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On a New Species of Bare-Eared Marmoset, Genus *Callithrix* Erxleben, 1777, from Central Amazonia, Brazil (Primates: Callitrichidae)

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ABSTRACT — A new marmoset species, *Callithrix saterei* sp.n. is described. The new taxon is allocated to the *Callithrix argentata* species group as a member of the bare-eared and smooth-tailed subgroup which includes: *C. argentata*, *C. leucippe*, *C. melanura*, *C. emiliae* and the recently described *C. nigriceps*. The new species is very distinct from its closest relatives, presenting as autapomorphic characters striking differences in the morphology of external genitalia of both sexes, a combination of unpigmented facial skin and pigmented auricular skin, bright orange coloration in the facial skin and genitalia (*in natura*), and a mantle strongly contrasting with the dorsum and anterior limbs. The geographical range and the conservation status of the new species in Central Brazilian Amazonia between the Rios Canumã, Paraná Urariá and Abacaxis are discussed.

KEY WORDS: *Callithrix saterei* sp.n., Callitrichidae, Primates, description, diagnosis, Amazonia, geographical distribution, allopatry, parapatry, conservation.

RESUMO — Uma nova espécie de sagüi, *Callithrix saterei* sp.n. é descrita. O novo *táxon* é alocado no grupo de espécies *Callithrix argentata*, como membro do subgrupo de orelhas nuas e cauda lisa, que inclui: *C. argentata*, *C. leucippe*, *C. melanura*, *C. emiliae* e a recentemente descrita *C. nigriceps*. Esta espécie é bastante distinta de seus parentes próximos, apresentando como caracteres próprios uma conspicuidade na morfologia da genitália externa de ambos os sexos, uma combinação de pele despigmentada na face e pigmentada nas orelhas, uma coloração laranja brilhante na pele da face e genitália (*in natura*), um manto contrastante com o dorso e membros anteriores, e um padrão de pelagem tetra-

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bandeada no dorso e tri-bandeada nos membros. São discutidos os limites da distribuição geográfica e o "status" de conservação da nova espécie na Amazônia Central Brasileira, entre os rios Canumã, Paraná Urariá e Abacaxis.

PALAVRAS-CHAVE: *Callithrix saterei* sp.n., Callitrichidae, Primatas, descrição, diagnose, Amazônia, distribuição geográfica, alopatria, parapatria, conservação.

INTRODUCTION

The primates of the genus *Callithrix* Erxleben, 1777, inhabit a large part of South America, occurring from the southern bank of the Amazon River, between the Rios Madeira and Tocantins, to northeastern and eastern Brazil from Maranhão to São Paulo, including neighboring parts of Bolivia and Paraguay (Vivo 1988, 1991).

Callithrix has been the subject of several taxonomic and zoogeographic studies this century (Thomas 1904, 1922; Elliot 1913; Lonnberg 1940; Lima 1944; Hill 1957; Carvalho 1959; Hershkovitz 1966, 1975, 1977; Ávila-Pires 1969, 1974, 1986; Coimbra-Filho & Mittermeier 1973; Rosenberger 1984; Vivo 1985, 1988, 1991; Alonso *et al.* 1986, 1987), reflecting the growing amount of information on the taxon.

The two most recent systematic reviews (Hershkovitz 1977; Vivo, 1988, 1991) differ in regard to the number of terminal taxa recognized and also in the taxonomic status of each form. Both authors recognize two species groups with allopatric geographical ranges. The *Callithrix jacchus* group occurs in the central, northeastern, eastern and southeastern Brazil; the *Callithrix argentata* group has an almost exclusively Amazonian distribution.

Hershkovitz (1977) recognized only three species of *Callithrix*: *C. jacchus*, *C. argentata* and *C. humeralifer*, with 5, 3 and 3 subspecies, respectively, for a total of 11 terminal taxa. Vivo (1988, 1991) elevated all 11 forms to the status of species. The latter author also included *Callithrix emiliae* in his taxonomic arrangement due to the absence of evidence of secondary intergradation between this and any other form of *Callithrix*.

The taxonomic status of *C. emiliae* has generated many controversies. The original description as a full species by Thomas (1920) was followed by Lima (1944). However, Hill (1957), Cabrera (1958) and Ávila-Pires (1985, 1986) consider *emiliae* as a subspecies of *C. argentata*, while Ávila-Pires (1969) and Hershkovitz (1977) synonymize both *emiliae* and *C. a. melanura* with *C. a. argentata*.

Vivo's results agree with the arrangement that was proposed by Coimbra-Filho & Mittermeier (1973) for the *C. jacchus* species group, except in relation to *C. kuhlii*, which Vivo (1988, 1991) considers a junior synonym of *C. penicillata*. Mittermeier *et al.* (1988, 1992) consider *C. kuhlii* as a valid species. Unable to review Vivo's (1988, 1991) research, Mittermeier *et al.* (1988) followed the arrangement of Hershkovitz (1977) for the taxa of the *C. argentata* species group. However, Mittermeier *et al.* (1992) later reconsidered the matter, accepting the Vivo's (1988, 1991) decision to raise all terminal taxa of the *C. argentata* group to full species status.

