Morphological Relationships between the Ka’apor Capuchin (Cebus kaapori Queiroz, 1992) and Other Male Cebus Crania: A Preliminary Report

Introduction

The genus Cebus is comprised of four widely distributed species, C. albifrons, C. apella, C. capucinus and C. nigrivittatus (= olivaceus) (taxonomy following Hershkovitz, 1949), and the recently described Cebus kaapori Queiroz, 1992. It is possible that other valid species may exist but are currently designated at the subspecific level (Mittermeier et al., 1988; Torres, 1988). Cebus kaapori, a previously unknown form of untufted capuchin, seems to be restricted to an area between the Rio Gurupi and Pindaré in the state of Maranhão, Brazil, outside the previously known distribution of untufted capuchins. It was observed in undisturbed and slightly disturbed dense lowland forest, and was reported to occur in very low densities. Interviews with local residents suggest that C. kaapori also occurs in edge habitats between the Amazonian and Cocais (palm) forest, where they feed on palm fruits. Two specimens have been described, a juvenile female skeleton and skin in the Emílio Goeldi Museum, Belém, Brazil, designated as the holotype (MPEG 22025), and an adult male skull and skin designated as the paratype (MPEG 21978). The adult male was described by Queiroz (1992).

Using a limited number of external and craniofacial measurements and small comparative samples, Queiroz (1992) reported that C. kaapori is longer in the body, and less robust, than the other untufted species. Queiroz argued that C. kaapori is “undoubtedly similar to C. nigrivittatus” (p. 9) in its general physical appearance, and suggested that C. nigrivittatus may be ancestral to C. kaapori. This report will test the hypothesis that the cranial of the adult males of these two species are morphologically similar. This was investigated by applying univariate, bivariate, and multivariate statistical tests to comparative samples of male crania from five capuchin species.

Methods

The comparative analyses in this study were based on two samples. The baseline sample consisted of a subset from a larger database used to examine the ontogeny of cranial form, growth, and sexual dimorphism in four capuchin species (Masterson, 1995). It was comprised of male Cebus crania from collections housed at the American, Field, and National Museums of Natural History. The samples are geographically heterogeneous as expected given the genus’ wide distribution and adaptability. The comparative sample included the only known adult male specimen of C. kaapori (MPEG 21978), housed in the Museu Paraense Emílio Goeldi, Belém, Brazil. No subspecific analyses were performed. Table 1 gives the sample sizes for each species, broken down into subadult and adult specimens.

Six linear measurements of the adult male cranium were provided in the initial description of C. kaapori Queiroz, 1992. These measurements were used as literature data in the following analyses. Only four measurements are comparable between Queiroz (1992) and the analysis of Masterson (1995): biorbital width, bizygomatic breadth, maximum cranial length, and neurocranial length. It was assumed that Queiroz used similar landmarks in his measurements, since they are standard in primate craniofacial analyses. The biases of using a single specimen to represent a species are clearly recognized. However, the results from this study will provide hypotheses for future analyses when more C. kaapori specimens are available.

In examining the morphological relationships among these five capuchin species, univariate, bivariate, and multivariate analyses were performed using the statistical program SYSTAT (Wilkinson, 1992). Tukey’s multiple comparison test for unequal sample sizes was used to examine significant differences (p ≤ 0.0083 after a Bonferroni adjustment) among the adult male species’ means. Only comparisons among adult male C. albifrons, C. apella, C. capucinus, and C. nigrivittatus were performed. The value for C. kaapori was assumed to represent the species’ mean in each measurement (it represents a single specimen in all other analyses). It was not statistically tested, but was included in Table 2 for interspecific comparisons.

Bivariate growth allometries were analyzed using the log-transformed version of Huxley’s (1932) bivariate regression technique.
and sexual maturity (Masterson, 1985). Cranial samples from the National Museum of Brazil and the University of California were used for the 1984-1985 study. In addition, male cranium data from four species (C. australis, C. apella, C. capucinus, and C. nigrivittatus) were used as a control sample. Only four skulls of C. australis (Queiroz, 1985) and two of C. apella (Queiroz, 1985) were used, since these were rare in the sample. The results indicate that Queiroz's interpretations are correct. The present study has revealed that the cranial measurements, in most cases, present a different distribution of data and, thus, the results indicate that there is more variability among specimens than was previously thought.

Table 2. Multi-group comparisons between adult male capuchin monkeys in four cranial variables. *AL = C. albifrons, AP = C. apella, CA = C. capucinus, NI = C. nigrivittatus, KA = C. kaapori. *Underlined species are not significantly different at p < 0.0083.

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Species</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Tukey's test</th>
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<tr>
<td>Biometric breadth</td>
<td>AL</td>
<td>41</td>
<td>43.2</td>
<td>2.175</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>62</td>
<td>43.1</td>
<td>1.821</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>38</td>
<td>44.3</td>
<td>2.068</td>
<td>NI&lt;KA&lt;AL&lt;AP</td>
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<tr>
<td></td>
<td>NI</td>
<td>38</td>
<td>45.9</td>
<td>2.631</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>KA</td>
<td>1</td>
<td>45.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Max. cranial length</td>
<td>AL</td>
<td>43</td>
<td>73.2</td>
<td>4.926</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>63</td>
<td>73.7</td>
<td>4.582</td>
<td>-</td>
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<td></td>
<td>CA</td>
<td>42</td>
<td>73.8</td>
<td>2.276</td>
<td>AP&lt;NI&lt;KA&lt;AL</td>
</tr>
<tr>
<td></td>
<td>NI</td>
<td>39</td>
<td>65.6</td>
<td>3.526</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>KA</td>
<td>1</td>
<td>61.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Neurocranial breadth</td>
<td>AL</td>
<td>43</td>
<td>52.2</td>
<td>1.997</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>66</td>
<td>53.2</td>
<td>1.786</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>41</td>
<td>52.9</td>
<td>1.700</td>
<td>NI&lt;AP&lt;KA&lt;AL</td>
</tr>
<tr>
<td></td>
<td>NI</td>
<td>40</td>
<td>54.5</td>
<td>2.181</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>KA</td>
<td>1</td>
<td>52.7</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

power function. Maximum cranial length was chosen as the independent variable. The best statistical fit to a respective species' regression line by C. kaapori was determined using the smallest standardized residual of the Ka'apor specimen after its inclusion in the calculation of each species' allometric coefficients.

Two multivariate factoring techniques, principal components analysis (PCA) and discriminant function analysis (DFA), were used to compare the capuchin species in multivariate space. The C. kaapori specimen was included in both analyses. Masterson and Leutenegger (1990) presented a detailed discussion of the PCA technique. Discriminant function analysis was used to examine how well the species can be differentiated based on the available cranial measurements. Klecka (1980) provided a detailed discussion of DFA.

The final test of the hypothesis used cluster analysis to produce a tree diagram. Euclidean distances between each variable and Ward's (1963) minimum variance linkage method were used to cluster the species. Wilkinson (1992) presented a detailed description of cluster analysis.

Results

The results of Tukey’s multiple comparison test are presented in Table 2, as well as means and standard deviations for the capuchin species. Tukey’s test indicated that C. kaapori is very similar in biometric width to C. nigrivittatus, which is significantly larger than C. capucinus, C. albifrons, and C. apella. Cebus kaapori possesses the smallest bimodal breadth of all five capuchin species, being closest in size to C. albifrons. Cebus albifrons is not significantly different from C. nigrivittatus, but is significantly smaller than C. capucinus and C. apella. The maximum cranial length of C. kaapori is closest to C. albifrons in linear distance and lies on the small end of the male Cebus range. Cebus albifrons is significantly smaller than C. nigrivittatus, C. capucinus, and C. apella. The neurocranial breadth of C. kaapori is the small end of the male Cebus range and lies between C. capucinus and C. albifrons. It is furthest in size from C. nigrivittatus. There are no significant interspecific differences present in neurocranial breadth.

