1987). *C.a.paraguayanus* habita las selvas de montaña del noroeste de Argentina, desde el límite con Bolivia hasta los 28° latitud sur. Desde 1981, A.Brown, S.Chalukian y L.Malmierca realizaron diversos estudios sobre hábitat, distribución, densidad poblacional, alimentación y estrategias de utilización de recursos de esta población (Brown, 1983, 1986; Brown y Colillas, 1984; Brown *et al.*, 1984, 1986). *C.a.nigritus* (= *C.a.vellerosus*) habita la selva paranense de Misiones, entre los 25.5° y los 27.5° latitud sur, en simpatría con las dos especies de aulladores. En 1987, A.Brown y G.Zunino inician estudios de esta población sobre uso del habitat y alimentación, en el Parque Nacional Iguazú, Misiones (Brown y Zunino, 1990). El estudio de esta población, continúa en 1991, con un proyecto sobre estructura social en primates dirigido por C.Janson (State University of New York, Stony Brook) y A.Brown (UNT-Consejo Nacional de Investigaciones Científicas y Tecnológicas de la Argentina, CONICET). Avances de este proyecto fueron presentados en el XIV Congreso de IPS en Strasbourg, Francia. En el marco de este proyecto se han estudiado en profundidad diversos aspectos del habitat (Placci *et al.*, 1992), ecología alimentaria y comportamiento social (Chediak *et al.*, 1993; Di Bitetti, en prep.). En 1992, M.Di Bitetti comenzó a desarrollar un estudio a largo plazo sobre demografía y reproducción de esta población.

La mayoría de estos estudios fueron y son financiados total o parcialmente por diferentes becas y subsidios del CONICET. Así también, se contó en diversas oportunidades, con apoyo de WWF, la Sociedad Zoológica de Nueva York y la NSF (subsidio a C.Janson). Cualquier información sobre facilidades para desarrollar estudios de campo con primates en Argentina, puede ser solicitada a los autores. Así mismo invitamos a quienes desean contribuir con artículos, notas o información primatológica en el *Boletín Primatológico Latinoamericano*, dirigirse al Dr.Gabriel Zunino (editor), Museo Argentino de Ciencias Naturales, Div. Mastozoología, Av. Angel Gallardo 470, (1450) Buenos Aires, Argentina.

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EUROPEAN ENDANGERED SPECIES PROGRAMME (EEP) PRIMATE TAG

The European Endangered Species Programme (EEP) was formed in 1985. Its mission is to coordinate and stimulate the endeavours of European zoos towards the conservation of endangered species. Breeding programmes for 17 species were established in 1985, and the number has since increased to more than 80, today including several New World primates (see box). The aim is to include several hundred species by the year 2000. Within the EEP framework, a "species coordinator" is appointed for each species programme; usually someone who is an employee in one of the participating zoos, and is an expert on the species in question. The coordinator compiles the regional studbook, and provides recommendations concerning the species' management (breeding strategies, exchanges) on a year-to-year basis, aided by an elected "species committee" of five to 10 people representing zoos and other institutions from different European countries (including Great Britain), that participate in the EEP and have experience in keeping the species in question. All species coordinators meet once a year, and are supported by the "EEP Committee", a group consisting of leading zoo representatives from each of the European countries with EEP institutions. The EEP Committee is the general policy-making organ of the EEP organisation, and also selects which species should be included in the EEP programmes. The EEP Executive Office in Amsterdam is responsible for the daily business on behalf of the Committee.

The EEP works in collaboration with similar programmes in North America, Australasia, Great Britain, India and Japan, with an underlying worldwide coordination in the form of the IUCN/SSC Captive Breeding Specialist Group (CBSG), and IUDZG - the International Zoo Organization.

The largest problem encountered in the functioning of the EEP is undoubtedly the actual execution of breeding management recommendations: it is often difficult to develop policies applicable to an entire group of zoos (varying from 10 to well over 50 depending on the species programme) when these are spread through several countries with different languages and laws, and with dissimilar political and economic backgrounds. The incongruencies in laws alone can sometimes make exchange of specimens for breeding purposes by two closely situated zoos a formidable task if a border happens to lie between them. Yet successes have been achieved.

The growth of the EEP-organisation has been considerable: now more than 350 zoos from 32 European countries are involved in breeding programmes. The EEP is strongly supported by the various national zoo federations and especially by the European Association of Zoos and Aquaria (EAZA), a recently formed pan European zoo association that, among other tasks, is responsible for EEP affairs.

NEOTROPICAL PRIMATES WHICH HAVE EEP BREEDING PROGRAMMES AND THE EUROPEAN REGIONAL COORDINATORS FOR EACH

Cebuella pygmaea - Wim B.Mager, Stichting Apenheul, J.C.Wilslaan 21-31, 7313 HK Apeldoorn, The Netherlands.

Saguinus imperator - Robert Colley, Penscynor Wildlife Park, Cilfrew, Neath, Glamorgan SA10 8LF, South Wales, UK.

Saguinus oedipus - Robert Colley, Penscynor Wildlife Park, Cilfrew, Neath, Glamorgan SA10 8LF, South Wales, UK. (Provisional)

Leontopithecus rosalia - Ron Willis, Royal Zoological Society of Ireland, Phoenix Park, Dublin 8, Ireland.

Leontopithecus chrysomelas - Helga de Bois, Antwerp Zoo, Koningin Astridplein 26, B-2000 Antwerpen, Belgium.

Callimico goeldii - Gustl Anzenberger, Anthropologisches Institüt und Museum, Universitat Zürich-Irchel, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland.

Lagothrix lagotricha - Wim B.Mager, Stichting Apenheul, J.C.Wilslaan 21-31, 7313 HK Apeldoorn, The Netherlands.

The EEP formed a Primate Taxonomy Advisory Group during the 9th EEP Annual Conference held at Edinburgh Zoo in July 1992. The Co-chairs are Miranda Stevenson (Edinburgh Zoo) and Christian Schmidt (Zoologischer Garten Zürich). The Primate TAGs within Europe, such as that of the Federation of Zoological Gardens of Great Britain and Ireland (see *Neotropical Primates* 1(1):9-10), are separate but comprise part of the EEP. At a meeting during the Congress of the International Primatological Society (IPS) in Strasbourg in August 1992, a number of people were designated the task of providing reviews of the populations of captive primates in European countries in order to evaluate space available, a survey coordinated by Michael Schwibbe and Joachim Wilde of the German Primate Centre. This review should be ready for an EEP Primate TAG meeting on December 4-5th 1993 at the Jersey Wildlife Preservation Trust, Jersey, and will allow for the establishment of a Regional Collection Plan (RCP).

A further meeting of the EEP Primate TAG, held in Salzburg in June 1993, recommended that it be split into sub-groups concerned with prosimians (Achim Johann, Tierpark Rheine), Old World monkeys (Neil Bemment, Paignton Zoo), the gibbons (Jean-Marc Lernould, Mulhouse Zoo), the great apes (Marianne Holtkotter, Stuttgart Zoo), and the New World Monkeys, with Bryan Carroll, Jersey Wildlife Preservation Trust, responsible for the callitrichids (including *Callimico goeldii*), and Leobert de Boer, Apenheul Zoo, Apeldoorn (Netherlands), responsible for the cebids.

Koen Brouwer, EEP Executive Office, c/o Amsterdam Zoo, Postbus 20164, 1000 HD Amsterdam, The Netherlands, **Miranda Stevenson**, Royal Zoological Society of Edinburgh, Scottish National Zoological Park, Corstorphine Road, Murrayfield, Edinburgh EH12 6TS, Scotland, and **Christian R. Schmidt**, Zoo Zürich, Zürichburgstrasse 221, CH-8044 Zürich, Switzerland.

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RESEARCH ON GOLDEN - HEADED LION TAMARINS AT ANTWERP ZOO

In 1986, one captive and seven wildborn golden-headed lion tamarins arrived at the Royal Zoological Society of Antwerp (RZSA). Since then, more than 100 animals have been born, about 30 of which have died, and 24 were transferred to other locations (data: May 1993). The sex ratio at birth has been biassed in favour of males: five males for every four females. Breeding pairs have produced on average more than two litters (or 3-4 offspring) a year. 13% of the offspring were stillborn, but only 5% of the young born alive died in their first year.

In recent years, research projects have been carried out on these animals, in collaboration with the University of Antwerp. Parental care was the first topic (Van Elsacker *et al.*, 1992). Studies on other callitrichids have suggested that the relative contribution of the mother in infant care is largely influenced by the social environment; the number and sex of helpers and infants, and such factors as the experience of the helpers. Two families at the RZSA with a nearly identical social situation were observed, and it was found that there was still a big difference in relative maternal investment. In one family the father was the primary carrier, in the other it was the female. It was also clear that infant transfers between the male and the female were controlled by the female. The results suggested that maternal behaviour in the golden-headed lion tamarin may depend primarily on the female's physical and hormonal condition.