The two species of the *C. argentata* group accepted by Hershkovitz (1977) were taken by Vivo (1988, 1991) and Mittermeier *et al.* (1992) as clusters situated between the species and species group level. Thus, the *C. argentata* group was split in two species subgroups: the bare-eared and smooth-tailed subgroup (*C. argentata*, *C. leucippe*, *C. emiliae* and *C. melanura*), and the tassel-eared and ringed-tailed (*C. humeralifera* and *C. chrysoleuca*). In this arrangement, *C. intermedia* occupies an intermediate position between the two subgroups cited above, with the combined presence of auricular tufts only on one surface of the pinna and a smooth tail. Its geographical range is also between those of the two recognized subgroups.

Recently two new marmoset species (*Callithrix nigriceps* Ferrari & Lopes, 1992 and *Callithrix mauesi* Mittermeier, Schwarz & Ayres, 1992) were described and placed in the *C. argentata* species group: *C. nigriceps* in the bare-eared and smooth-tailed subgroup, and *C. mauesi* in the tassel-eared and ringed-tailed subgroup. In this paper we adopt with the arrangement proposed by Mittermeier *et al.* (1992). Table 1 shows the comparison

Table 1 - Comparisons of the taxonomic arrangements for *Callithrix* in Hershkovitz (1977), Vivo (1988, 1991), Mittermeier *et al.* (1992), and this paper. Modified from Mittermeier *et al.* (1992).

Hershkovitz (1977)	Mittermeier <i>et al.</i> (1988)	Vivo (1988, 1991)	Mittermeier <i>et al.</i> (1992)	This paper
<i>Callithrix jacchus</i> Group				
<i>Callithrix j. jacchus</i>	<i>Callithrix jacchus</i>	<i>Callithrix jacchus</i>	<i>Callithrix jacchus</i>	<i>Callithrix jacchus</i>
<i>Callithrix j. penicillata</i>	<i>Callithrix penicillata</i>	<i>Callithrix penicillata</i>	<i>Callithrix penicillata</i>	<i>Callithrix penicillata</i>
<i>Callithrix j. geoffroyi</i>	<i>Callithrix geoffroyi</i>	<i>Callithrix geoffroyi</i>	<i>Callithrix geoffroyi</i>	<i>Callithrix geoffroyi</i>
<i>Callithrix j. flaviceps</i>	<i>Callithrix flaviceps</i>	<i>Callithrix flaviceps</i>	<i>Callithrix flaviceps</i>	<i>Callithrix flaviceps</i>
<i>Callithrix j. aurita</i>	<i>Callithrix aurita</i>	<i>Callithrix aurita</i>	<i>Callithrix aurita</i>	<i>Callithrix aurita</i>
	<i>Callithrix kuhlii</i>		<i>Callithrix kuhlii</i>	<i>Callithrix kuhlii</i>
<i>Callithrix argentata</i> Group				
Bare-eared marmosets				
<i>Callithrix a. argentata</i>	<i>Callithrix a. argentata</i>	<i>Callithrix argentata</i>	<i>Callithrix argentata</i>	<i>Callithrix argentata</i>
<i>Callithrix a. leucippe</i>	<i>Callithrix a. leucippe</i>	<i>Callithrix leucippe</i>	<i>Callithrix leucippe</i>	<i>Callithrix leucippe</i>

Table 1 - Comparisons of the taxonomic arrangements for *Callithrix* in Hershkovitz (1977), Vivo (1988, 1991), Mittermeier *et al* (1992), and this paper. Modified from Mittermeier *et al.* (1992).(continuation)

Hershkovitz (1977)	Mittermeier <i>et al</i> (1988)	Vivo (1988, 1991)	Mittermeier <i>et al</i> (1992)	This paper
<i>Callithrix a. melanura</i>	<i>Callithrix a. melanura</i>	<i>Callithrix melanura</i>	<i>Callithrix melanura</i>	<i>Callithrix melanura</i>
	<i>Callithrix emiliae</i>	<i>Callithrix emiliae</i>	<i>Callithrix emiliae</i>	<i>Callithrix emiliae</i>
			<i>Callithrix nigriceps</i>	<i>Callithrix nigriceps</i>
				<i>Callithrix sarerei</i> sp.n.
		<i>Callithrix intermedia</i>	<i>Callithrix intermedia</i>	<i>Callithrix intermedia</i>
Tassel-eared marmosets				
<i>Callithrix h. humeralifer</i>	<i>Callithrix h. humeralifer</i>	<i>Callithrix humeralifera</i>	<i>Callithrix humeralifera</i>	<i>Callithrix humeralifera</i>
<i>Callithrix h. chrysoleuca</i>	<i>Callithrix h. chrysoleuca</i>	<i>Callithrix chrysoleuca</i>	<i>Callithrix chrysoleuca</i>	<i>Callithrix chrysoleuca</i>
<i>Callithrix h. intermedius</i>	<i>Callithrix h. intermedius</i>			
		<i>Callithrix mauesi</i>	<i>Callithrix mauesi</i>	<i>Callithrix mauesi</i>

between the more recent taxonomic schemes and that used in the present study.

Recently we discovered a hitherto unnamed form of bare-eared marmoset in Central Amazonia in the region located between the lower courses of the Rios Madeira and Tapajós. Previously, only species of the tassel-eared and ringed-tailed subgroup were known to inhabit this region. The newly discovered form, designated *Callithrix saterei*, the Saterê-Maués Indians' Marmoset, is described below.

***Callithrix saterei* sp.n.**

HOLOTYPE: MPEG-23955, field n° CZ-1293, adult male, stuffed skin, skull and skeleton, liver and blood samples for molecular and parasitological studies, stomach and intestinal contents, and measurements of the digestive tract. This specimen was collected by Raimundo Rodrigues da Silva on June 7, 1994, at the type locality, during an expedition by J. de Sousa e Silva, Júnior and M. Noronha to Central Amazonia.