Bivariate growth allometries for C. albifrons, C. apella, C. capucinus, and C. nigrivittatus are listed in Table 3. Standardized residuals indicated that C. kaapori lies closest to the regression line of C. nigrivittatus in biometric width and is furthest from C. apella. In bimodal breadth C. kaapori lies closest to the line of C. capucinus and is furthest from C. apella. Cebus nigrivittatus is the next best fit after C. capucinus. For neurocranial breadth C. kaapori lies closest to C. albifrons and is furthest from C. nigrivittatus. Low correlation coefficients in all species suggest that the best fit lines do not explain the majority of the samples' variances in neurocranial breadth.

The results of the multi-group PCA for all male Cebus are presented in Table 4. Factor scores for all five species are illustrated in Figure 1, with 90% probability ellipsoids drawn for each species. The first principal component accounts for 89.72% of the total variation. The variable loadings are all positive, although a wide range of values does exist indicating...
Table 3. Bivariate coefficients for three cranial variables regressed against maximum cranial length.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Species</th>
<th>n</th>
<th>log b</th>
<th>a</th>
<th>95% C.I. (a)</th>
<th>r</th>
<th>SR</th>
<th>Slope comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biobital width</td>
<td>AL</td>
<td>83</td>
<td>-0.540</td>
<td>1.101</td>
<td>(0.983, 1.220)</td>
<td>899</td>
<td>1.091</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>199</td>
<td>-0.391</td>
<td>1.016</td>
<td>(0.958, 1.075)</td>
<td>925</td>
<td>2.326</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>101</td>
<td>-0.328</td>
<td>0.991</td>
<td>(0.900, 1.082)</td>
<td>908</td>
<td>1.617</td>
<td>AL&gt;Ni&gt;AP&gt;CA</td>
</tr>
<tr>
<td></td>
<td>Ni</td>
<td>58</td>
<td>-0.393</td>
<td>1.033</td>
<td>(0.885, 1.182)</td>
<td>881</td>
<td>0.468</td>
<td></td>
</tr>
<tr>
<td>Biziogmatic breadth</td>
<td>AL</td>
<td>81</td>
<td>-1.168</td>
<td>1.505</td>
<td>(1.359, 1.651)</td>
<td>918</td>
<td>0.688</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>190</td>
<td>-1.515</td>
<td>1.689</td>
<td>(1.625, 1.757)</td>
<td>965</td>
<td>1.641</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>102</td>
<td>-1.420</td>
<td>1.629</td>
<td>(1.528, 1.729)</td>
<td>955</td>
<td>0.473</td>
<td>AP&gt;CA&gt;Ni&gt;AL</td>
</tr>
<tr>
<td></td>
<td>Ni</td>
<td>59</td>
<td>-1.222</td>
<td>1.529</td>
<td>(1.402, 1.656)</td>
<td>954</td>
<td>0.547</td>
<td></td>
</tr>
<tr>
<td>Neurocranial breadth</td>
<td>AL</td>
<td>85</td>
<td>0.199</td>
<td>0.199</td>
<td>(0.108, 0.291)</td>
<td>429</td>
<td>0.082</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>200</td>
<td>0.299</td>
<td>0.215</td>
<td>(0.159, 0.272)</td>
<td>470</td>
<td>0.152</td>
<td>Ni&gt;AP&gt;AL&gt;CA</td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>199</td>
<td>1.520</td>
<td>0.106</td>
<td>(0.014, 0.199)</td>
<td>226</td>
<td>0.459</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ni</td>
<td>60</td>
<td>1.307</td>
<td>0.218</td>
<td>(0.088, 0.348)</td>
<td>403</td>
<td>0.839</td>
<td></td>
</tr>
</tbody>
</table>

that each variable contributes unequally to component I. Biziogmatic breadth and neurocranial breadth possess the largest and smallest loadings, respectively. The first component loadings are interpreted as an allometry vector. Little separation of the species occurs along the allometry vector.

Principal component II explains 5.47% of the remaining variation. Although this is a small percentage, it is clearly of biological importance because the species are differentiated along component II. The presence of bipolar component loadings indicates that this variable is not significant in component II than in the allometry vector. The separation of the species is more pronounced in the second component axis (Shea, 1985). The measurements primarily contribute to the separation of the species along component II are by bizymmatic breadth, with a strong positive loading, and bizymmatic breadth and neurocranial breadth, each possessing strong positive loadings. The first two components explain 95.19% of the total sample variation. In examining the multi-group PCA (Figure 1), the adult male C. kaapori specimen falls within the sample of C. nigrivittatus. Cebus capucinus is the next best fit. Cebus kaapori lies furthest from the tufted capuchin, C. apella.

Results from the DFA using species membership as the test of effect are presented in Table 5. Figure 2 shows 90% probability ellipsoids for each species.

The DFA is statistically significant (Wilks’s lambda = 0.2863, F = 15.5735, df = 16, 492, P = 0.0000). Discriminant function I is highly significant, P = 0.0000. It possesses a canonical correlation of 0.7899; therefore, a high association exists between function I and species membership. Function II seems to differentiate between the tufted and untufted species (Fig. 2) by overall skull size, as judged by bizymmatic breadth and maximum cranial length possessing negative canonical loadings.

Function II is also highly significant (P = 0.0000). It possesses a canonical correlation of 0.4163. Although the canonical loadings possess similar values, function II helps to differentiate the untufted species. Figure 2 illustrates that the differentiation between the untufted species and C. apella occurs along function I. Function II, in conjunction with function I, differentiates the untufted species. Along function I, C. kaapori lies closest to C. nigrivittatus and is furthest from C. apella.

Results and linkage distances from the cluster analysis are illustrated in Figure 3. The first cluster contains adult male C. capucinus and C. nigrivittatus (0.011). The next cluster joins C. kaapori and C. albifrons (0.015). Cebus apella then joins C. capucinus and C. nigrivittatus (0.022). This cluster joins with C. kaapori and C. nigrivittatus.

Which characters are linked to untufted species? C. kaapori is linked to C. capucinus, and C. nigrivittatus. This is consistent with the idea of similar size and shape, as indicated by the DFA.
reported that bizygomatic breadth is one of several cranial variables related to palm nut usage in *C. apella*, that is, larger infratemporal fossae allow for larger muscles of mastication which are needed for cracking open palm nuts. Because there is no evidence of similar bizygomatic morphology between *C. apella* and *C. kaapori*, it may be that *C. kaapori* is using palm nuts more like *C. albifrons* rather than *C. apella*. Further behavioral data is needed to examine this suggestion.

The taxonomy of *Cebus* is complex (see Queiroz, 1992, for a discussion). Anonymous (1993) has discussed the taxonomic status of *C. kaapori* at length, and concludes that “the evidence for the species’ status of *C. kaapori* is slim” (p.7). Whether *C. kaapori* is a valid species will only be answered when more specimens have been collected and comparative analyses use more measurements. Future morphometric analyses will need to be supplemented with molecular data from all capuchin species to answer this and other questions about *Cebus* taxonomy.