In this context, a preliminary study was carried out to examine the possibility of associations between prepartum and postpartum hormonal levels in the females and their maternal behaviour (Van De Veegaete, 1991), as has been demonstrated for other callitrichids. The level of oestradiol (an oestrogen metabolite) in the urine was measured during the three weeks before birth in two females with differing maternal behaviour. No difference was found for prepartum levels, although the laboratory kit used was for measuring oestradiol in humans, and this might not have been entirely adequate. However, a relation has been detected

between the sharp decrease in oestradiol concentrations around eight days following birth and maternal performance at that time, although this may be confounded by the occurrence of a postpartum oestrus, where sexual motivation may be interfering with that for maternal behaviour.

Two smaller research projects are studying scent-marking and anti-predator behaviour (Walraven, 1990; Walraven and Van Elsacker, 1991). Observations demonstrated the following: a) males marked more frequently than females; b) marking occurred mainly at the borders of the enclosures, adjacent to neighbouring groups, and at feeding sites; c) marking occurred mainly during bouts of intergroup vocalizing and while feeding; d) marking was predominantly circumgenital at the enclosure borders, and predominantly sternal in the interior of the enclosure.

Regarding anti-predator behaviour, different smells were tested which represented: 1) a sympatric predator; 2) an allopatric predator; and 3) an allopatric non-predator. Pieces of cotton wool impregnated with the smell of an ocelot, a polecat, and a common marmoset were placed in the lion tamarin's resting sites (Declerck, 1991). Tha test-animals had also been confronted with smell samples of familiar, as well as unfamiliar conspecifics in the course of the previous study. They were able to distinguish between predator and non-predator smells. They generally avoided the cotton wool impregnated with the smells of ocelots and polecats, which was not true for the smell of the marmoset. When they did approach the "predator smell" they sniffed it more intensively.

A study on contraception as a means of controlling the growth of the population, and as a management tool, was also begun recently. We are studying the effect of melengestrol-acetate (MGA) implants on the implanted breeding female and the possible effects on the non-implanted sexually mature daughters still resident in the family. The main objective is to examine if the breeding female's inability to breed affects the process of social contraception on the younger female group members. Behavioural observations are combined with urine analyses (in collaboration with the University of Gent) to obtain information on underlying hormonal mechanisms.

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MIXED-SPECIES *SAGUINUS* GROUPS AT BELFAST ZOOLOGICAL GARDENS

Associations between sympatric species are a common occurrence in a number of forest primates. These associations range from very temporary encounters to permanent closed membership groups. Tamarin species of the genus *Saguinus* form some of the most stable mixed-species groups observed in mammals.

In the wild, groups of red-bellied tamarins, *Saguinus labiatus*, and saddle-backed tamarins,

S.fuscicollis, are reported to spend approximately 85% of their time within 50 m of each other (Buchanan-Smith, 1990). These mixed-species groups are stable and the two species share a common home range which they defend jointly against neighbouring mixed species groups (Buchanan-Smith, 1990; S.M.Hardie, pers.obs.). However, despite the close association found between these monkeys in nature, most captive environments house just one species in any enclosure.

There would be a number of advantages to exhibiting species which associate in the wild in a single enclosure. First, there is good reason to believe that mixed-species exhibits would improve the well-being of the animals concerned; due to the stimulation of greater activity and increased social encounters. Second, a mixed-species exhibit is a more informative and exciting display. Third, the captive environment is ideal for experimentally testing certain hypotheses regarding the costs and benefits to each species in association, under controlled conditions.

There have been some attempts to house more than one species in a single enclosure (see Baker, 1992; Xanten, 1990). These have met with limited success, perhaps because the species selected do not form close associations in nature. There is only one published report of a mixed-species tamarin group in captivity (Heymann and Sicchar Valdez, 1988). This involved wild-caught groups of five *S.mystax* and six *S.fuscicollis*, which lived in harmony and demonstrated the feasibility of keeping groups together in captivity. Here, we describe the formation and behaviour of mixed-species groups of *S.labiatus* and *S.fuscicollis* at the Belfast Zoo, Northern Ireland.

In August 1992, a mixed-species group was created from one pair each of *S.labiatus* and *S.fuscicollis*. The group remained stable over approximately nine months, and was split up only after the death of the female *S.fuscicollis* during labour. The male was subsequently removed and a new pair of saddle-backs were successfully introduced to the original *S.labiatus* pair in June 1993. The mixed group has been shown to consist of two groups of "pair-bonded" animals that spend a much greater percentage of their time with their mate than with individuals of the other species. However, individuals of different species spend some 25% of their time in close (< 1 m) contact. As the cage used was some 10 m x 3.5 m x 4 m, this demonstrates a significant coincidence in time and space. Interactions between the species were relatively rare, and involved calls, huddling, displacements, and other non-injurious behaviour.

After it was shown that stable mixed-species groups could be formed from captive-born animals, the main focus of research was centred around an investigation of the costs and benefits of association. In order for the association to evolve, the benefits accrued by the members of a polyspecific group must outweigh the costs. Increased conspicuousness and feeding competition are examples of potential costs. Benefits may include predator detection, avoidance or defence, increased encounter rate with food, and defence of food resources. In order to determine how each species is affected by the association, tests are currently being conducted to compare behaviour in an out of association. Monospecific groups of both species are also being tested for responses to presentation of different classes of objects. For example, novel non-threatening objects are presented to the subjects in various areas of their enclosures, and the latency to approach provides a comparison of relative "curiosity"; while the presentation of threatening objects is used to examine the role of both species in dealing with potential dangers. In addition, objects which contain food and others without food are used to examine the ability of each species to learn properties of new objects and to retain the information. Species are initially tested alone and subsequently when with the other species to see exactly how the association affects their behaviour. Details on interactions, competition, spacing, and general behaviour are recorded. Recently, two other mixed-species groups have been formed, and we plan to form at least two more larger breeding groups. One mixed group has been allowed to free-range in a wooded area, to examine whether they really do behave similarly to their wild counterparts.

An assessment of this free-ranging group was made over a period of four months, from June to October 1993. The animals were based in an outdoor enclosure, wih heated boxes place in the centre. Their enclosure was located on the edge of a large wooded area. After a month of baseline acclimatisation and data collection, an opening was made in the cage wall, giving access to the woods. Potentially, they could range for over a kilometre within the Zoo. All members of the mixed-species group made forays of up to 30 m from the base on

the first day. Their activity time increased significantly after the release, and they adapted well to the arboreal environment. Both species foraged for plant matter and animal prey species which were novel to them. The *S.labiatus* male successfully hunted two small birds. With few exceptions, the group subsequently remained within a 30 m radius of the home base. The species differed in a number of behavioural variables: the *S.labiatus* pair preferred different foraging sites and food resources from those of its congener, and this was reflected in the divergent locomotory and foraging techniques used. *S.fuscicollis* were frequently displaced from food sites by the dominant *S.labiatus*, although both species remained within 5 m of each other for much of the time. Interspecific interactions ranged from aggression to grooming and play: there were no injuries. The frequency of interactions increased significantly over the period of the study, and reached a climax when the *S.fuscicollis* male was observed mating with the *S.labiatus* female.

We hope to continue cataloguing the nature of this association, and evaluate its suitability as a longterm method of exhibiting tamarins in captivity. It will be especially important to compare behaviour around the time of infant birth to see if each species can rear their young successfully in the mixed environment. Finally, as *S.labiatus* and *S.fuscicollis* also associate with *Callimico goeldii* in the wild, we would indicate that it may be appropriate to examine the possibilities of captive mixed-species groups involving all three species (Pook and Pook, 1982; Buchanan-Smith, 1991; S.M.Hardie, pers.obs.).

We are particularly grateful to John Stronge, Manager of Belfast Zoological Gardens, for his enthusiasm and cooperation with the project. The research was funded by the Science and Engineering Research Council (SMH) and the Carnegie Trust (RTD).

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News

Field Investigations on Masked Titi Monkeys (*Callicebus personatus melanochir*) in Una, Bahia, Brazil

The four subspecies of the masked titi monkeys (*Callicebus personatus*) are endemic to the Atlantic forest region of eastern Brazil (Hershkovitz, 1990). The coastal rain forest is nearly completely destroyed, and *C.personatus* is considered the most endangered species of its genus (Mittermeier *et al.*, 1982). It is also one of the least known of the titi monkeys. Only the results of one short study have been published so far (Kinzey & Becker, 1983). In 1991, a longterm study on the behaviour and ecology of the masked titi monkey, *C.p.melanochir*, was initiated in the vicinity of the town of Una in the state of Bahia, eastern Brazil. The study area is a forest fragment of 100 ha, which is part of a forest of 400 ha owned and protected by the local cocoa growing authority CEPLAC (*Comissão Executiva do Plano da Lavoura Cacaueira*). The study site consists mostly of secondary forest, and contains three or four family groups.