PARATOPOTYPES: MPEG-23956, field n° CZ-1300, adult pregnant female, stuffed skin, skull and skeleton, liver and blood samples, stomach and intestinal contents, and measurements of the digestive tract. This specimen was collected by Souzimar Rodriguez de Lima on June 10, 1994, at the type locality, during the same expedition where the holotype was collected. Another juvenile female was observed as a pet at Sr. Pedro Coelho's home, at the type locality.

PARATYPES: MPEG-23957, field n° CZ-1312, adult female, collected by João Bosco da Costa Araújo on June 13, 1994, at São João, left bank of the Rio Marimari, near its mouth, municipality of Borba, Amazonas State, Brazil (03°57'49.9"S, 58°48'36.5"W); MPEG-23958, field n° CZ-1311, juvenile male, collected by João Luís, a local hunter, in the same date and locality of MPEG-23957. This two paratypes were preserved in stuffed skins, skulls and skeletons, liver and blood samples for molecular genetics, cytogenetics and parasitology, stomach and intestinal contents, and measurements of digestive tract, collected during the J. de Sousa and Silva Júnior and M. Noronha expedition to Central Amazonia. Another four

specimens were obtained by M. Noronha at Itacoatiara on March 10, 1994, from Sr. José, a regional boat commander that had brought the animals from the town of Terra Preta, on the right bank of the Rio Abacaxis, municipality of Nova Olinda do Norte, Amazonas State, Brazil (04°49'S, 58°26'W): MPEG-23959, juvenile female, and MPEG-23960, juvenile male, stuffed skins, skulls and skeletons, and liver sample for molecular genetics. Two living animals, maintained in captivity at Centro de Reabilitação de Primatas (CRP)-Fundação Floresta Amazônica, Manaus: an adult female and a juvenile male; MPEG-23961, adult male, no locality information, apprehended by IBAMA (the Brazilian environmental agency) in Manaus in July 1994; obtained by M. Noronha; skin, skull and skeleton.

TYPE LOCALITY: Foz do Canumã, right bank of lower Rio Canumã, in front of its confluence with the Paraná Urariá (called Paraná Abacaxis in the RADAM map, 1975, and in the Carta do Brasil ao Milionésimo-IBGE, 1972), municipality of Borba, Amazonas State, Brazil (03°59'50.8"S, 59°05'36.7"W). This area is located in Central Amazonia, south of the Rio Amazonas, and between the Rios Madeira and the Tapajós (Figure 1).

GEOGRAPHICAL DISTRIBUTION: The information concerning geographical range of *Callithrix saterei* sp.n. is still only sketchy, requiring more field studies. However, the available evidence allows an initial indication. *C. saterei* occupies a region formerly considered to contain only tassel-ear marmosets: the area located between the lower course of the Rios Madeira and Tapajós (Hershkovitz, 1977; Vivo, 1988, 1991; Mittermeier *et al.*, 1992). The records obtained for the new species show that its occurrence is in the region limited in the east by the Rio Abacaxis, in the west by the Rio Canumã, and at north by the Paraná Urariá (Figure 1) being parapatric with *Callithrix mauesi* in the east and with *Callithrix chrysoleuca* in the north and west (Silva Jr. & Noronha, in press). According to the data obtained in the region of the lower Rio Canumã, this river seems to operate as an efficient barrier. Hunters and other local residents from Foz do Canumã and Santa Bárbara, located at opposite banks of the Rio Canumã (Santa Bárbara, 04°01'36.3"S, 59°06'27.2"W) were unanimous in affirming the exclusivity of *C. saterei* sp.n. on the right bank of the Rio Canumã and south bank of the Paraná Urariá, and of *C. chrysoleuca* on the left bank of the Rio Canumã and