**Acknowledgments**

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**References**


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**AN OVERVIEW OF PRIMATOLOGICAL STUDIES IN ECUADOR: PRIMATES OF THE CUYABENO RESERVE**

In a small area of 270,000 km², Ecuador has 19 species of primates (Albuja, 1991) (Table 1). Primate communities of 10 to 12 species have been reported in some tropical areas such as the Cuyabeno Reserve and the Yasuni National Park in Ecuadorian Amazonia (Albuja, 1994; de la Torre et al., 1995). However, little is known about the ecology, behavior and conservation status of the species. Only few field primatological studies have been done, most of them by biologists of the Pontificia Universidad Católica of Quito, in the Cuyabeno Reserve (de Vries et al., 1993). Ulloa (1988) carried out a preliminary synecological study of the primate species of the reserve, in the area of the Laguna Grande, in the Cuyabeno river basin, that was continued by de la Torre and Campos (in press) during 1989 and 1990. Schell (unpubl. data) carried out a similar study in the area of Zabalo, in the Aguarico river basin, during 1994 and 1995.

The Cuyabeno Reserve is a protected area in the Province of Sucumbios, northeastern Ecuador. The reserve of 655,781 ha is located on the equator. It extends from the origins of the Rio Cuyabeno through its hydrographic system, until it empties into the Rio

<table>
<thead>
<tr>
<th>Family Callitrichidae</th>
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</thead>
<tbody>
<tr>
<td>Cebuella pygmaea</td>
<td>Saginus fuscicollis</td>
</tr>
<tr>
<td><em>Saginus nigriglovis</em></td>
<td>Saginus partitalis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Cebidae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alouatta palliata</td>
</tr>
<tr>
<td>Alouatta seniculus</td>
</tr>
<tr>
<td>Ataon viti-soros</td>
</tr>
<tr>
<td>Ataon lemurina</td>
</tr>
<tr>
<td>Ataon bell-bone</td>
</tr>
<tr>
<td>Ataon fuscipes</td>
</tr>
<tr>
<td>Callicebus cupreus</td>
</tr>
<tr>
<td>Callicebus torquatus</td>
</tr>
</tbody>
</table>

Table 1. List of the primate species in Ecuador (Albuja, 1991)

Aguarico; then 60 km east to the lakes Zancudococha and Lagartococha (76°30' W - 75°30' W). With an altitude around 200-300 m above sea level, it is part of the Tropical Humid Forest life zone (Cañadas Cruz, 1983; Ministerio de Agricultura y Ganadería, República del Ecuador, Acuerdo Ministerial No. 0328, 1991).

Limited recordary records indicate an annual mean precipitation of about 3,000 mm; with more than 250 mm of monthly rainfall during the rainy season (from mid-March through August) and less than 250 mm during the dry season (from September through the first days of March), when the rivers and lakes may dry out.

The study area, of 1 km², was located near one of the margins of the Laguna Grande, in the Cuyabeno basin. Additional surveys were carried out along the Rio Cuyabeno. Four types of forest have been recognized: 1) non-flooded, terra firma forest located on small hills; 2) swamps, with a vegetation dominated by Mauritia

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Figure 1. The location of the Yasuni National Park (1), the Cotacachi-Cayapas Ecological Reserve (2), and the Cuyabeno Reserve (3) in Ecuador.
Neotropical Primates 3(4), December 1995

The Cuyabeno Reserve supports a primate community which comprises ten species: *Cebuella pygmaea*, *Saguinus nigrigolllis*, *Aotus vociferans*, *Callicebus cupreus*, *Callicebus torquatus*, *Pithecia monachus*, *Saimiri sciureus*, *Cebus albifrons*, *Alouatta seniculus* and *Lagothrix lagotricha* (Emmons and Feer, 1990; Hershkovitz, 1977, 1983, 1990; but see Albuja, 1991). Data on habitat use and reproduction of all the primate species were obtained during 1989 and 1990.

Preliminary results showed that *Callicebus torquatus* and *Pithecia monachus* use almost exclusively the non-flooded terra firma forests; the former species shows some preference for edge habitats. *Cebus albifrons*, *Saimiri sciureus* and *Saguinus nigrigollis* are generalists, but *C. albifrons* makes more use of palm swamps, *S. sciureus* spends more time in the black-water flooded forest (igapó), and *S. nigrigollis* uses more the terra firma forests. *Cebuella pygmaea* inhabits only the flooded black-water and white-water forests (igapó and várzea, respectively). Limited data suggested the preference of *Callicebus cupreus* for várzea, of *Alouatta seniculus* and *Lagothrix lagotricha* for terra firma, and a possible widespread use of habitat by *Aotus vociferans*.

Generalized birth peaks for all primate species occurred in the dry season, from December through February. The callitrichids presented a second birth peak, limited to some of the groups, in the middle of the rainy season, from June through August.

Further research at the Cuyabeno Reserve has focused on the ecology of the black-mantle tamarin, *Saguinus nigrigollis* (de la Torre, 1991; de la Torre et al., 1992; 1995; Reyes, 1991), yellow-handed titi monkeys, *Callicebus torquatus* (Campos, 1991; Campos et al., 1992); white-fronted capuchins, *Cebus albifrons* (Jimenez, unpubl. data); and saki monkeys, *Pithecia monachus* (Navarro, unpubl. data).

Additional studies have been done in the Cotacachi-Cayapas Reserve, western Ecuador, on spider monkeys, *Ateles fusciceps* (Madden and Albuja, 1989), and in the Yasuni National Park (Albuja, 1994). Currently, field research is being carried out in the Yasuni National Park by the University of California, Davis, the Pontificia Universidad Católica, Quito, and the Escuela Politecnica Nacional, Quito; and in the Cuyabeno Reserve by the University of Wisconsin-Madison, and the Pontificia Universidad Católica, Quito. These studies focus on the ecology and behavior of the different species, such as woolly monkeys, *Lagothrix lagotricha*, in the Yasuni National Park, and the pygmy marmoset, *Cebuella pygmaea*, in the Cuyabeno Reserve.

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References


PRIMATES FROM THE VICINITY OF VIÇOSA, MINAS GERAIS, BRAZIL

There is an urgent need for an understanding of the human impacts on animal communities, especially in such as the tropical forests, due to their very high biodiversity and the rapidity and extent of their destruction and fragmentation. Fragmentation of forests on a fine scale results in the confinement of one or few groups of primate species, for example, and limits the genetic flow between populations, accelerating extinction processes on local, regional and national levels. As such, it is most important to verify how these animals are distributed in impacted areas in order to obtain a better understanding of their ability to survive in forest mosaics separated by open vegetation formations and urban environments.

Fragmentation of natural areas is a reality in most of the Brazilian ecosystems, and is most evident in the Atlantic forest, once covering an area of more than 1,200,000 km², but today reduced to forest fragments in less than 8% of its original extent. The city of Viçosa (20°45' S, 42°51' W), state of Minas Gerais, lies within the Atlantic Forest, and remnant patches are located on hilltops separated by pasture. Forest can no longer be found in valleys and other areas of low relief.

The project reported here involved a survey of primates in the main fragments remaining in the vicinity of Viçosa which are still able to sustain groups over the mid- to long-term. Four monkey species are believed to occur in the area, following Kinzey (1982) and Coimbra-Filho (1982): Cebus apella, Alouatta fusca, Callicebus personatus and Callithrix aurita. Of these, only C. apella is not classified as threatened (Rylands et al., 1995). The selected fragments were mapped during July 1993 and June 1994. Selection involved the use of the following parameters: fragment area, topographic location, easy access, vegetation structure, disturbance and successional stage, extent of urbanization near the area, and the probable presence of primates. The data were obtained by interviewing local people, and using maps and aerial photographs. Confirmation of the presence of primates, either through vocalizations or sightings, was by periodic surveys.