Titi monkeys are generally very difficult to observe because they are quick-moving, extremely shy, and very quiet (see, for example, Easley, 1982 for

C.torquatus). To guarantee longterm continuous observations it was necessary to use radio telemetry. Conventional trapping was found to be unsuccessful, but we eventually succeeded in using a carbon dioxide-powered gun to anaesthetize one of the group members, and a radio collar was attached with a range of 200 m. One group was habituated, permitting the collection of basic data on the behaviour and ecology, especially on activity budgets and feeding ecology. In October 1993 two further studies were begun, and we plan to habituate a further one or two groups.

The first study will analyse the social relationships within and between groups of masked titi monkeys, with emphasis on migration events. Territorial behaviour will be investigated using playback experiments. The second study will investigate foraging, determining the availability and use of food resources in different seasons. Costs and benefits of foraging will be calculated by analysing the energetic content of food items and by estimating the energy needed to obtain them.

The project is funded through travel grants from the DAAD (*Deutscher Akademischer Austauschdienst*), and equipment is being provided by the German Primate Center, Göttingen. The projects form part of a cooperation agreement between the German Primate Center (DPZ) and the Rio de Janeiro Primate Centre (CPRJ/FEEMA).

Klaus-Heinrich Müller, **Stefanie Heiduck** and **Siglinde Schultze**, German Primate Center, Kellnerweg 4, 37077 Göttingen, Germany.

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FIELD STUDY OF WILD BROWN HOWLING MONKEYS, *ALOUATTA FUSCA*

Studies are underway examining the ecology (feeding, ranging, and daily activity patterns) and mother-infant relations of brown howling monkeys, *Alouatta fusca clamitans*, in the Aracuri-Esmeralda Ecological Station of 272 ha, created in 1981 and administered by the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama), in Rio Grande do Sul, Brazil. The field research is being supervised by Dr Cesar Ades of the University of São Paulo, and comprises a master's thesis for the Catholic University of Rio Grande do Sul. The project is being financed by the *Fundação o Boticário de Proteção à Natureza*, based in Curitiba, Paraná. It was begun in May 1993 and will continue till September 1994. The social relations and development of offspring, examining particularly processes involved in weaning and independence, are being accompanied during the first year of life. The ecological study will cover a full year to compare seasons in this the southernmost limit to the species' distribution. Temperatures in winter can be as low as -11°C, and of particular interest is the fact that the howlers are occupying pine forest, *Araucaria angustifolia* (predominant in the reserve along with broad-leaved trees and scrubland), and the pine needles and cones form an important component of the howler's diet. The significance of this study lies not only in terms of the protection of this threatened species and Brazilian pine forest, but also, considering its unusual habitat, for understanding the amplitude of behavioural and ecological variability characteristic of the genus.

FUNDAÇÃO O BOTICÁRIO DE PROTEÇÃO A NATUREZA

Ana Alice Biedzicki de Marques, Posta Restante, 95200-000 Vacaria, Rio Grande do Sul, Brazil.

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DEFORESTATION IN THREE BRAZILIAN STATES

Following the publication of the *Atlas da Evolução dos Remanescentes Florestais da Mata Atlântica* for the states of Rio de Janeiro and São Paulo, the Fundação SOS Mata Atlântica in collaboration with the Instituto Nacional de Pesquisas Espaciais (INPE) have recently completed similar analyses for the states of Espírito Santo, Santa Catarina and Paraná. The results have demonstrated widespread deforestation during the period 1985 to 1990, and according to the geographer, Diana Hamburger, technical coordinator for the Atlas, forecast the total extinction of Atlantic forest ecosystems in these states within a little over 50 years if the present rate of destruction continues unchecked.

According to the Atlas, more forest was destroyed in Paraná during 1985-1990 than in the states of Rio de Janeiro, São Paulo and Espírito Santo combined in the same period. An estimated 144,240 ha of forests, which formerly covered 85% of the state, were destroyed in five years. In 1990, the total forest cover corresponded to 7.7% (2,025,092 ha) of Paraná, concentrated in the Serra do Mar (30% of the remaining forest) and the Iguaçú National Park (10% of the remaining forest). The forests most affected were those in the interior of the state, most especially the pine forests, *Araucaria*, and central plateau regions, now replaced largely by plantations of soy bean, wheat, and cotton. An estimated 99,412 ha of forests were cut down in this five-year period (1985-1990) in the state of Santa Catarina; corresponding to 6.1% of the forests remaining in 1985. 81.5% of the state was formerly covered by Atlantic forest. This was reduced to 16.2% (1,527,794 ha) by 1990. Particularly affected were the coastal *restinga* forests. The figures for the state of Espírito Santo are equally alarming. The Atlantic forest, which formerly covered 87% of the state, has been to reduced to an estimated 8.3% in 1990. A total of 19,212 ha of forests, equivalent to 1% of the forest remaining in 1985, were destroyed during the period 1985-1990, with approximately 402,811 ha remaining.

Convênio SOS Mata Atlântica-INPE, Rua Manoel da Nobrega 456, 04001-001 São Paulo, São Paulo, Brazil. Fax: (001) 885-1680. Visual interpretation of Landsat TM images, color composition 3B, 4G and 5R + ground-truthing.

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STATUS AND DISTRIBUTION OF THE GOLDEN LION TAMARIN IN RIO DE JANEIRO

Cecília Kierulff, a graduate student of the master's course in Ecology, Conservation and Wildlife Management of the Federal University of Minas Gerais (UFMG), Brazil, recently completed her thesis on the status and distribution of the golden lion tamarin, *Leontopithecus rosalia*. The study was supervised by Dr Jody R. Stallings (currently working with CARE International in Ecuador) and Anthony B.Rylands (UFMG). The study was begun in April 1990 and field work lasted for 18 months. It was financed by the Brazil Science Council (CNPq/CAPES), U.S.Fish and Wildlife Service (USFWS), World Wildlife Fund (WWF), IESP (Smithsonian Institution) and Conservation International (CI), and formed part of the activities of the Smithsonian Institution's Golden Lion Tamarin Conservation Program, directed by Dr

Devra Kleiman. The following is the abstract of the thesis:

A survey of lion tamarin, *L.rosalia*, populations was carried out throughout its original distribution, excluding the Poço das Antas Biological Reserve in the state of Rio de Janeiro, Brazil. Remaining forests were identified by visual interpretation of LANDSAT-TM satellite images. Populations of *L.rosalia* were located by interviewing local people, and forests were surveyed using "play-back" recordings of lion tamarin long calls. A total of 299,568 ha of forests below 700 m. above sea level remain within the golden lion tamarin's geographic range. It was estimated that 53% of this forested area is comprised of forest patches of less than 500 ha, and about 17% occur between 500 and 700 m above sea level. The total population of *L.rosalia*, including that of the Poço das Antas Biological Reserve, was estimated to be 559 individuals in 103 groups. The lion tamarins are divided into four populations, with a further 12 groups each isolated in forest "islands". The species' distribution is restricted to just four municipalities: Silva Jardim, Cabo Frio, Saquarema, and Araruama. Habitats were evaluated in each of the regions where lion tamarins were found to occur. It was concluded that climate and vegetational differences could be influencing the species' distribution, population densities, and annual reproductive rate. Although they were originally restricted to lowland forest below 300 m above sea level, they were also found in one locality at 550 m. This range expansion was probably caused by deforestation in nearby lowland forest. In order to examine its current conservation status, effective population size was estimated and extinction simulations were carried out using a the computer model Vortex. None of the populations were found to have an effective size (N_e) sufficient to avoid genetic drift and future inbreeding effects. According to the model, all the *L.rosalia* populations in the wild, excepting that of Poço das Antas (which includes neighbouring forest), will go extinct in a few years. The principal strategies suggested were the effective protection of more forests, increasing the habitat quality (carrying capacity) of the areas where they occur, monitoring of habitat components, controlled exchange of individuals between isolated populations, translocation of isolated groups, and the reintroduction of groups to the larger forests in the lowland region where they existed originally.

Reference

Kierulff, M.C.M. 1993. Avaliação das populações selvagens de mico-leão-dourado, *Leontopithecus rosalia*, e proposta de estratégia para conservação da espécie. Master's thesis, Institute of Biological Sciences, Federal University of Minas Gerais, Belo Horizonte. 172pp.