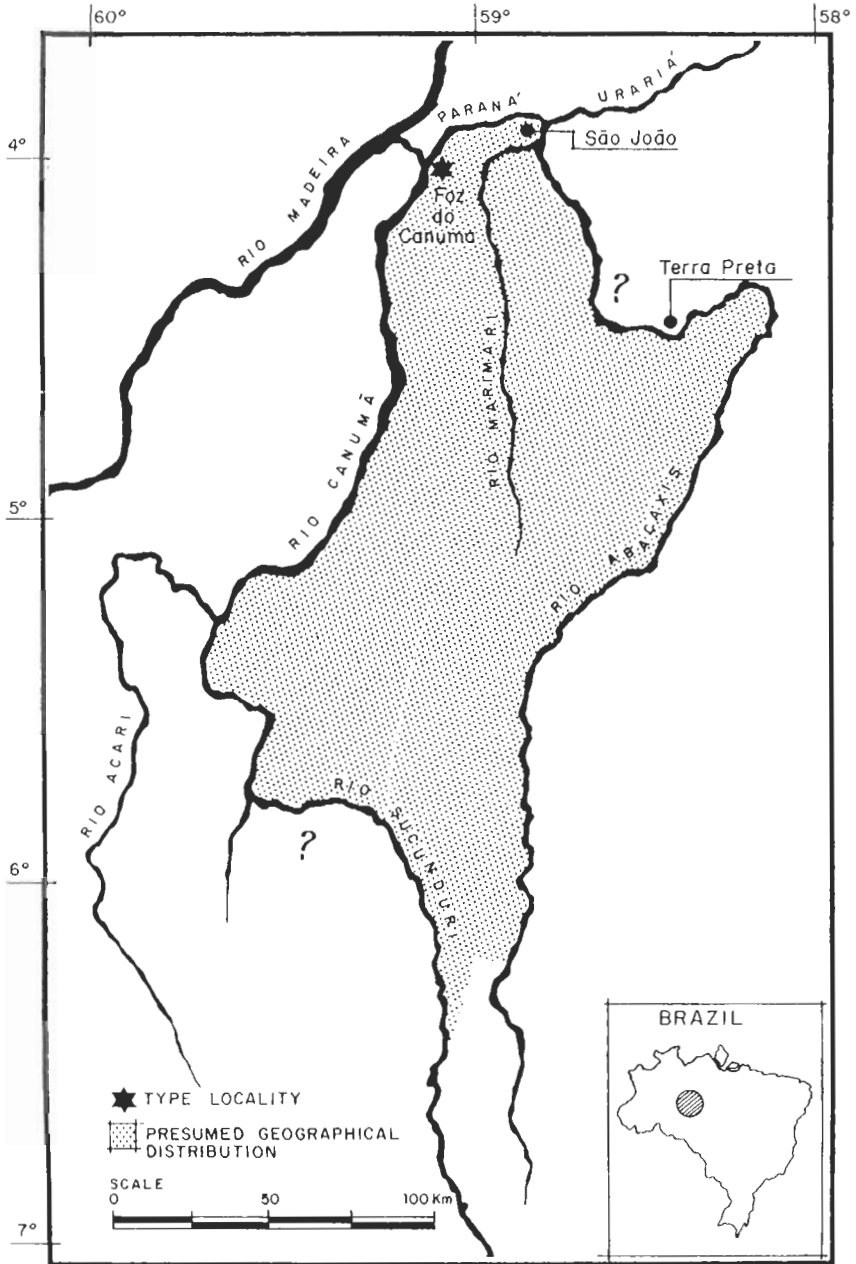


Figure 1 - Presumed geographical distribution of *Callithrix saterei*.

north bank of the Paran Urari. This information is in agreement to the results of the observations made in the region. Nevertheless, information gathered from other localities suggested the possibility of the existence of populations of *C. saterei* occurring in sympatry with *C. mauesi* in areas immediately adjacent to the right bank of the Rio Abacaxis. This hypothesis was suggested by residents from the localities of Santa Maria (0354'S, 5846'W) and Abacaxis (0355'S, 5845'W), both located on right bank of the Rio Abacaxis, that claimed to have observed *C. saterei* at these localities, but in lower densities than *C. mauesi*. This information, however, could not be verified during the expedition, which registered the presence of only *C. mauesi* in Santa Maria. On the other hand, the locality of Terra Preta (0429'S, 5826'W), assigned to the paratypes MPEG-23959 and MPEG-23960, and to the two living animals housed at CRP, is also located at the right bank of the Rio Abacaxis, in the probable range of *C. mauesi*. This could be evidence of a population of *C. saterei* that has broken the barrier that otherwise confines it in the east. Unfortunately, these data are not completely trustworthy. The animals could actually have been captured on the left bank of the Rio Abacaxis, opposite Terra Preta. This matter, therefore, requires more investigation. With regard to the southern, southeastern and southwestern limits, no data are available up to now. In the south, the course of the Rios Abacaxis and Sucunduri (an eastern tributary of the Rio Canum) come close to the region of the headwaters of the Rio Abacaxis, with a cerrado area located a few more kilometers to southeast (RADAM, 1975), and this could be the southern boundary of the geographical range of *C. saterei*.

HABITAT: As other callitrichids, *Callithrix saterei* is apparently common in primary, secondary and disturbed terra firme and igap forests, including capoeiras at diverse stages of succession, in the area located between the Rios Canum, Paran Urari and Abacaxis.

DIAGNOSIS: A bare-eared marmoset of the *Callithrix argentata* species group (*sensu* Hershkovitz, 1977). Apparently completely allopatric, *C. saterei* sp.n. is quite distinct from its closest relatives *C. argentata*, *C. leucippe*, *C. emiliae*, *C. melanura* and *C. nigriceps*. The most distinctive character of the new species is the morphology of the external genitalia (see

center color illustrations). Individuals of both sexes and all age classes present two lateral pendular skin appendages. In the male genitalia this is a narrowing of the inferior part of the scrotal lobes that retains the testicles in the anterior part. In the female genitalia this appears in the inguinal region, anteriorly positioned to the vaginal gap. In all cases, adult genital skin presents nodular structures of glandular character. Adults of both sexes present, *in naturae*, a bright orange coloration in the external genitalia skin focusing in the inguinal region and fading to flesh color in the posterior part of the genitalia and in the direction of the belly and thighs. This morphological trait is obviously an autapomorphic character, since it is exclusive of *C. saterei*, being absent in all other *Callithrix* species and all other genera of Neotropical primates. The function of this anatomical structure is still unknown; probably it is associated with the identification of conspecific strategies as suggested by Hershkovitz (1977, pp. 112-119), in his discussions of the morphology of the external genitalia and accessory structures in related species. *C. saterei* also differs from the other bare-eared marmoset species in the degree of eumelanin saturation in the face and ears skin. It is different from the darker forms, *C. emiliae*, *C. melanura* and *C. nigriceps*, in presenting an unpigmented facial skin, except in the lateral parts of the neck, and small patches at the supraorbital, rhinarium and circumbucal region, the reverse is observed in *C. melanura*. It differs from the lighter forms, *C. argentata* and *C. leucippe* for presenting pigmented ears in its free part and a strong reddish orange patch in the posterior part of the ear lobe. Regarding the skin face color, *in naturae*, *C. saterei* differs from the darker forms (with its brownish, grayish and blackish skin faces) and the lighter form *C. argentata* (with its bright pink skin face) resembling *C. leucippe* by presenting a coloration golden orange fading to flesh color in the forehead, chin and sides of the face. However it differs from *leucippe* by presenting eumelaninic patches in supraorbital, nasal and circumbucal areas. Concerning chromatic patterns of the pelage *C. saterei* sp.n. is quite different of all other bare-eared marmoset species, presenting a well distinct mantle contrasting with the dorsum and anterior limbs, and a well-marked blackish gray crown patch. Between the bare-eared marmosets, *C. saterei* sp.n. presents a chromatic pattern that approximates of *C. nigriceps* due to the