Eight forest fragments were chosen and investigated, seven of which were between 15 and 60 ha and just one the “Mata do Paraíso”, covered 194 ha (Fig. 1). Six primates species were recorded: Alouatta fusca, Callicebus personatus nigrifrons, Cebus apella nigritus, Callithrix aurita, C. geoffroyi and C. jacchus (Table 1).
Table 1 - Distribution of primates in eight forest fragments in the vicinity of Viçosa, Minas Gerais.

<table>
<thead>
<tr>
<th>Forest fragment</th>
<th>Species</th>
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<tbody>
<tr>
<td>Mata do Paraíso</td>
<td>Callithrix personatus nigrifrons</td>
</tr>
<tr>
<td></td>
<td>Cebus apella nigritus</td>
</tr>
<tr>
<td>Fazenda Arruda</td>
<td>Callithrix aurita</td>
</tr>
<tr>
<td></td>
<td>Ateles fuscus</td>
</tr>
<tr>
<td>Área dos Nobres</td>
<td>Callithrix personatus nigrifrons</td>
</tr>
<tr>
<td></td>
<td>Callithrix sp.</td>
</tr>
<tr>
<td>Sítio Cascalho</td>
<td>Callithrix personatus nigrifrons</td>
</tr>
<tr>
<td></td>
<td>Callithrix sp.</td>
</tr>
<tr>
<td>Mata da Biologia</td>
<td>Callithrix geoffroyi</td>
</tr>
<tr>
<td></td>
<td>Cebus apella nigiritus</td>
</tr>
<tr>
<td>Fazenda São Geraldo</td>
<td>Callithrix personatus nigrifrons</td>
</tr>
<tr>
<td></td>
<td>Callithrix sp.</td>
</tr>
<tr>
<td>Sítio Paraíso</td>
<td>Callithrix jacchus</td>
</tr>
<tr>
<td></td>
<td>Cebus apella nigritus</td>
</tr>
</tbody>
</table>

The occurrence of two of the Callithrix species has evidently resulted from introductions: C. jacchus and C. geoffroyi are species from northeast Brazil and the east of the state of Minas Gerais and Espirito Santo (Vivo, 1991), respectively. This was verified through interviews. The animals were introduced by local people, who feed them in their backyards, and result in the colonization of nearby forest patches.

Only one individual of C. aurita (Fazenda Arruda) was observed. It was following a group of C. personatus nigrifrons. Interviews and vocalizations pointed, however, to the occurrence of Callithrix in three other areas (Fazenda São Geraldo, Área dos Nobres, Sítio Cascalho), but we were unable to identify the species, and the possibility remains that they are C. aurita (Vivo, 1991). C. personatus nigrifrons was the most abundant species, occurring in all fragments studied, and is probably the most common primate in the region. C. aurita and C. apella nigritus were the least abundant, and only a few individuals were seen.

Regarding the conservation status of the native species around Viçosa, we consider all, except for C. personatus nigrifrons, to be seriously threatened. Through field surveys and interviews, we have recorded a pronounced population decline for C. apella and A. fuscus, the first recorded in just one fragment with three individuals, and the second only in the northwest of the municipality.

Contacts with local residents revealed that A. fuscus and C. apella were abundant in all regions, and that their current rarity is due mainly to hunting. This is not only the factor, however, and forest fragmentation and possibly even epidemic diseases, such as has been cited for A. fuscus by Bitetti et al. (1994) in Argentina, Hirsch et al. (1994) for the Rio Doce State Park in Minas Gerais, and Mendes (1991) in Espirito Santo, also contribute significantly to their decline.

Acknowledgments: The authors thank the Centro Mineiro para a Conservação da Natureza for logistic support provided during the project. We are also grateful to the undergraduate students Rita de Cássia, Ana Júlia Lemos Alves Pedreira, Lício Valdir Assad and Cláudia Carvalho de Mello for their help in the field. We also acknowledge Professors Gumercindo Lima and Gisele Mendes for their helpful suggestions during the development of the project. The work would not have been possible without the collaboration and support of the local people.

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In: Resumos do XX Congresso Brasileiro de Zoologia, Rio de Janeiro, p.144.

SOBRE LA POSIBLE PRESENCIA DE ALOUATTA CARAYA EN URUGUAY

Introducción

Si bien existen algunas referencias imprecisas, la presencia del orden Primates nunca ha sido detectada en el país. Aunque existen áreas de bosque indígena de real importancia y en su mayoría asociadas a cursos de agua, el porcentaje con respecto a la superficie territorial total, es muy reducido. Este argumento es el que podría manejarse para suponer que no existiría la cobertura vegetal capaz de soportar poblaciones de monos, dado su régimen alimenticio. Sumado a esto, la presencia de alguna forma pertencente a este grupo llamaria poderosamente la atención por la atracción que el común de la gente siente por estos mamíferos.

Antecedentes

En el verano de 1993 fue capturado un mono aullador negro (Alouatta caraya) en la estancia Charqueada, km 85 de la Ruta Nacional N° 30, próximo a Masoller, departamento de Artigas, 3ª Sección Judicial (aprox. 31°00’S, 56°00’W). El ejemplar fue mantenido cautivo algunos días, escapándose posteriormente. Se obtuvo una fotografía con una cámara sencilla, que pese a presentar algunas deficiencias técnicas permite identificar a un mono aullador negro, adulto, macho. La presencia de un ejemplar aislado permitiría suponer la fuga de un aullador cautivo de algún particular o traficante de animales salvajes, pero es importante destacar la observación de otros individuos en la zona.

Redford y Eisenberg (1992) reportan que Alouatta es el género más ampliamente distribuido de los primates del Nuevo Mundo, con un rango que se extiende desde
región mesopotámica de Entre Ríos, Argentina y hasta las vertientes orientales de los Andes en la región centro-sur de Bolivia. Cabe destacar que a pesar de citar a la provincia de Entre Ríos, Argentina, no destaca localidad alguna en el Apéndice II del trabajo. La única referencia, y como más austral para Argentina, la constituye la 149 (Isla Yuruhatá, Corrientes, 28°17'S, 59°07'W). Destacan que las dos especies (A. caraya y A. fusca) llegan a traspasar el paralelo de 30°, en el estado de Río Grande del Sur, Brasil y Argentina (A. caraya), reconocido por Hershkowitz (1977) como límite meridional de este género.

La amplia distribución geográfica del género la sustentan por la combinación de factores como: capacidad de los individuos de habitar áreas abiertas y cruzar barreras ecológicas, hábitos alimentarios no especializados y alta fecundidad. Di Bitetti et al. (1994), haciendo referencia a Rumiz (1990), indican que “el aullador negro vive en muy fragmentadas y perturbadas florestas y tiene una gran capacidad para dispersarse y colonizar manchas y remanentes de floresta en la región del chaco boliviano. Altas densidades de aulladores negros son mantenidos en las islas del río Paraná con una vegetación de crecimiento secundario y una baja concentración de componentes secundarios.”

Conclusiones

La distribución geográfica en países limítrofes como Argentina y Brasil muestran una relativa proximidad de grupos salvajes de A. caraya. La no especificidad de su dieta que incluye una importante fracción de hojas, la posibilidad de desplazamiento a través de áreas abiertas, el trasponer barreras ecológicas y el área de captura del ejemplar citado, que coincide con la isoterma más alta para el promedio 1946-1970, así como con la mayor isoyeta (1300 lts/m) en el mismo período (Lafitte, 1980), sugerirán la posible ocurrencia de esta forma en nuestro territorio. La presencia de un primate, hasta el momento no citado en ninguna lista sistemática dentro de la literatura mastozoológica uruguaya, de confirmarse, ameritaría paralelamente medidas de protección en lo que respecta al hábitat. Zonas muy próximas como el Valle del Lunarejo, no se encuentran protegidas y poseen características naturales excepcionales.