FUND-RAISING AND GOLDEN LION TAMARINS AT ADELAIDE ZOO

During 1992 considerable work was undertaken at the Adelaide Zoological Gardens, South Australia, to improve conditions and display facilities for both golden lion tamarins (*Leontopithecus rosalia*) and cotton-top tamarins (*Saguinus oedipus*). Because of their threatened status, an education and conservation campaign was set up featuring the lion tamarins and using the idea of "A Golden Coin for a Golden Animal". In brief, thanks to generous support from the Electricity Trust of South Australia (ETSA) which paid for the exhibit improvements, a video was made featuring the well-known conservationist, the Honorary Director of the Jersey Wildlife Preservation Trust (JWPT), Dr Gerald Durrell. The video is activated by dropping a $1.00 coin (a golden coin in Australia) through the slot. Excellent footage of golden lion tamarins is then displayed, with a message from Dr Durrell detailing the plight of this beautiful creature, and encouraging people to assist in its preservation and conservation. Contributors are assured that all money raised will be used to contribute to the revegetation project in the Poço das Antas Biological Reserve, Rio de Janeiro, and the reintroduction of captive-born groups of this "flagship" species in its native habitat, projects which form part of the Golden Lion Tamarin Conservation Programme of the National Zoological Park, Smithsonian Institution, Washington, D.C. The funds are being channeled through the "The Lion Tamarins of Brazil Fund", an international appeal started by Dr Durrell in December 1991, and managed by Jeremy Mallinson, Zoological Director of JWPT, and Devra Kleiman of the National Zoological Park, Washington, D.C. Adelaide Zoo's particular campaign for golden lion tamarins has been able to

guarantee the funding for a field assistant for three years, and the first allocation of money was forwarded in early 1993.

The publicity surrounding the golden lion tamarin did not stop with this particular project, but continued, using some very provocative posters, to try to boost membership of the Royal Zoological Society of South Australia Inc., and to encourage people to become involved with conservation. The posters and full page advertisements in the local newspapers, once again sponsored by ETSA, were certainly very eye-catching and effective and raised the profile of the Adelaide Zoo considerably.

Adelaide Zoo now has two open-air, mixed exhibits containing golden lion tamarins. The first in association with scarlet macaws, jandaya conures, and razor-billed curassows, and the second in association with nanday conures and razor-billed curassows. Both exhibits have proved to be very popular with the public, and have inspired us to continue our efforts to increase the number of mixed exhibits. As an aside, we first attempted a mixed exhibit of this sort with cotton-top tamarins in association with scarlet macaws and the other species mentioned above. The tamarins, however, "ganged-up" on the macaws, and almost caused the death of one, and thus had to be removed and replaced with the less aggressive lion tamarins.

Ed J. McAlister, Director and Chief Executive, Adelaide Zoological Gardens, Frome Road, Adelaide, South Australia 5000, Australia, and **David J. Langdon**, Acting Director, Monarto Zoological Park, Princes Highway, Monarto South, South Australia 5254, Australia.

STUDBOOK FOR THE BLACK LION TAMARIN

The International Committee for the Preservation and Management of the Black Lion Tamarin, *Leontopithecus chrysopygus*, chaired by Faiçal Simon (Fundação Parque Zoológico de São Paulo) and Devra Kleiman (National Zoological Park, Washington, D.C.), recently published the fourth studbook for the captive population, covering the period January 1, 1991 to December 31, 1992. The studbook keeper is Claudio Pádua (Instituto de Pesquisas Ecológicas, Piracicaba). Three institutions now hold this species: the Jersey Wildlife Preservation Trust (JWPT), the Rio de Janeiro Primate Center (CPRJ/FEEMA), and the São Paulo Zoo. The captive population, begun in 1973 by Adelmar F.Coimbra-Filho of the Rio de Janeiro Primate Center with seven individuals obtained from the Morro do Diabo State Park, São Paulo, increased by 6% in 1991 and 11% in 1992, and on December 31, 1992 totalled 81 animals (42.33.6), with 18 founders, 13 of which are still alive. The studbook is available from Faiçal Simon.

Faiçal Simon, Fundação Parque Zoológico de São Paulo, Rua Miguel Stefano 4241, 04301-905 São Paulo, SP, Brazil, and **Devra G. Kleiman**, National Zoological Park, Smithsonian Institution, Washington, D.C. 20008-2958, USA.

Reference

Pádua, C.V. 1993. *1992 International Studbook for the Black Lion Tamarin,* Leontopithecus chrysopygus. Fundação Parque Zoológico de São Paulo, São Paulo. 28pp.

1992 STUDBOOK FOR THE GOLDEN LION TAMARIN

The 1992 International Studbook for the captive populations of *Leontopithecus rosalia*, published in August 1993 by the Smithsonian Institution, Washington, D.C., provides a list of all specimens, by holding and owning institutions and by studbook number, alive on 31 December 1992, along with summaries of births, deaths, and ownership and location changes during 1992. The captive population on 31 December 1992 was 524 in 125 institutions, arising from 43 founders, eight of which were alive on that date. The 1992 Studbook also includes information on animal identities and locations, sex, parentage, ownership, and genetic relationships. In addition, data are presented on juvenile's parental care experience, proven breeders, hand rearing, and evidence for diaphragmatic hernias or other medical conditions. Information (unpublished) concerning causes of death is maintained by the studbook keeper. A comprehensive listing will be published only in 1994, and subsequently at five-year intervals. A complete historical chronology of the captive population, listing all events through 1989, is contained in the 1989 International Studbook. A Husbandry Protocol for Golden Lion Tamarins (English and Portuguese) and a Lion Tamarin

Bibliography are available on request from the Studbook Keeper.

Jonathan D.Ballou, Golden Lion Tamarin International Studbook Keeper, Department of Zoological Research, National Zoological Park, Washington, D.C. 20008-2958, USA. Fax: 202-673-4815.

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Ballou, J.D. 1993. *1992 International Studbook Golden Lion Tamarin* Leontopithecus rosalia. Smithsonian Institution, Washington, D.C. August 1, 1993.

AUSTRALASIAN REGIONAL STUDBOOK FOR *ATELES GEOFFROYI*

The September 1993 issue of *Neotropical Primates* reported on the activities of the Australasian Species Management Plan (pp.3-5). Mandy Howie of the Orana Park Wildlife Trust, New Zealand, listed as the regional studbook keeper for *Ateles geoffroyi vellerosus*, has retired, and records for all *Ateles geoffroyi* held in the Australasian region are now being kept by Steven Wilson, Royal Melbourne Zoological Gardens, P.O.Box 74, Parkville, Victoria 3052, Australia.

POSTCARDS FOR SALE FOR THE MAMIRAUÁ PROJECT

Color postcards, two with remarkable photographs of the white uacari (*Cacajao c. calvus*) by Luiz Claudio Marigo, are being sold to support the Mamirauá Project - a multidisciplinary research and management program for the Mamirauá State Ecological Station. The large cards (20 x 15 cm) cost US$1.00 and the smaller cards US$0.50 each. Payment can be made in Brazilian currency (CR$).. Orders may be placed with Aline P.Da Rin Azevedo. Primatam, Departamento de Zoologia, Museu Paraense Emílio Goeldi, Caixa Postal 399, 66000 Belém, Pará. Brazil.

PASANTIAS EN PRIMATOLOGIA

El Centro Argentino de Primates (CAPRIM) ofrece pasantias en su sede de Corrientes para realizar los siguientes trabajos originales. 1) Evaluación poblacional de monos aulladores (*Alouatta caraya*): demografia y ambiente. 2) Perfil sanitário y zoonótico de publicaciones silvestres de monos aulladores, *Alouatta caraya*. Las poblaciones de monos aulladores sufren oscilaciones debido a epidemias de diverso origen y a cambios climatológicos e inundaciones periódicas que afectan la disponibilidad de alimentos. El objetivo de este estudio es evaluar el impacto de modificaciones ambientales en poblaciones estudiadas por casi una década y hacer un estudio intensivo del estado sanitario y potencialidad zoonótica de esta especie en islas del río Paraná y en montes en tierra firme sobre el río Riachuelo (Corrientes). Estos trabajos se realizaran los meses de febrero y marzo de 1994. Con el auspicio del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" y de la Sociedad Argentina de Primatologia. Lugar de trabajo: Centro Argentino de Primates (San Cayetano, Corrientes) y zonas aledañas. Alojamiento: Gratuito. No se incluyen gastos de viaje, alimentación ni cobertura médica. No se abona ningún salario ni viático. Requisitos: Graduado con menos de 2 años de recibido o alumno avanzado; carta de presentación de un profesor de la facultad en la que estudió; curriculum vitae y certificado de notas; conocimiento de inglés. Inscripción e informes: Julio C.Ruiz, Director, Centro Argentino de Primates, Casilla de Correo 145, 3400 Corrientes, Argentina. Tel. y Fax: 54 783 27790, Email: RUIZ@CAPRIM.EDU.AR.