reddish brown tonality in the pelage of the posterior limbs and coloration bright brownish orange in the underparts of the body. *C. saterei* sp.n. also resembles *C. emiliae* in regards the darkening of the limbs extremities and presence of a blackish gray crown patch. However, the chromatic pattern of the mantle, dorsum, legs and underparts of *C. saterei* sp.n. turn this species close to *C. intermedia* that any other form of do bare-eared marmoset. Regardless of the obvious differences on the tail coloration, the presence of a well-marked crown patch and the morphology of the ear hairs, *C. saterei* is also close to *C. intermedia* in presenting a pelage pattern tetra-banded in the dorsum and tri-banded in the limbs, characters not shared by any other bare-eared marmoset species.

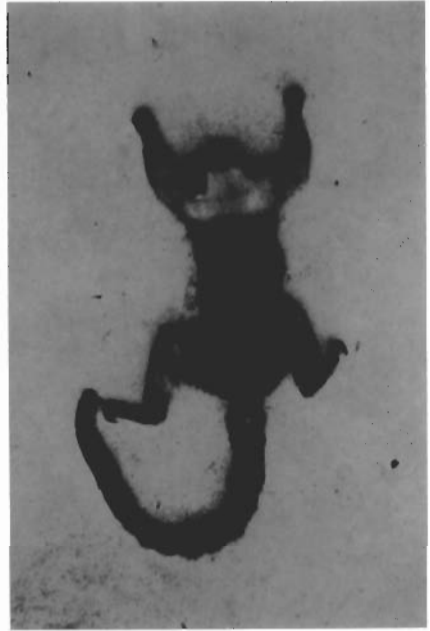
DESCRIPTION OF THE HOLOTYPE (see center illustrations): Face thinly and sparsely haired, white and short hairs around and between the eyes, extending to the forehead and sides of the face; skin face unpigmented, except to the rhinarium and around the lips; two small eumelanin patches present in the region of the supraorbital vibrissae; eumelanin patches mottled in the circumbucal region; skin face coloration (*in naturae*) golden orange, with diverse fading tonalities around the eyes, rhinarium, cheeks, circumbucal area and chin, changing to flesh color at the sides of the face and forehead; facial vibrissae present; ears bare, except for tiny and short hairs, white at the adhered part and black in the free part, exposing the skin; ear skin unpigmented (flesh color *in naturae*) in the adhered part and deeply pigmented in the free part; backside of the face mottled, pigmented below and behind the ears, extending laterally to full neck; white hairs not banded in the lateral and frontal parts of the forehead; vertex well-marked, general coloration blackish gray, the white hairs with apical blackish band; the deep gray effect in the general coloration of the vertex emphasized by the eumelanin skin of the crown; mantle strongly distinct in coloration from the back and forelimbs, with hairs paler yellowish orange or yellowish white at the base, fading to dirty white apically; general mantle coloration bright yellowish white, silvery near the nape; dorsum less distinct than the hindlimbs, hairs with four bands: dark brown at the base, clear yellowish brown in the second band, blackish brown in the subapical band, and pale brown at the tip; general aspect blackish brown, producing yellowish brown

bands according to hair movements; flanks presenting a combination of pelage similar to the dorsum blending to a pelage similar to the underparts in the median lateral line; thorax (or frontal part of the mantle) silvery yellow; inferior portion of the thorax fading to bright yellowish brown, with a brownish orange tonality in the belly; ventral face of the forelimbs bright yellowish brown similar to the anterior part of belly; dorsal face of the forelimbs with silvery hairs mixed with clear yellowish brown hairs with grayish tip in the shoulders; paler yellowish brown hairs with short grayish subterminal band in the arms; forearm hairs yellowish brown with a short blackish subterminal band that becomes broader in the direction of the wrists where it assumes an all blackish pattern with yellowish brown terminal bands; ventral face of the hindlimbs bright yellowish brown fading to brownish orange in the direction of the ankles; dorsal face of the hindlimbs without strong contrast with the dorsum, presenting tri-banded hairs: proximal band reddish brown, small subapical blackish band and a short terminal brown band; general appearance of the hindlimbs reddish brown speckled black, darkening more or less uniformly in direction to the ankles due to the greater extension of the blackish band; in this area lateral patch of the thighs diffused reddish brown; dorsum of the hands blackish brown speckled with reddish brown hairs, especially at the external lateral border; dorsum of the feet similar to hands, hallux fully reddish brown as the internal and external lateral borders; tail completely black, except in the inferior proximal part which presents brownish cupreum coloration with unbanded hairs; scrotum hairless and unpigmented, presenting golden orange coloration (*in naturae*) at the inguinal area, fading to flesh color in the inferior part of the scrotal lobes and pendular structures, and in the direction of the abdomen and thighs.