A. caraya está incluida en el Apéndice II de CITES y goza de protección en los países con poblaciones estables, integrantes de la Convención.


Bibliografía


THE RED-HANDED HOWLING MONKEY IN THE STATE OF PERNAMBUCO, NORTH-EAST BRAZIL

The red-handed howler, Alouatta belzebul, is endemic to Brazil and has a disjunct distribution, being found mainly in eastern Amazonia but also in the northeastern Atlantic forest, an area today separated from the Amazon by wide expanses of dry caatinga (thorn scrub) and cerrado (bush savanna). The majority of localities are from the south bank of the Rio Amazonas, east of the Rio Purus, but records extend east as far as Miritiba, Maranhão, and south and east into the states of Ceará, Alagoas and Paraíba (Bonvicino, 1989; Bonvicino et al., 1989, Langguth et al., 1987).
The four subspecies recognized are *Alouatta belzebul* belzebul, *A. b. discolor*, *A. b. nigerrima*, and *A. b. ustulata* (see Hill, 1962; Bonvicino et al., 1989). Chromosome studies, taken together with phenotype and field observations, suggest, however, that *A. b. belzebul* is phenotypically variable in respect to pelage coloration, which is, therefore, unreliable for identification of the subspecies (Armada et al., 1987). Relatively minor phenotypic differences have been observed in animals which are karyotypically divergent. The possibility remains that the disjunct Amazonian and northeastern Brazilian populations may be different subspecies.

The red-handed howler was first registered for the Atlantic forest of Pernambuco by Marcgrave and Piso in 1648 (Marcgrave, 1648). No further report of its existence in the region was forthcoming over the following 346 years. During primate surveys in the north-east of Brazil, Langguth et al. (1987) discovered a few surviving populations in the states of Paraíba and Alagoas, and also registered the existence of specimens collected in the state of Pará and Acre in the state of the state of a large population on the coast of Amazonas (Marcgrave, 1648). Also, however, Bonvicino et al. (1989) stated that this species has not been observed in the state of Ceará, and the original population had disappeared in the state of Paraíba. The population of Pernambuco, Brazil.


ON THE GEOGRAPHIC DISTRIBUTION OF THE RED-HANDED HOWLING MONKEY, ALOUATTA BELZEBUL, IN NORTH-EAST BRAZIL

The red-handed howling monkey, Alouatta belzebul, has a wide geographic distribution which includes a large part of the lower Amazon, south of the Rio Amazonas, in the states of Amazonas, Pará, and Maranhão, and also North-east Brazil (Hill, 1962; see also Hirsch et al., 1991). Langguth et al. (1987) and Bonvicino et al. (1989) reviewed the distribution of this species and the sparse information available regarding the non-Amazonian part of its range. They listed records for the coastal regions of the states of Ceará, Pará and Alagoas (Fig. 1), and indicated that the original range also included Piauí, Rio Grande do Norte, and Pernambuco, and that the southern limit to the Atlantic forest population was the Rio São Francisco. They argued that the similarity in pelage coloration with Amazonian populations of A. b. belzebul indicates that the connections between the now disjunct populations were through the interior, western portions of these states as well as along the coast. Since these reviews, further, very small, remnant populations have been recorded for the states of Pernambuco and Rio Grande do Norte, again near the coast (Fig. 1). Due to the widespread and almost total destruction of the Atlantic forest of North-east Brazil information concerning the extent of its non-Amazonian distribution is extremely scarce and difficult to obtain.

The first reference to A. belzebul was by Marcgrave (1648) who obtained specimens from rain forest in the state of Pernambuco. Two-hundred and sixty-six years later, Marcgrave (1648) was probably the source that led Hibern (1914) to give the Rio São Francisco as the southern limit to its distribution, besides the fact that extensive rain forest still existed along the coast of Alagoas at the beginning of the century. Hibern's (1914) supposition was endorsed by Hill (1962) who, lacking further concrete information however, merely placed an arrow on the distribution map for the genus (opposite p.136), which extended the range of A. b. ululata, otherwise known from coastal Maranhão.

As was recorded by Hibern (1914) and Bonvicino et al. (1989), Burmeister (1854) registered the distribution of the brown howling monkey, A. fusca, as extending north in the Atlantic forest as far as the Rio São Francisco. The presence of gallery forests along the tributaries of the Rio São Francisco in the 16th Century would indicate that both species extended well inland, and that a large part of the basin was occupied by howling monkeys: A. fusca along its right margin and A. belzebul along its left margin. A. fusca is extinct throughout a large part of Bahia, with very small populations possibly still surviving only in the southernmost regions of the state, but in the past it undoubtedly occupied gallery forests and forests along the slopes of the mountain ranges inland, from the coast as far west as the Rio São Francisco, in regions which are today characterized by semi-desert scrub.

The survival of A. belzebul in North-east Brazil was first documented during an expedition of Olivério Pinto to Alagoas in 1967, when two specimens were collected in the forest of the Usina Sinimbú, although this fact was only recorded in 1981 by Silva (p.899). Nearly a decade later, Paiva (1973, 1974) referred to the existence of howling monkeys in Ceará, but confused A. belzebul with the black howling monkey, A. caraya, typical of central and southern Brazil. Coimbra-Filho and Maia (1979) were also mistaken...
in suggesting the possibility of *A. caraya* occurring in the Sete Cidades National Park, Piauí. The Brazilian common name for howling monkeys is *guariba*. There are a number of localities around this Park which bear this name and local people informed that howling monkeys occurred there in the past. Coimbra-Filho and Maia (1979) failed to see the monkeys, and the already advanced destruction of the remaining forest, and the widespread hunting and fires, indicated that *A. belzebul*, undoubtedly the species in question, was probably already extinct there.

Numerous localities in the northeastern Brazilian states of Piauí, Ceará and Rio Grande do Norte have the name of Guariba or Guaribas (Vanzolini and Papavero, 1968). It is reasonable, as such, to presume that *A. belzebul* once occurred throughout the north-east to the left margin of the Rio São Francisco. This coincides with the distribution map presented by Emmons and Feer (1990, p.125). Today, however, *A. belzebul* populations have been eliminated by the decimation of their forests and a long history of hunting, and only a few minute remnant populations in the coastal region remain. In 1979, A. Langguth discovered a small population in a rain forest remnant in the state of Paraíba, at the Fazenda Pacatuba, municipality of Sapé. In 1984, an ornithological expedition organized by the National Museum, Rio de Janeiro, resulted in the collection of specimens by F. M. de Oliveira, from Serra Branca, municipality of Murici, Alagoas (Coimbra-Filho, 1984; Langguth *et al.*, 1987; Bonvicino *et al.*, 1989). Numerous populations probably existed in Alagoas as recently as 1970, up to which time the last forests of the state were being cut down for sugar cane plantations. This included the forest of São Miguel dos Campos, one of the richest remaining forests of the northeastern Atlantic coast in terms of biodiversity, and now destroyed (Coimbra-Filho, 1971).