BOLETIN PRIMATOLÓGICO LATINO-AMERICANO (BPL)

El BPL fue publicado inicialmente en 1989 como una continuación del *Boletin Primatológico Argentino* (BPA), con el objetivo de difundir trabajos que cubran aspectos de la primatologia en el neotrópico. Los temas aceptados incluyen artículos originales, comunicaciones y revisiones. Hasta el presente han contribuido al BPA y BPL investigadores de diferentes países de Latinoamérica, Estados Unidos y España. Actualmente esta publicación intenta además publicar tesis doctorales y monografías, trabajos que por extensión no son aceptados en otras revistas y que contienen, valiosa información, muchas veces publicada en forma fragmentaria en artículos cortos. Los idiomas aceptados por el BPL son el castellano, portugués, inglés y francés. Para mayor información dirigirse a: Dr Gabriel Zunino, Museo Argentino de Ciencias Naturales, Div. Mastozoologia, Av. Angel Gallardo 470, 1405 Buenos Aires, Argentina.

SUSTAINABLE USE OF WILDLIFE

The journal of the Fauna and Flora Preservation Society, *Oryx*, will be emphasizing the theme "Sustainable Use of Wildlife" in their 1994 issues, publishing case histories, comments, and analyses on the topic. Other papers will also be published, but the Editorial Board felt it timely and important to give this matter more detailed coverage. *Oryx* is published quarterly by Blackwell Scientific Publications. Submitted manuscripts are peer reviewed. The editor is Dr Jacqui Morris, Fauna and Flora Preservation Society, 1 Kensington Gore, London SW7 2AR, England, UK.

WILDTRAK - HOME RANGE ANALYSIS FOR MACINTOSH COMPUTERS

Wildtrak is an integrated package of non-parametric home range analyses for use with radio-tracking or other locational data. It is a flexible and user-friendly application, employing all the usual Macintosh features. Text format data files with any number of fields and up to 5000 fixes may be used. Analyses include: variable speed animation of animal movements over the study area; autocorrelation - calculation of Schoener's index; analysis of spatial drift of home range over time; determination of significant deviations from expected spatio-temporal separations for simultaneously tracked individuals; grid cell analysis - area and density of use plots; calculates minimum distance moved and speed of movements; calculates and plots minimum convex polygons, peeled polygons and restricted polygons; static interaction - measures spatial overlap between pairs of ranges and calculates Spearman's rank correlation coefficient. The package also includes a utility for conversion of bearing station data to coordinates. Results may be saved to text files or printed on any standard primter. Price £ 70.0 (+ VAT in the UK) + postage and packing. For further information: Dr Ian Todd, Department of Zoology, University of Oxford, South Parks Road, Oxford OX1 3PS, UK.

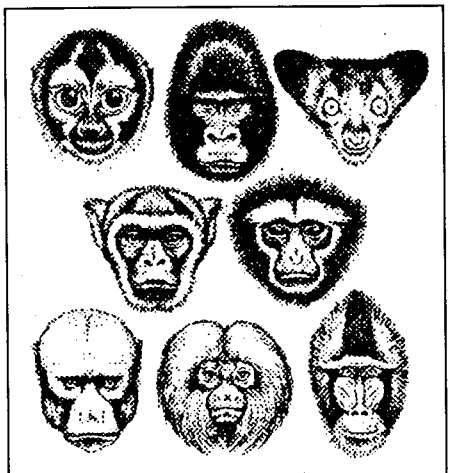
NEW YORK CONSORTIUM IN EVOLUTIONARY PRIMATOLOGY (NYCEP)

The NYCEP is a graduate training program in all aspects of the behavioral and evolutionary biology of primates, by the Research Training Grant. This program brings together a diverse faculty of 26 scientists from five universities and research/public education institutions in New York city: City University of New York, Columbia University, New York University, The American Museum of Natural History, and the Wildlife Conservation Society (Bronx Zoo). NYCEP faculty research focuses on nonhuman (and human) primates from the perspectives of comparative morphology, paleontology and systematics, molecular and population genetics, behavior and ecology, and conservation biology. Full tuition is provided along with a stipend of US$12,000 annually for 4-5 years. Minority students and women are especially encouraged to apply to NYCEP, and special funding support may be available to them. Application is made jointly to NYCEP and to one or more cooperating universities by early January. Application forms and detailed information about all three universities and the NYCEP program may be obtained from Dr Eric Delson, Director of NYCEP, Department of Vertebrate Paleontology, The American Museum of Natural History, New York NY 10024, USA. Tel: (212) 769-5992, Fax: (212) 769-5842.

FAO - RED DE COOPERACIÓN TÉCNICA EN PARQUES NACIONALES, OTRAS AREAS

PROTEGIDAS, FLORA Y FAUNA SILVESTRES - NEW COORDINATORS

In Colombia, Sra. Martha Rojas Urrego, Directora Parques Nacionales, INDERENA, Carrera 10, No.20-30, piso 8°, Apartado Aereo 13458, Santa Fé de Bogotá D.C., has been appointed the national coordinator for the Red Latinoamericana de Cooperación Técnica en Parques Nacionales, otras Areas Protegidas, Flora y Fauna Silvestres and the Subred de Planificación y Manejo de Areas Protegidas en la Región Amazónica. In Honduras, Sr. José A.Reyes Chirinos, Jefe Departamento de Areas Protegidas y Vida Silvestre, Corporación Hondureña de Desarrollo Forestal, Apartado Postal 1378, Tegucigalpa D.C. was appointed national coordinator. Likewise, Ing. Antonio Moizaka Taura, Director General de Areas Naturales, Protegidas y Fauna Silvestre, Instituto Nacional de Recursos Naturales, Calle Diecisiete No.355, Urb., El Palomar, Apartado Postal 4452, San Isidoro, Lima, has been appointed national coordinator for Peru. For further information: Kyran D.Thelen, Oficial Regional Forestal, Oficina Regional de la FAO para América Latina y el Caribe, Casilla 10095, Santiago, Chile, Tel: (56 2) 2185323, Fax: (56 2) 2182547.



POSTCARDS OF PRIMATE STAMPS

The German Primate Society (Gessellschaft für Primatologie - GfP) and the Primate Society of Great Britain (PSGB) are selling sets of four attractive postcards featuring primate stamps. GfP is selling sets for DM5.00 (approx.US$3.20). The price is reduced to DM4.00 per set for orders of 25 or more sets. Orders must be prepaid in cash or by cheque in DM payable to "Gessellschaft für Primatologie". All income from German sales will be used exclusively for primate conservation projects. Likewise PSGB is selling the cards for 40p each, in addition to T-shirts (£ 7 + £ 1 p&p, yellow, green and blue) and sweatshirts (£ 12 + £ 1 p&p, cream, pink, blue, green, yellow, and brown), with the design "Our future is your future", in sizes small, medium, large and X-large. Checks to "Primate Society of Great Britain". Return from sales is also set aside for primate conservation projects. Contact: Dr Eckhard W. Heymann, Gesellschaft für Primatologie, Kellnerweg 4, 37077 Göttingen, Germany, or Dr Miranda Stevenson, PSGB, Edinburgh Zoo, Murrayfield, Edinburgh EH12 6TS, Scotland, UK.

JWPT SUMMER SCHOOL

The Jersey Wildlife Preservation Trust (JWPT) will be holding its Summer School on "Breeding and Conservation of Endangered Species", from 30 July to 20 August, 1994. The course is designed for students, zoo and veterinary staff, and others with an interest in conservation and/or captive animals. It offers: an overview of how JWPT and other organisations have integrated captive and wild conservation, and what the future strategy should be; lectures, given by visiting professionals and staff, which are a mixture of fundamentals and provocative appraisals encouraging the formulation of views on the conservation role of zoos, based on an understanding of the issues involved; individual projects which provide an opportunity for first-

hand experience of research and data analysis; practical instruction/workshop sessions with demonstrations of systematic data collection, based on appropriate experimental design, and showing how to analyse the information obtained; other demonstration sessions in which zoo staff and invited experts explain some of the practicalities of captive and field management. Course directors: Trust Training Officer, Dr John E.Fa, and two internationally recognised scientists. Course tutor: Dr Anna T.C.Feistner, Trust Research Officer. Course coordinator Chris Clark, Assistant Training Officer at the Trust. Fee per person is £ 850, including expenses, accommodation and meals. Participation limited to 24 students. Closing date for application: 31 January 1994. Early application essential. Contact: Summer School Coordinator, Jersey Wildlife Preservation Trust, Trinity, Jersey JE3 5BF, Channel Islands, British Isles.