PARATYPES: The small available series presents a small degree of individual variation in pelage coloration, including variation in some patches of the pelage and difference in the general appearance of some body parts. The morphology of the grayish crown patch suggests that the expression of this character is related to sex and age classes. The adult females collected (MPEG-23956, MPEG-23957 and the adult female housed at CRP) exhibit a crown patch paler and less accentuated than that of the adult male (MPEG-



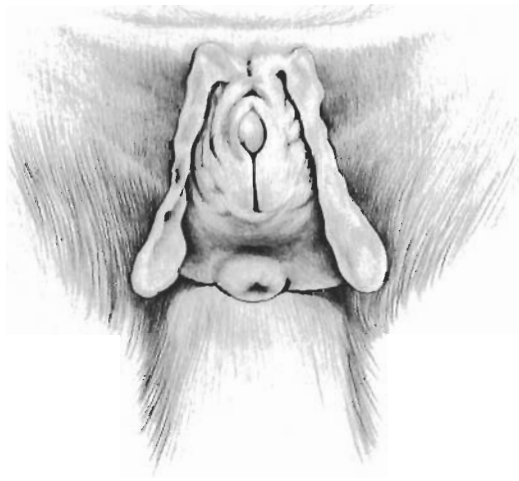
Photographs of a live adult female *Callithrix saterei* (photos by M. Noronha).



Views of an adult female *Callithrix saterei* (photos by M. Noronha).



Color illustration of *Callithrix saterei* (illustration by Stephen D. Nash).



Illustrations of (above) the head, and (below) female genitalia of *Callithrix saterei* (illustrations by Stephen D. Nash).

23955). Juveniles of both sexes (MPEG-23958, MPEG-23959, MPEG-23960, the juvenile male housed at CRP, and the juvenile female observed as a pet at Foz do Canumã) present a darker and more sharply defined crown patch, demonstrating a median longitudinal bar shape that in adult individuals becomes expanded towards the ears and nape. The juveniles are also different from the adults by presenting a less contrasting and more grayish mantle, the hairs with yellowish subterminal bands that are lighter in color and less sharp, and with silvery apical bands; hairs of the dorsum with lighter brown bands that are less contrasting with the subterminal bands; hindlimbs with a more yellowish color owing to the small size of the darker bands of the hairs; chest more grayish and less contrasting with the abdomen.

VERNACULAR NAMES: This marmoset is known locally as “mico-leão,” a allusion to the well-marked whitish yellow mantle (perhaps reinforced by television images of *Leontopithecus*), or “sauim-de-cara-branca” by the residents of the type locality and the towns of Nova Olinda do Norte, Santa Bárbara, São João, Santa Maria and Abacaxis.

ETYMOLOGY: This marmoset is named in honor of the Saterê-Maués Indians, the Amerindian tribe that inhabits, together with Mundurucu Indians, a major part of the range of the new species. The name *Callithrix sateremauesi* was avoided due to the possibility of confusion with *Callithrix mauesi* Mittermeier, Schwarz & Ayres, 1992.

MEASUREMENTS AND COMPARISONS

Owing to the small available series, composed of only three adult specimens (one male and two females) and three juveniles (two males and one female), it is practically impossible to make an intraspecific morphometric variation analysis in *Callithrix saterei*, and also difficult to draw firm conclusions on interspecific variation within the bare-eared marmoset species subgroup. Nevertheless, external and craniometric measurements (following Vivo 1988, 1991 and Ferrari & Lopes 1992) are presented for these specimens in Tables 2 and 3. Craniometric measurements are presented only for adults. *C. saterei* has an average head/body length of

Table 2 - External measurements and weights of *Callithrix saterei* sp.n., holotype and paratypes.

Variable	MPEG-23955 ¹	MPEG-23956	MPEG-23957	MPEG-23958	MPEG-23959	MPEG-23960
Sex	male	female	female	male	female	male
Relative age	adult	adult	adult	juvenile	juvenile	juvenile
Body weight (g)	470	425	400	245	120	80
Length (mm) of:						
Head and body	230	202	195	165	170	155
Tail with fur	370	383	350	312	290	225
Tail without fur	360	360	340	292	272	205
Foot with claw	65	65	68	63	60	50
Foot without claw	60	64	64	60	57	45
Ear (longitudinal)	26	26	28	25	26	23
Ear (transversal)	10	12	11	18	10	10

1. Holotype

Table 3 - Craniometric measurements of *Callithrix sateri* sp.n., holotype and adult paratypes.

Measurement ¹ (mm)	MPEG-23955 ²	MPEG-23956	MPEG-23957
1. Length of cranium	47,49	47,09	46,94
2. Condylobasal length	38,59	37,58	36,81
3. Zygomatic breadth	32,95	30,84	31,22
4. Braincase width	26,95	26,89	26,28
5. Orbital breadth	28,05	26,63	28,03
6. Across molars	16,89	16,26	16,48
7. Length of mandible	31,78	29,44	31,13
8. Height of articular process	16,62	15,20	16,55
9. Dental field (P ₂ -M ₂)	11,40	10,77	11,11
10. Across canines	13,23	11,92	12,11