The discovery of the populations in Paraíba and Alagoas stimulated the search for further sites. Oliveira and Feer (1993) found howling monkeys in five secondary forest patches amongst 17 which were surveyed in the coastal region near to and north of João Pessoa. All are very small, degraded, isolated and privately-owned, and the minute populations resident in them are as such highly vulnerable. With a view to providing for their protection, the Brazilian Environment Institute (Ibama) created the Guaribas Biological Reserve (4321 ha), in the municipalities of Manhães, Bom Jardim, and the undergrowth of the vegetation in the state of Pernambuco of a population. Hirsch and Pernambuco and the undergrowth of a population. Pernambuco and Peres (1766). Perhaps the argument that the absence of Guariba in the literature is due to the natural quality of the region and the relative scarcity of monkeys is not always true. The habitat of the mammals is now discussed (see time we 1766).
of Mamanguape and Rio Tinto. Despite its name, no howling monkeys have survived there, but plans are underway to translocate groups from the other sites where there are no prospects for their future. Surveys in the state of Pernambuco have resulted in the finding of a population in two forest patches at the Usina Sacramento, in the municipality of Água Preta, Pernambuco (Almeida et al., 1995), and also in the Mata da Estrela, municipality of Baía Formosa, Rio Grande do Norte, on the coast near to the state border with Paraíba (M. da F. Arruda, unpubl. data).

Perhaps the most important locality, reinforcing the argument that A. belzebul and its forests were until recently widespread throughout the north-east of Brazil, and which has not been included in the literature concerning its range, is in the south of the state of Piauí. During an expedition for medical and natural history purposes carried out in 1912, Neiva and Penna (1916, p.106) observed bands of howling monkeys, described as black with the upper surface of the hands yellowish, in the locality of Angico, municipality of Parnaguá. Specimens collected at the time were identified as Alouatta belzebul (Linnaeus, 1766). This locality, along with those mentioned above, and the numerous places which have the name of Guaruva, demonstrates that the original distribution of A. belzebul extended throughout the north-east of Brazil, and confirms the supposition of Ihering (1914) that it once extended as far south as the Rio São Francisco. Ihering (1914), however, did not extend the range beyond Alagoas, possibly because of the absence of forests resulting from the long history of destructive occupation of the region. The record of Neiva and Penna (1916) indicates that the species occurred throughout Pernambuco, to the west and south as far as at least southernmost Piauí, and, as mentioned, the most precise published description of the range of this species is given by Emmons and Feer (1990, p.125).

Although the expedition carried out by Neiva and Penna (1916) was at the beginning of the century, the vegetation of the north-east of Brazil had already undergone profound alterations. The presence of A. belzebul in southern Piauí represents important evidence for the historic existence of a forest continuum between Amazonian and Atlantic forests in the Brazilian North-east (Coimbra-Filho and Câmara, in press).

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References


**AGGRESSION BETWEEN ALOUATTA CARAYA MALES IN FOREST PATCHES IN NORTHERN ARGENTINA**

The aggressive interactions between primates that live in social groups vary in form and intensity according to the species, social organization, and habitat type. Aggressive behavior can involve fights over food, water, and sites for resting and feeding (Calegaro-Maques and Bicca-Maques, 1994). Howler monkeys are considered to be a peaceful species in terms of group interactions as a result of their adaptation to a folivorous diet, where the presence of anti-herbivorous defenses impose selective forces that constrain the use of aggressive behavior (Jones, 1980; Calegaro-Marques and Bicca-Marques, 1994).

In *Alouatta*, both sexes obtain benefits through intrasexual aggressive competence, maintaining as much as possible of entering and remaining in a stable group. This is a prerequisite for reproductive success in this genus (Crockett and Pope, 1988; Calegaro-Maques and Bicca-Marques, 1994). Solitary individuals, males or females that leave their natal groups, are found in *A. caraya* as for other species. The howlers may leave a group because of intense intrasexual competition which can limit group size. Non-stable groups promote dispersal (Neville et al., 1988). Solitary individuals are subadults or young adults that are forced to occupy marginal zones of the habitat, with low availability of resources. They may join an established group or form a new one with other solitary animals, and compete as such for sites with adequate availability of food sources (Zunino et al., 1985).

The arrival of immigrant males in established groups is interpreted as an invasion with fights between males. The encounters can result in: coexistence with the residents, the replacement of the dominant male, or the withdrawal of the invader (Rumiz, 1990). The replacement of the dominant male has been associated with infanticide and the disappearance of infants in several howler species (Clarke, 1983; Zunino et al., 1985; Rumiz, 1990; Galetti, 1994). Howling occurs in a variety of contexts, and is believed to act as a mechanism of communication, spacing, and territory defense (Baldwin and Baldwin, 1976; Jones, 1980; Sekulic, 1982).

Behavioral observations on *A. caraya* were made during a study of seed dispersal in forest patches in the Province of Corrientes in northeastern Argentina (27° 30'S - 58° 41'W), during August 1994 (Figure 1). One forest fragment (10 ha) was occupied by a group of nine howlers comprised of: one adult male (male A), two subadult males, three adult females, one juvenile female, and two infants. When an adult male (B) strange to the troop appeared, we began to observe aggressive interactions. During the first three days, the strange male B remained 20-30 m from the troop. Subsequently, he began moving closer to the group, and the male A, followed by the other males, chased the male B for about 250 m into low forest. The females did not participate, and remained where they were until the chase finished, about 1-2 hours later, after which they rejoined the males.

When the resident males returned, the male B began to follow the group at a distance of 23-30 m. Each time the male B approached, it resulted in a series of vocalizations, involving all of the group members. On the fourth day, the male B was observed to descend to the ground, and ran for about 25 m, followed by the male A. On day 6 there was a fight between males A and B when the male B again approached the group, coming to within about 1 m of an adult female (about 1 m) and an infant (about 0.5 m). This resulted in vocalizations and chasing, but this time the male B did not retreat, and attacked male A. They hung from their tails and bit and scratched each other. When male B jumped to the ground the other male was unable to disentangle them.

Another forest fragment of *A. caraya* in the same area of the study experienced the arrival of an adult male, two juveniles (one 2-year-old male and an immature female), and an infant, about 10 days after arrival of the group. A group of howlers moved through the strip completely, already including the adult female and the adult male, and chased the infant along the strip for four days.

The presence of the infant in an established group may be an important factor in maintaining a harmonious relationship among the group members. The infant may be an obligate female member of the group hierarchy. The presence of the infant reduces the frequency of fights between dominant males, and the frequency of zero sum male-male competitions. The infant may also be a useful resource for the group members, as the infant is carried, groomed, and fed by the female and on occasion by the male, which may be a good strategy for survival of the infant. This behavior may be interpreted as a strategy to reduce the frequency of male-male contests, and to maintain a stable group. Another hypothesis is that the infant is an important resource for the group, and that the infant is an important resource for the group. The infant may be an obligate female member of the group hierarchy. The infant may be an obligate female member of the group hierarchy.
increase of resource availability to the infanticidal individuals and their offspring (Hrdy, 1979; Rudran, 1979). If infanticide occurs frequently it will represent as such an important source of mortality. During 1984 in our study area, infanticide and infant disappearance represented 25% of mortality for the population (Zunino et al., 1985). When populations reach a low density, male replacement and the infanticide become less frequent, along with a return to population growth (Hrdy, 1979; Rudran, 1979). In A. caraya, infanticide and dominant male replacement are correlated with an increase in density through the increase of the number of solitary males (Zunino et al., 1985; Galetti, 1994). The elimination of non-related infants would have a double effect, on the one hand, the females become fertile in less time, and on the other, this reduces the number of potential competitors for its descendants. Male replacement may also contribute to reduce the inbreeding, increasing the genetic variability in the groups (Zunino et al., 1985).

We observed agonistic interactions caused principally by the expression of intrasexual competition, but also for the most profitable feeding sites. We believe that competition in our study site may increase due to progressive deforestation, which is resulting in an alarming reduction of the habitat available for A. caraya, and predicting a future reduction in the ecological density (Zunino et al., 1994; Amaya Santi et al., 1994). If habitat reduction acts as a stressor, the rate of aggression may increase, along with the number of dispersing individuals (Jones, 1980), but this has to be confirmed. We are presently looking for a relation between habitat destruction and aggression.