UNIVERSIDAD NACIONAL COSTA RICA - TWO FACULTY POSITIONS AVAILABLE

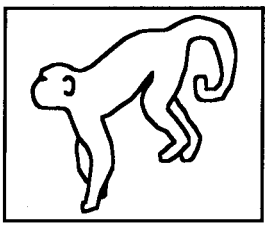
The Regional Wildlife Management Program for Mesoamerica and the Caribbean, of the Universidad Nacional, Costa Rica, has two positions available for Visiting Professors. Candidates should have a Master's or Doctorate degree, preferably in Wildlife Management, be fluent in Spanish, and have field experience in the Neotropics. Previous teaching and university outreach experience is desirable. Latin Americans are particularly encouraged to apply. Fields of experience/specialization: wildlands management, environmental assessment, natural resources economics, and biometry. Contact: Director, PRMVS, UNA, Apdo.1350-3000, Heredia, Costa Rica, Fax: (506) 37-7036, email: prmvs@huracan.cr.

DUKE UNIVERSITY - POSITIONS AVAILABLE

The Department of Biological Anthropology and Anatomy of Duke University, Durham, North Carolina, is offering several one to three-year teaching/research positions as Visiting Assistant Professors in the following areas: Primate behavior and sociecology; Primate morphology; Primate or human evolution; and Medical gross anatomy. Qualifications: Ph.D or anticipated award of a Ph.D. within two months of appointment. Salary: competitive and commensurate with qualifications. Starting date: September 1994. Deadline for applications: 15 February, 1994. Applications require a letter of application, current CV, and at least three letters of reference to: Richard F.Kay PhD, Professor and Chairman, Department of Biological Anthropology and Anatomy, Box 3170, Duke University Medical Center, Durham, NC 27710, USA.

Primate Societies

SOCIEDADE BRASILEIRA DE PRIMATOLOGIA - PUBLICATION OF THE PROCEEDINGS OF THE SOCIETY'S V CONGRESS



Maria Emília Yamamoto (President of the Society, 1989-1990) and Maria Bernadete Cordeiro da Sousa of the Department of Physiology, Federal University of Rio Grande do Norte (UFRN), have edited and published the proceedings of the V Brazilian Primatological Congress, held at the Federal University of Bahia, Salvador, Bahia, 24th February to 1st March 1991 (see "Recent Publications"). The book, the fourth in the series *Primatologia no Brasil*, has 22 articles in four sections: Ecology and behaviour; Conservation; Physiology and pathology; and Methods and techniques. For the first time in the series the manuscripts were reviewed by anonymous referees. The publication was financed through a grant from the National Environment Fund (FNMA) in collaboration with the Research Foundation of the Federal University of Rio Grande do Norte (FUNPEC), Natal, Rio Grande do Norte, and printed by the University Press.

AMERICAN SOCIETY OF PRIMATOLOGISTS - MEMBERSHIP DIRECTORY

The American Society of Primatologists (ASP) have recently published their *1994 Directory*, which includes the names, addresses and specialization of all members, and also the

Constitution and Bylaws of the Society. The ASP are responsible for the publication of the *American Journal of Primatology*, and besides organizing annual meetings, publish a newsletter - the *ASP Bulletin*. The President of the Society is Dr Richard Rawlins, Rush-Presbyterian-St Luke's Medical Center, Chicago. Information about membership can be requested from Dr Margaret Clarke, Executive Secretary ASP, Delta Regional Primate Research Center, Tulane University, Three Rivers Road, Covington, LA 70433, USA. Address changes of members, and subscriptions, should be sent to the ASP Treasurer, Dr Jeffrey French, Department of Psychology, University of Nebraska at Omaha, Omaha, NE 68182, USA.

AMERICAN SOCIETY OF PRIMATOLOGISTS RESOLUTION REGARDING CONSERVATION OF WILD PRIMATE POPULATIONS

The Board of Directors of the American Society of Primatologists (ASP) approved the following resolution concerning primate conservation on the 9 September 1993. It was reported in the *ASP Bulletin* 17(3), September 1993.

WHEREAS, many wild populations of nonhuman primates are declining due to habitat loss associated with increasing demands for agricultural land and forest products; and
WHEREAS, eradication of primates as agricultural pests and hunting of primates for food are also contributing to the decline of wild primate populations; and
WHEREAS, careless capture of nonhuman primates can threaten the viability of natural populations and result in unnecessary suffering, mortality, and wastage; and
WHEREAS, the United States is the world's largest importer of nonhuman primates for scientific use and is a Party to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); and
WHEREAS, the scientific study of nonhuman primates contributes to advances in human and veterinary medicine and yields information that is essential to the conservation of wild primate populations; and
WHEREAS, all primate species are listed in Appendix I or Appendix II of the Convention and the Convention recognizes that trade in species threatened with extinction should be regulated: and
WHEREAS, many of the primate species most often involved in scientific research and testing in the United States are available from sources other than wild populations within the natural ranges of these species,
The American Society of Primatologists resolves:
To encourage actions that provide for appropriate scientific access to nonhuman primates while ensuring that importation of primates into the United States does not contribute to the decline of natural primate populations;
To support limitation of importation of nonhuman primates to those that are humanely obtained through purpose breeding or, when necessary captured in accordance with good wildlife management practices;
To recognize that the availability of purpose-bred primates can never fully replace the need for scientific access to the full range of primates from wild populations and that prediction of which primate populations may yield critically important information is not possible;
To respect the rights of primate habitat countries to decide for themselves, within the terms of the Convention (to which all are Parties), whether or not to make nonhuman primates available for export;
To seek means of promoting the health and well-being of primates during all phases of trade from capture through quarantine; and
To recognize the continuing need for objective and reliable population data on wild primate populations.

The Resolution does not imply endorsement by the American Society of Primatologists of any specific legislation or other activity, and may not be represented by anyone as such an endorsement.

Recent Publications

A Primatologia no Brasil - 4, edited by Maria Emília Yamamoto and Maria Bernadete C. de Sousa, 1993, 327pp. Editora Universitaria, Universidade Federal Rio Grande do Norte, Brazil. Price: US$15.00 (or equivalent in Cruzeiros Reais). Cheques made payable to: Associação Norteriograndense de Amparo à Psicobiologia (ANAP). This fourth volume of the series produced by the Sociedade Brasileira de Primatologia (SBPr), publishes the proceedings of the V Brazilian Primate Congress, held at the Federal

University of Bahia, Salvador, 24 February to 1 March 1991. The book is divided into four sections. Section I: Ecology and Behaviour. Reação a intrusos da mesma espécie em *Callithrix jacchus*: influência do status social (A.Araújo and M.E.Yamamoto); Padrão de atiividades diárias do bugio-preto *Alouatta caraya* (Primates, Cebidae): uma análise temporal e bioenergética (J.C.Bicca-Marques); Reprodução de *Alouatta caraya* Humboldt, 1812 (Primates, Cebidae) (C.Calegáro-Marques and J.C.Bicca-Marques); Evidências sobre a adaptação de primatas neotropicais às áreas de mangue com ênfase no macaco-prego *Cebus apella apella* (M.E.B.Fernandes and N.O.Aguiar); Variação circadiana no padrão de distribuição do "autogrooming" e do "allogrooming"em um casal do sagüi comum (*Callithrix jacchus*) (M.T.Mota, M.B.C.de Sousa and M.de F.Campos); Ausência de efeitos depressivos decorrentes de isolamento parcial ou total do filhote do sagüi comum (*Callithrix jacchus*) (N.G.da Silva, C.Ades and M.E.Yamamoto); Influência dos irmãos mais velhos sobre o comportamento de amamentar da fêmea do sagüi comum (*Callithrix jacchus*) (M.de F.F.M.Ximenes and M.B.C.de Sousa). Section II: Conservation. Conservação do sagüi-da-serra (*Callithrix flaviceps*): o papel de matas particulares (V.H.Diego, S.Ferrari and F.D.C.Mendes); Distribuição geográfica e estado de conservação de *Callithrix flaviceps* (Primates, Callitrichidae) (S.L.Mendes); A situação dos cebídeos como indicador do estado de conservação da mata Atlântica no estado do Paraíba, Brasil (M.M.de Oliveira and J.C.C.Oliveira); Notas sobre o mico-leão-de-cara-preta, *Leontopithecus caissara* Lorini and Persson, 1990, no sul do Brasil (Primates, Callitrichidae) (V.G.Persson and M.L.Lorini); Primatas do Rio Grande do Sul: ocorrência em unidades de conservação (J.C.Prates *et al.*). Section III: Physiology and Pathology. Spontaneous diabetes mellitus in *Leontopithecus chrysomelas* (Kuhl, 1820) and *Leontopithecus chrysopygus* (Mikan, 1823) Callitrichidae, Primates (J.B.da Cruz, A.Pissinatti and M.D.do Nascimento); Histoplasmosis in *Callithrix geoffroyi*, Humboldt, 1812 (Callitrichidae, Primates) (J.B.da Cruz *et al.*); Early embryo development and implantation in the marmoset monkey, *Callithrix jacchus*: studies in reproductive medicine and conservation (J.P.Hearn and G.E.Webley); Hematological profiles of *Callithrix geoffroyi* (Humboldt, 1812), *Callithrix kuhli* (Wied, 1826), and *Callithrix aurita* (Geoffroy, 1812) (Callitrichidae - Primates) (M.D.do Nascimento *et al.*); Primatas platirrínos e leishmanioses da Região Neotropical Americana (L.H.Pereira *et al.*); Primatas platirrínos como modelos experimentais da doença de Chagas: infecção natural e experimental pelo *Trypanosoma cruzi* (L.H.Pereira *et al.*); Primatas platirrínos: malária simiana natural e estudos experimentais de malária humana (L.H.Pereira *et al.*); Primatas não humanos da Região Neotropical como modelos experimentais das esquistossomoses humanas (L.H.Pereira *et al.*). Section IV: Methods and Techniques. Criação artificial e adoção no sagüi comum (*Callithrix jacchus*): um estudo de caso (V.Boere and R.da L.Fernandez); Métodos e estratégias informais na primatologia de campo (F.D.C.Mendes). Available from: Maria Bernadete C.de Sousa, Setor de Psicobiologia, Caixa Postal 1511, 59072-970 Natal, Rio Grande do Norte, Brazil.