1. Following Vivo (1988, 1991) and Ferrari & Lopes (1992)

2. Holotype

approximately 200 mm, tail of 370 mm and a mean weight of 430 g. Table 4 shows a comparison of mean weights and mean external measurements for *C. saterei*, with mean values for five other species of bare-eared marmosets. The mean values of external and cranial measurements in marmosets were lumped for both sexes (Vivo 1988, 1991; Ferrari & Lopes 1992). It appears that in *Callithrix*, sexual dimorphism does not provide a source for bias in biometrical analysis, this in contrast to other genera of Neotropical primates (Assumpção 1983; Thorington 1985; Queiroz 1992; Silva Jr. 1992). However, the adult male of *C. saterei* was considerably heavier than the females (Table 2). *C. saterei* has a very compact body. Although it is the heaviest bare-eared marmoset species, *C. saterei* has a smaller body (except that of *C. nigriceps*) and a longer tail (Table 4). Observing the absolute values of the external measurements individually, the head/body length ratios of *C. saterei* approximate those of *C. emiliae*, *C. argentata* and *C. nigriceps*; and the tail length of *C. saterei* is distinctly greater than that of all other species. The foot and ear measurements are less reliable, as they are badly standardized, and the available data are probably contaminated by important methodological differences.

Based on cranial measurements, the sexual dimorphism suggested by body weight is more evident in our small sample of adult *C. saterei*. The male is larger than the females in all cranial dimensions, especially condylobasal length, zygomatic breadth and across the canines, indicating a broader dental arch. A comparison of the mean values of craniometric measurements of *C. saterei* with other bare-eared marmoset species (Table 5) shows that the robusticity observed with regards to weight is also demonstrated in the zygomatic breadth, orbital breadth, dental field, length of mandible and across canines, measurements in which *C. saterei* sp.n. showed higher scores than all other species. In the other measurements, *C. saterei* sp.n. also presented high values surpassing those of the majority of the other species. Nevertheless, the length of the cranium, condylobasal length, brain case width and across molars measurements in *C. saterei* sp.n. were exceeded only by *C. melanura* in the first two, by *C. emiliae* in the third and by *C. argentata* in the last, presenting scores near those of *C. nigriceps*.

Table 4 - A comparison of mean weights and external measurements recorded for *Callithrix saterei* sp.n., with values recorded for specimens of *C. argentata*, *C. leucippe*, *C. melanura* and *C. nigriceps*.

Variable	Species:										
	Cs ¹	Ca ²	Ca ³	Ca ⁴	Clb	Cec	Ced	Cmb	Cmc	Cmd	Cnc
Body weight	431,6 (3) ⁵	-	355,6 (14)	-	-	313,3 (12)	410,0 (1)	-	-	380,0 (2)	370,0 (3)
Length (mm) of:											
Body (bregma-ischium)	209,0 (03)	225,3 (71)	210,7 (30)	214,1 (13)	237,3 (14)	220,6 (16)	210,0 (01)	225,9 (09)	216,3 (04)	230,0 (02)	206,3 (04)
Tail	367,6 (03)	321,1 (71)	326,7 (29)	317,6 (13)	312,6 (14)	310,0 (16)	330,0 (01)	330,4 (09)	320,0 (04)	300,0 (02)	319,3 (04)
Foot	066,0 (03)	062,8 (66)	061,6 (29)	060,8 (13)	060,3 (14)	055,1 (16)	054,0 (01)	069,8 (09)	065,8 (04)	070,0 (02)	065,3 (04)
Ear	026,6 (03)	028,1 (29)	027,8 (29)	021,8 (8)	023,0 (04)	027,8 (16)	-	027,2 (04)	025,5 (04)	-	029,3 (04)

Cs=C. *saterei* sp.n.; Ca=C. *argentata*; Cl=C. *leucippe*; Ce=C. *emiliae*; Cm=C. *melanura*; Cn=C. *nigriceps*.

1. Adults only
2. From Vivo (1988, supplement p.28-44)
3. From Ferrari & Lopes (1992)
4. Specimens from Museu Nacional, Rio de Janeiro
5. Sample size=N

Table 5 - A comparison of the mean craniometric measurements of *Callithrix saterei* sp.n., with *C. argentata*, *C. leucippe*, *C. emiliae*, *C. melanura* and *C. nigriceps*.an

Measurement ¹ (mm)	Species									
	<i>C. saterei</i>	<i>C. argentata</i> ²	<i>C. argentata</i> ³	<i>C. leucippe</i> b	<i>C. emiliae</i> b	<i>C. emiliae</i> ⁴	<i>C. melanura</i> b	<i>C. melanura</i> c	<i>C. nigriceps</i>	
1	47.2 (03) ⁵	45.7 (88)	45.4 (21)	46.1 (15)	44.5 (01)	45.8 (08)	46.8 (14)	47.3 (03)	46.2 (03)	
2	37.7 (03)	36.8 (74)	36.8 (20)	36.8 (15)	36.5 (01)	36.6 (08)	38.2 (12)	38.1 (03)	37.8 (03)	
3	31.7 (03)	30.4 (73)	29.8 (17)	30.6 (14)	30.6 (01)	30.3 (07)	30.4 (13)	30.3 (03)	31.0 (02)	
4	26.7 (03)	26.1 (83)	25.8 (22)	26.4 (16)	24.8 (01)	27.0 (08)	26.1 (14)	26.7 (03)	26.2 (03)	
5	27.6 (03)	26.2 (79)	26.1 (22)	26.3 (16)	25.8 (01)	25.8 (08)	26.7 (17)	26.5 (04)	26.5 (04)	
6	16.5 (03)	15.0 (88)	17.7 (19)	15.2 (15)	15.6 (01)	15.5 (07)	15.2 (15)	15.9 (05)	16.0 (04)	
7	30.8 (03)	28.5 (81)	27.8 (20)	28.7 (15)	28.8 (01)	29.4 (09)	28.7 (12)	29.9 (04)	29.5 (03)	
8	16.1 (03)	16.5 (71)	14.6 (20)	16.4 (14)	16.7 (01)	15.5 (09)	15.9 (07)	16.1 (05)	14.8 (04)	
9	11.1 (03)	10.1 (70)	10.2 (17)	10.1 (15)	10.7 (01)	10.3 (08)	10.3 (11)	10.7 (05)	11.0 (04)	
10	12.4 (03)	12.0 (81)	11.8 (17)	12.2 (14)	12.1 (01)	11.6 (13)	11.6 (13)	12.0 (05)	12.6 (04)	