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References
Chromosomal Variation in Alouatta Fusca

The genus Alouatta (Primates, Atelidae) includes six different species, with a wide distribution in South and Central America (James et al., 1993). Of these, the brown howling monkey (Alouatta fusca) is endemic to the Atlantic Coastal Forest being found from Bahia, Espírito Santo and Minas Gerais (Brazil) south to Missiones (Argentina), and comprises two subspecies: A. fusca fusca and A. fusca clamitans.

Koifman (1977) reported a variation in the diploid number of A. fusca from 48 to 50. The diploid number of 48 chromosomes was found in a single male from Registro (southern part of the state of São Paulo), heterozygotic for two Robertsonian rearrangements. The same author reported males with 2n = 49, due to a y-autosome translocation, and males and females with 2n = 50.

Methods

Blood samples of ten specimens of Alouatta fusca, eight males and two females from different localities (Table 1), were collected using heparinized plastic syringes. Lymphocytes were cultivated for 72 hours in RPMI medium, enriched with fetal calf serum at 20% and Phytohemagglutinin at 2%. The chromosome analyses were performed by G-C-NOR banding procedures (Seabright, 1971; Sumner, 1972; Howel and Black, 1980).

Results and Discussion

The chromosome complement of Alouatta fusca showed a wide variation in the diploid number, with 2n = 45, 46, 49 and 52. This variation may be associated with the geographic origin of each individual (Table 1).

Figure 1. Karyotype of Alouatta fusca from southern Brazil.
The karyotype of the specimens from southern Brazil comprised 45 chromosomes in the males, and 46 in the females (Fig. 1). The analysis of the G-banded chromosomes of the males, compared to those of the females, allowed us to assume that this variation was due to a y-autosome translocation involving a large submetacentric pair. This rearrangement was also observed in the four males from the state of Rio de Janeiro, which showed 2n = 49 (Fig. 2), with a heteromorphic submetacentric pair, not found in previously reported karyotypes of females (Koffmann, 1977). The only male from the state of Espírito Santo had 52 chromosomes, with a small acrocentric y-chromosome (Fig. 3).

G-banded karyotypes of 2n = 45 and 46 and 2n = 49 were compared. Unfortunately, we did not succeed in banding the karyotype with 2n = 52. Based on this comparison, we could clearly identify two Robertsonian rearrangements (fusion/fission), as well as pericentric inversions. Moreover, some chromosomes found in the southern karyotype could not easily be recognized in 2n = 49, suggesting that complex rearrangements, such as multiple translocations, were also involved in the differentiation of these two cytotypes. We assume that Robertsonian rearrangements and pericentric inversions have played a critical role in the chromosomal evolution of this species.

Although the chromosomal variation in *A. fusca* seems to be clinical, and agrees with the clinical variation found in the hair color patterns, (R. Gregorin, pers. comm.), the results of the chromosome comparisons suggest that the populations analyzed are in different stages of speciation, and probably reproductively isolated, due to meiotic disturbances. A complete failure to hybridize, or the production of hybrids presenting reduced fertility or complete sterility would indicate that the parents belong to different species. Although meiotic and crossing studies should be carried out to confirm our hypothesis, we suggest that the different cytotypes found in *Alouatta fusca* are reproductively isolated, with hybrids presenting very low fertility, if not complete sterility. We suggest that the taxonomic status of *Alouatta fusca* should be critically reviewed, based not only on morphology, but also cytogenetics, biochemistry and other approaches that could clarify the phylogeny and taxonomy of this species.

**Acknowledgments**, we are most grateful to Alcides Pissinatti (Centro de Primateologia do Rio de Janeiro), Emerson Suemitsu (Itaipu Binacional), and the staff of the Passeio Público de Curitiba and the Rio de Janeiro Zoo, for allowing us to collect the blood samples from the animals housed in their institutions. We also thank Renato Gregorin (University of São Paulo) for providing unpublished information. This study was supported by the Brazil Science Council (CNPq), the Brazilian Higher Education Authority (CAPES), and the Federal Universities of Paraná (UFPR), Curitiba, and Pará (UFPA), Belém.

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19095, 81531-990 Curitiba, Paraná, Margarida Maria C. de Lima, Laboratório de Citogenética, Departamento de Genética, Centro de Ciências Biológicas, Universidade Federal do Paraná (UFPR), Campus do Guama, 66000-000 Belém, Pará, and Ives José Sbalqueiro, Laboratório de Citogenética Animal, Departamento de Genética, Universidade Federal do Paraná (UFPR), Caixa Postal 19071, 81531-990 Curitiba, Paraná, Brazil.

References

News

**TWO BREEDING FEMALES IN A SAGUINUS FUSCICOLLIS WEDDELLI GROUP**

On 20 September 1994, we captured a group of saddleback tamarins composed of six individuals (one adult male, two adult females, one subadult male, one subadult female, and one juvenile male) in a "Saguinus" trap (Encarnación et al., 1990) in the Zoobotanical Park of the Federal University of Acre (95°30' - 95°19'S, 6752°08' - 6753°00'W; 155 m above sea level; area 100 ha). All individuals except one adult female, suspected to be pregnant, were anesthetized, weighed, measured and fitted with collars of different colors.

On 24 October, the adult male (Blue) was seen carrying two newborn infants of the unmarked adult female. One week later, while Blue was carrying the infants (the only individual except the mother seen to do so), the other adult female (Orange) was seen surrendering food (banana) to him. By 13 December the infants were feeding at the capture platform, and were quite independant.

About two months later, Orange gave birth to twins, first seen on 23 January, increasing the group size to 10. These new infants were carried by Orange, Blue and a subadult female (Yellow). It seemed that Blue was the father, being the only adult male. The infants were last seen in April 1995, apparently healthy.

This would seem to be a case of poliginy, an uncommon mating system in callitrichids (for reviews see Ryland, 1993), having been observed in only four species to date (Callithrix jacchus - Digby and Ferrari, 1994; Callithrix kuhli - Alonso and Porfirio, 1993; Saguinus fuscicollis - Terborgh and Goldizen, 1985; and Leontopithecus rosalia - Dietz and Baker, 1993).

Acknowledgments: We are grateful for financial support from the Brazil Science Council (CNPq), the Federal University of Acre, S.O.S.Amazonia, and the Fundação O Boticário de Proteção à Natureza.

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References

PRELIMINARY OBSERVATIONS ON BILINGUALISM IN THE FRENCH GUIANAN SABLEBACK TAMARIN (SAGUINUS MINNIEI)

A six-month study of Saguinus minniei vocalizations and behaviors was conducted at the Station de Recherches sur la Forêt de la Bouche, between July 1982 and 1983, among the population sampled melanistic tamarins was recorded. The home range of this group was characterized by an abundance of C. venezuelensis. Previous studies have noted the range patting behavior and changes in call spatial and temporal patterns of this species. In this study we report on the variation in vocalizations observed. The collection of data on the changes resolute in this study was those in food foraging groups.

Four groups were observed, which contain an average of seven individuals. The main focus of this group was the place where food is gathered. In the dry season, the range of tamarins increased at the border of their range. At the beginning of the dry season, the group started to visit the border of their range. The home range of S. minniei contained at least 46%, but in seasonal changes the group is located in the center of their range. The increase in the border of their range was a result of food foraging, with the most important points of defense is the "Saguinus minniei."