Distance Sampling: Estimating Abundance of Biological Populations, by S.T.Buckland, D.R.Anderson, K.P.Burnham, and J.L.Laake, 1993, 464pp. Chapman and Hall Ltd., Andover, UK. Proce Hdbk £ 40.00, Pbk £ 19.95. An extremely important reference for population survey methods for primates. Contents: Introductory concepts. Assumptions and modelling philosophy. Statistical theory. Line transects. Point transects. Extensions and related work. Study design and field methods. Illustrative examples. Information: Direct Response Supervisor, Chapman and Hall Ltd., Cheriton House, North Way, Andover, Hants SP10 5BE, England.

GIS Applications in Mammalogy, edited by Suzanne B.McLaren and Janet K.Braun, 1993, 41pp. Oklahoma Museum of Natural History, Norman, Oklahoma. Includes the following chapters: Introduction - S.B.McLaren and J.M.Briggs; The application of GIS to mammalogy: basic concepts - J.K.Berry; GIS in mammalogy: building a database - P.V.August; Ecological analyses using geographic information systems - L.B.Johnson; Glossary - P.V.August, J.M.Briggs, L.B.Johnson and S.B.Mclaren. Available from: Oklahoma Museum of Natural History, 1335 Asp Avenue, Norman, Oklahoma 73019, USA.

Biodiversity Prospecting: Using Genetic Resources for Sustainable Development, edited by W.V.Reid, S.A.Laird, C.A.Meyer, R.Gamez, A.Sittenfield, D.H.Janzen, M.A.Gollin, and C.Juma, 1993, 342pp. World Resources

Institute (WRI), USA, Instituto Nacional de Biodiversidad (INBio), Costa Rica, Rainforest Alliance, USA, and the African Centre for Technology Studies (ACTS), Kenya. Seven chapters and four annexes as follows: A new lease on life - W.V.Reid *et al.*; Costa Rica's conservation program and National Biodiversity Institute (INBio) - R.Gamez *et al.*; Biodiversity prospecting by INBio - A.Sittenfield and R.Gamez; Contracts for biodiversity prospecting - S.A.Laird; Research management policies: permits for collecting and research in the tropics - D.H.Janzen *et al.*; An intellectual property rights framework for biodiversity prospecting - M.A.Gollin; Policy options for scientific and technological capacity-building - C.Juma; and annexes 1) The role of parataxonomists, inventory managers, and taxonomists in Costa Rica's National Biodiversity Inventory - D.H.Janzen *et al.*; 2) Biodiversity prospecting contract - D.Downes; 3) The Convention on Biological Diversity and intellectual property rights - M.A.Gollin; 4) The United Nations Convention on Biological Diversity (transcript). Contact: WRI Publications, P.O.Box 4852, Hampden Station, Baltimore, MD 21211, USA.

Banco de Dados da Mata Atlântica, No.1/1993, edited by the Fundação SOS Mata Atlântica, 1993, 369pp. Fundação SOS Mata Atlântica, São Paulo, in collaboration with the John T. and Catherine D.MacArthur Foundation and the World Wide Fund for Nature (WWF). An extremely useful indexed bibliography on conservation and sustainable use of resources in the Atlantic forest of Brazil. Contact: João Paulo Ribeiro Capobianco, Superintendente, Fundação SOS Mata Atlântica, Rua Manoel da Nobrega 456, Paraíso, São Paulo, 04001-001 São Paulo, Brazil. Tel:(011) 887-1195, Fax: (011) 885-1680.

Parques y Progreso: Areas Protegidas y Desarrollo Economico en América Latina y el Caribe, editado por V.Barzetti, 1993, 258pp. Unión Mundial para la Naturaleza (UICN) y Banco Interamericano de Desarrollo (BID), Washington, D.C. Este libro se basa en los escritos presentados en el IV Congreso Mundial de Parques, y en los trabajos realizados por los miembros y socios de UICN de la región Latinoamericana y del Caribe. Información: Susan Stearns, World Conservation Union (IUCN), Washington Office, 1400 16th Street, NW, Washington D.C. 20036, USA. Fax: (202) 797-5461.

Guide to Biological Field Stations: Directory of Members, edited by the Organization of Biological Field Stations, Washington University, Eureka. Price US$10. Provides information on 150 biological stations throughout North America, Central America, Mexico, and the Caribbean. Included are maps and a brief outline of what each station offers within eight regional overviews, as well as the location, environmental facilities, and ongoing research and educational programs for each station. Contact: Richard C.Coles, Secretary-Treasurer, Organization of Biological Field Stations, Tyson Research Center, Washington University, P.O.Box 258, Eureka, Missouri 63025, USA. Tel: (314) 935-8430.

Amazonia Peruana: Vegetación Tropical en el Llano Subandino, edited by Risto Kalliola, Maarit Puhakka and Walter Danjoy, Proyecto Amazonia, Oficina Nacional de Evaluación de Recursos Naturales, University of Turku, Finland, 1993. ISBN 952-90-4387-2. Price US$20.00 + postage (US$3.00 for Nordic countries, US$4.00 for Europe, US$5.00 for other countries: cheques made payable to "Turku University Library"). In Spanish. This book presents a synthesis of the current knowledge concerning geological and ecological aspects of the Peruvian Amazonian lowland forest in the region occupied by humid tropical vegetation in the subandine llanos. The book is divided into five parts. The first describes Peruvian Amazonian landscapes, with overviews of the geography of Peruvian lowland forest (R.Kalliola and M.Puhakka), the history of scientific exploration of the area (J.Salo), and a discussion of the role of the *Oficina Nacional de Evaluación de Recursos Naturales* in Amazonian development (W.Danjoy). Part 2 discusses the geohistory and geology of the Peruvian Amazon (M.Räsänen), the geology of the Pebas formation in northeastern Peruvian Amazon (C.Hoorn), and sedimentation processes in the lowland forests (A.Linna). Part 3 examines the vegetation, including chapters on vegetation classification (H.Tuomisto), inundated forest (M.Puhakka and R.Kalliola), *terra firme* forest (K.Ruokolainen and H.Tuomisto), patterns of floristic composition (A.H.Gentry and R.Ortiz), and succession (M.Puhakka *et al.*). Part 4 provides an explanation of a geoecological map of the Peruvian lowland forest (M.Räsänen), and the last section discusses future prospects, including forest

management (J.Torres Vásquez) and conservation and scientific research (J.Salo and R.Kalliola). Contact: Turku University Library, SF-20500 Turku, Finland. Tel: 358-21-6336170, Fax: 358-21-6335050.

Meetings

1994

67TH MEETING OF THE SPECIES SURVIVAL COMMISSION, 15-17 January 1994, Buenos Aires, Argentina. Organizers: World Conservation Union (IUCN). Contact: Coordinadora logistica de la Asemblea General, IUCN, Rue Mauvernay 28, CH-1196 Gland, Switzerland. Tel: 41 22 999 0001, Fax: 41 22 999 0020.