1. Following Table 2

2. From Vivo (1988, 1991)

3. From Ferrari & Lopes (1992)

4. Measurements taken from adult specimens in the Goeldi Museum collection

5. Sample size=N

CONSERVATION STATUS OF THE NEW SPECIES

The conservation status of *Callithrix saterei* is unknown. The area indicated as the geographical range of this species is in great part occupied by the Área Indígena Coatá-Laranjal (FUNAI), but we have no information about the conservation status of the forest in this indigenous area. *C. saterei* is apparently common in the most degraded area of its range, the lands immediately adjacent to right bank of the lower Rio Canumã and Paranã Urariá, and the left bank of the lower Rio Abacaxis, where the primary terra firme and igapó forests are almost all modified to capoeiras at diverse stages of succession. Due the lack of either commercial value or as protein source for the local non-Indian people, *C. saterei* seems be hunted only occasionally for pets. We have no direct information about the relations between *C. saterei* and the Saterê-Maués or Mundurucu Indians, but we believe them to be the same as non-Indian people, a common pattern in almost all Amazonian human communities with regards to callitrichids. Residents in Foz do Canumã, Nova Olinda do Norte and Santa Maria reported gold prospecting activities in the region of the upper course of the Rios Canumã, Abacaxis and Marimari; we have no direct information about the conservation status of the forest environment in those areas. Since it is clear that *C. saterei* is a species with a highly restricted geographical range, more information on its conservation status is urgently needed.

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APPENDIX 1

Specimens examined at Museu Nacional, Rio de Janeiro (MNRJ) and Museu Paraense Emílio Goeldi (MPEG), in addition to those cited by Ferrari & Lopes (1992).

Callithrix argentata

MNRJ: Pará: Fazenda Vaicajá, Cametá, male 2846, female 2845 (topotypes); Santarém, males 5953, 11572, 11573, 11574, 11575, 11577, female 11571; Rio Tapajós, female 5946; Rio Tocantins, male 5954; origin unknown, females 5718, 11576, sex unknown 2847, 2848, 2849, 11915.

MPEG: Pará: Belterra, Rio Tapajós, males 21379, 22922, 22924, 22925, females 22926, 22929, sex unknown 22923, 22927, 22928; Estrada PA-156 (Cametá-Tucuruí), Km 27, males 23157, 23158, female 23156; born at Centro Nacional de Primatas, Ananindeua, male 21633, sex unknown 21630, 21631, 21632, 21634, 21635, 21636, 21637.

Callithrix emiliae

MNRJ: Amazonas: mouth of Rio Castanho, sex unknown 2851, 2856, 2857; Rondônia: Rio Jamari, female 28486; Vila Rondônia, Rio Urupa, female 23827.

MPEG: Pará: Maloca, Rio Curuá, male 170 (paratype); Rondônia: Cachoeira Samuel, Rio Jamari, males 21648, 21649, 21651, 21653, 21654, 21655, 21656, 21659, 21889, 21891, 21898, females 21650, 21652, 21657, 21658, 21892.

Callithrix intermedia

MNRJ: Mato Grosso: Aripuanã, sex unknown 2850.

MPEG: Amazonas: Rio Guariba, female 8156 (holotype); Rio Roosevelt, female 23065; Mato Grosso: Cidade Humboldt, Rio Aripuanã, female 12599 (paratype).

Callithrix leucippe

MNRJ: Pará: Fordlândia, female 4798.

Callithrix melanura

MNRJ: Mato Grosso: Jururu, Salto, male 2853; Rio Arica, male 2855, sex unknown 2854; São Luís de Cáceres, male 5845, females 5843, 5847, 5849; Chapada dos Guimarães, male 24913, female 24912; Porto Esperidião, male 25008, origin unknown, male 2852, sex unknown 2858, 2859.

MPEG: Mato Grosso: Cidade Humboldt, Rio Aripuanã, female 21396.

Callithrix nigriceps

MPEG: Amazonas: Lago dos Reis, male 21998 (holotype), males 21996, 21999 (paratopotypes), males 22958, 22959, females 22956, 22957 (topotypes); Rio dos Marmelos, males 22961, 22962; Rio Aripuanã, female 22960; BR-230 (Humaitá-Apuí), Km 164, female 22955; Rondônia: Calama, female 21997 (paratype).

Callithrix saterei

MPEG: Amazonas: Foz do Canumã, male 23955 (holotype), female 23956 (paratopotype); São João, Rio Marimari, male 23958, female 23957 (paratypes); Terra Preta, Rio Abacaxis, male 23960, female 23959 (paratypes); 23961, male, no locality data, apprehended by IBAMA in Manaus in July 1994 (paratype).



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