XIX SESSION OF THE IUCN GENERAL ASSEMBLY, 18-26 January 1994, Buenos Aires, Argentina. Organizers: World Conservation Union (IUCN). Contact: Coordinadora logística de la Asemblea General, IUCN, Rue Mauvernay 28, CH-1196 Gland, Switzerland. Tel: 41 22 999 0001, Fax: 41 22 999 0020.

HOMINID AND PRIMATE BEHAVIOUR, Primate Society of Great Britain, Spring Meeting, 8 April 1994, Cambridge, UK. Information: Marta Lahr & Kate Robson-Brown, Departament of Biological Anthropology, University of Cambridge, Downing Street, Cambridge CB2 3DZ, UK. Fax: 0223-335460.

SYMPOSIUM ON THE PRIMATE FAMILY CALLITRICHIDAE, 1 May 1994, New World Primate Taxon Advisory Group (TAG), American Association of Zoological Parks and Aquariums (AAZPA), Hershey, Pennsylvania. This meeting will precede the 1994 Northeastern Regional AAZPA meeting. The one-day symposium will focus on topics of husbandry, nutrition, behavior, reproduction, and field research. Poster, video, and oral presentations are invited. Deadline for submission of abstracts is 15 February 1994. Registration fee: US$25.00. For more information contact: Andrew J.Baker or Beth Bahner, Philadelphia Zoo, 3400 W.Girard Avenue, Philadelphia, Pennsylvania 19104, USA. Tel: (215) 243-1100, Fax: (215) 243-0219.

JOINT ANNUAL MEETING - ANIMAL BEHAVIOR SOCIETY (ABS) AND AMERICAN SOCIETY OF PRIMATOLOGISTS (APS), ABS - 23-28 July 1994, ASP - 27-30 July 1994, Regional Primate Research Center, University of Washington, Seattle. Contact: James C.Ha (JCHA@U.WASHINGTON.EDU) or Carolyn Crockett (CROCKET@U.WASHINGTON.EDU), Primate Center SJ-50, University of Washington, Seattle, WA 98195, USA. Tel: (206) 543-1440.

XX CONGRESSO BRASILEIRO DE ZOOLOGIA, 24-29 de julho de 1994, Universidade Federal do Rio de Janeiro, Rio de Janeiro. A temática a ser abordada está baseada na questão: "Os Rumos da Zoologia". Neste contexto serão abordados os aspectos referentes a Sistemática, pesquisa básica e aplicada, filosofia e história de zoologia, coleções, publicações e a ética na zoologia. As políticas referentes às legislações ambientais, áreas de proteção e espécies ameaçadas de extinção, terão espaços em mesas redondas e/ou conferências. O Comitê Organizador aguarda sugestões de todos os zoólogos no desenvolvimento de outros subtemas que poderão ser encaminhados até 30 outubro de 1993. Envio de resumos até 30 de novembro de 1993. Informações: Secretaria do XX CBZ, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Ilha do Fundão, 21949-900 Rio de Janeiro, Rio de Janeiro, Brasil. Tel: (021) 280-7993, 590-9522 r.343 ou 340, Fax: (021) 280-7993.

VI CONGRESSO BRASILEIRO DE PRIMATOLOGIA, 24-29 de julho de 1994, Universidade Federal do Rio de Janeiro, Rio de Janeiro. Será realizado como parte das atividades do XX Congresso Brasileiro de Zoologia. Programação: Horácio Schneider/ Stephen F.Ferrari, Departamento de Genética, Universidade Federal do Pará, Caixa Postal 8607, 66075-150 Belém, Pará, Brasil. Fax: (091) 229-9785. Outras informações: Secretaria do XX CBZ, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Ilha do Fundão, 21949-900 Rio de Janeiro, Rio de Janeiro, Brasil. Veja "Primate Societies".

4TH INTERNATIONAL CONGRESS OF VERTEBRATE MORPHOLOGY, 31 July-4 August 1994, Chicago. Contact: Dr Susan Herring, Chair, ICVM Organizing Committee, Department of Orthodontics SM-46, University of Washington, Seattle, Washington 98195, USA, Tel: (206) 543-3203, Fax: (206) 685-8163.

XVTH CONGRESS OF THE INTERNATIONAL PRIMATOLOGICAL SOCIETY, 3-8 August 1994, Bali, Indonesia. Organizers: Directorate General of Forest Protection and Nature Conservation (PHPA), the Indonesian Wildlife Society (IWS) and the International Primatological Society (IPS). Contacts: Secretariat, 15th IPS Congress, PT, Bayu Buana Travel Service Ltd., Wisma Bank Dharmala 19th Fl, Jend.Sudirman Kav. 28, Jakarta 12910, Indonesia, or Dr Linda Prasetyo, c/o Perth Zoo, 20 Labouchere Road, Western Australia 6151, Australia, Tel: 09 368-1916, Fax: 09 367-3921, or Dr Soegardjito , WWF/US Asia-Pacific Program, 1250 Twenty-fourth Street, N.W., Washington, D.C. 20037, USA, Tel: (202) 861-8300, Fax: (202) 223-6971.

VTH INTERNATIONAL BEHAVIORAL ECOLOGY CONGRESS, 14-20 August 1994, University of Nottingham, England. Contact: ISBE 1994, Conference Nottingham, The Business Information Centre, 309 Haydn Road, Nottingham NG5 1DG, UK.

VITH INTERNATIONAL CONGRESS OF ECOLOGY: ECOLOGICAL PROGRESS TO MEET THE CHALLENGE OF ENVIRONMENTAL CHANGE, 20-26 August 1994, University of Manchester, England. Thematic symposia include: Learning from the Past (org. A.G.Hildrew, R.M.May); Predicting Outside our Experience (org. J.Grace, R.M.May); Managing Change and Uncertainty (org. M.V.Angel, P.J.Grubb). Symposia together with related poster sessions will be organized around the following titles: General Ecology; Applied Ecology; Geographical Regions and Ecosystems; Ecological Affairs. Deadline for abstracts: 15 September 1993. Registration deadline: 1 May 1994. Contact: The Secretary, VI International Congress of Ecology, The Manchester Conference Centre, U.M.I.S.T., P.O.Box 88, Manchester M60 1QD, England.

RESOURCES AND ENVIRONMENTAL MONITORING, 3-7 October 1994, Niterói, Brazil. Contact: Roberto Pereira da Cunha, INPE, Caixa Postal 12201, São José dos Campos, São Paulo, Brazil.

FOREST CANOPIES - ECOLOGY, BIODIVERSITY AND CONSERVATION, 10-13 November 1994, Marie Selby Botanical Gardens, Sarasota, Florida, USA. Contact: Dr Meg Lowman, Director of Research, Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, Florida 34236, USA.

II CONGRESSO BRASILEIRO DE ECOLOGIA, 5-9 December 1994, Londrina State University, Paraná, Brazil. Contact: Dr Nélio Roberto dos Reis, Coordenador Científico do II CBE, Departamento de Biologia Animal e Vegetal, Centro de Ciências Biológicas, Campus Universitário, Universidade Estadual de Londrina, Caixa Postal 6001, Londrina 86051, Paraná, Brazil, Tel: (0432) 21-2000, Fax: (0432) 27-6932.

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, either in the form of manuscripts (double-spaced) or in diskettes for PC compatible text-editors (MS-Word, Wordperfect, Wordstar). Articles, not exceeding six pages, can include small black-and-white photographs, figures, maps, tables and references, but please keep them to a minimum.

Please send contributions to the editors: **Anthony Rylands**, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Brazil, Fax: (031) 441-1412, or c/o Conservation International, Avenida Antônio Abrahão Caram 820/302, Pampulha, 31275-000 Belo Horizonte, Minas Gerais, Brazil, Fax: (031)441-2582 or **Ernesto Rodríguez Luna**, Parque de La Flora y Fauna Silvestre Tropical, Universidad Veracruzana, Apartado Postal 566, Xalapa, Veracruz 91000, México, Fax: (281) 8-77-30.

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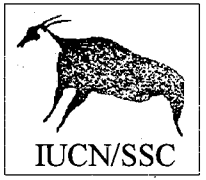
NEOTROPICAL PRIMATES is produced in collaboration with **Conservation International**, 1015 18th Street NW, Suite 1000, Washington DC 20036, USA, and **Fundação Biodiversitas**, Rua Maria Vaz de Melo 71, Dona Clara, Belo Horizonte 31260-110, Minas Gerais, Brazil.
Design and Composition - YURI L. R. LEITE and RICARDO B. MACHADO, Biodiversity Conservation Data Center (CDCB), Fundação Biodiversitas.



NEOTROPICAL PRIMATES
Anthony Rylands/Ernesto Luna, Editors
Conservation International
Avenida Antônio Abrahão Caram 820/302
31275-000, Belo Horizonte
Minas Gerais, Brazil

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