A six-month field study was carried out on the ecology and behaviour of free-ranging red-handed tamarins (*Saguinus midas midas*), concentrating on ranging behaviour and habitat use. The data were collected at the Station of Nouragues (CNRS) in French Guiana between July and December 1994, using a scan-sampling method (Altman, 1974; Rylands, 1982). The home ranges of most callitrichids are characterised by a mix of habitats, usually including an abundance of forest edge (Sussman and Kinzey, 1984; Rylands, 1996). Seasonal availability, distribution, and habitat location of food resources are known to have a major impact on the feeding and ranging patterns of tamarins (Garber, 1993). Seasonal changes in climate and the distribution of different forest types had the effect that the *S. midas* in this study were confronted with both spatial and temporal variation in ecological conditions. The periods of data collection permitted assessment of behavioural changes resulting from seasonal changes, including those in food supply.

Four groups were identified in the study area, one of which, containing three individuals, was taken as the main focus of study. The groups contained three to seven individuals, and had home ranges of 34 to 39 ha. In the dry season (September to November), the tamarins spent more time foraging. Feeding on fruits increased at the beginning of the wet season. *Saguinus midas* was never observed feeding on exudates. During the dry season, insectivory appeared to influence how the tamarins moved about their home range. Movement during the dry season was less goal-directed, probably related to the fact that insects are a spatially and temporally fluctuating food resource. At the beginning of the wet season, the tamarins started to visit their feeding trees more systematically. Home range overlap between the range of the focal group and neighbouring home ranges amounted to at least 46%, but many confrontations were recorded. These aggressive encounters did not serve to defend the border of the home range. Instead, they were concentrated around the liana forest, which was located in the centre of the focal group’s home range. The increase in confrontations during the dry season, which was accompanied by increased time spent foraging, would suggest that liana forests are an important potential foraging area and that their defence is therefore economical.

*Saguinus midas* was observed predominantly in the lower and middle strata of the forest (10-30 m) and mainly used supports 1 to 5 cm in diameter. While the tamarins were mostly at heights of 20-30 m during feeding on fruits, they spent more time at heights between 10 and 20 m during foraging for insects on leaves and lianas, as is also shown by *S. imperator* and *S. mystax* (Terborgh, 1983; Garber, 1988). Different heights were preferred according to the forest type, which might reflect either convenient travel paths or anti-predator behaviour. *S. midas* showed a distinct preference for edge habitats and was more frequently observed in liana forests than expected by chance. In addition to their apparent importance as foraging sites, the liana forests afford protection against predators of small-bodied primates. Raptors are the main threat for callitrichids (Ferrari and Lopes Ferrari, 1990; Heymann, 1990), so that predator pressure is probably stronger in open vegetation. This was confirmed by one observed attack on an individual tamarin made by a crested eagle (*Morphus guianensis*) in an open forest. Anti-predator behaviour appeared to have consequences for group cohesion. In the open forest, the tamarins travelled in close-knit groups, because co-ordination was favoured not only for visiting patchily distributed food sources such as fruits but also for early detection of predators (see Caine, 1993). In the cover of the dense liana forest, the tamarins searched individually for the dispersed animal prey.

This text is a summary of a Master’s thesis supervised by Prof. Dr. R. D. Martin and Dr. P. Charles-Dominique. The thesis (in German) may be requested from Philip Kessler at the address below. A full publication in English is in preparation.

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References


**CENSUS OF ALOUATTA FUSCA AND HABITAT QUALITY IN TWO AREAS OF ATLANTIC FOREST IN MINAS GERAIS, BRAZIL**

In September 1995, André Hirsch defended his thesis on a census of *Alouatta fusca* in relation to habitat quality in two protected areas of Atlantic Forest in the state of Minas Gerais, Brazil. The thesis formed part of the requirements for the Master’s course in Ecology, Conservation and Wildlife Management, Institute of Biological Sciences, Federal University of Minas Gerais, Belo Horizonte, Brazil. His supervisor was Dr. Anthony B. Rylands, and the study was supported by the World Wide Fund for Nature (WWF/Brazil), the Brazil Science Council (CNPq) and the PADCT/CIAMB Interdisciplinary Program - Biodiversity, Population and Economy of the Federal University of Minas Gerais. The following is a summary of the thesis.

The study was carried out in the Estação Biológica de Caratinga - EBC (860 ha) and the Parque Estadual do Rio Doce - PERD (36,113.6 ha), two protected areas of Atlantic Forest in the state of Minas Gerais. The aim was to evaluate habitat quality in both areas and correlate this with the density of *A. fusca*. Data on habitat quality was obtained using a Point Sampling Method (MTAP): sample points (300 m between each) were placed along the same transects as those used for censusing *A. fusca*. Ninety-nine points were sampled at EBC and 67 at PERD. Thirty-six environmental variables were recorded. The habitat data were analysed using multivariate techniques, including Cluster Analysis, Principal Co-ordinate Analysis and Discriminant Analysis (MULVA-5 Program). The Cluster Analysis produced four consistent groups of sampling points, making it possible to order them in a gradient of habitat quality. Discriminant Analysis allowed for the selection of 14 variables at EBC and 13 at PERD, all with a strong relation to habitat structure and the floristic composition of the forest. Census data were obtained using the Linear Transect Method adapted for two simultaneous observers. Fifty-two transects at EBC and 18 at PERD were surveyed three times by each observer, resulting in 157.8 km and 112.5 km of census, respectively. The time spent censusing was 234.7 h at EBC and 140.8 h at PERD. Average density estimates for *A. fusca* at EBC were 1.493 indiv./ha for the first observer, and 0.922 indiv./ha for the second observer. Likewise, for PERD the estimates were of 0.495 indiv./ha and 0.018 indiv./ha, respectively.

The relation between howler density and habitat for each of the specific regions identified in the study areas was clearer at EBC, where a closer relation was found between the complexity of the habitat structure, floristic diversity and *A. fusca* density. At the PERD, few records were obtained due to the low density of *A. fusca*, despite the very similar habitat structure and floristic composition of this, the larger, area. The reason for the density difference remains unclear, but such possible ties as habitat structure, size of the area, forest fires, disease epidemics (yellow fever, simian malaria and leishmaniosis), predation and hunting are possibly involved. The most important problems arising are related to the limited carrying capacity of the habitat in the case of EBC, and the increase of inbreeding depression between the howlers, related to their high density, the relatively small area, and the degree of isolation of the area. Future management and translocation programs must take these factors into account, and it will be necessary to involve the owners of private areas for protecting the forest fragments still remaining and encourage the regeneration of degraded areas, that can serve as forest “corridors” between fragments.

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**MOLECULAR PHYLOGENY OF THE CALLITRICHINAE**

In September 1995, Carmem Barroso defended her doctoral thesis on the molecular phylogeny of the subfamily Callitrichinae (sensu Rosenberger, 1981) for the postgraduate course in Biological Sciences (specialization in Genetics and Molecular Biology) of the Federal University of Pará, Belém. The study was supported by the Federal University of Pará, Belém, the Brazil Science Council (CNPq), and Wayne State University, Detroit, Michigan. The thesis was supervised by Dr. Horacio Schneider. The following is a summary.

DNA sequences encompassing the intron 1 of the IRBP gene, with approximately 1800 base pairs, were obtained for the following species: *Saguinus midas*, *S. bicolor*, *Leontopithecus rosalia*, *Callimico goeldii*, *Callithrix jacchus*, *C. geoffroyi*, *C. argentata*, *C. humeralis* and *Cebuella pygmaea*. The sequences were added to the IRBP data base created for the remaining ceboid genera by Harada et al. (1995). An in-tandem alignment was constructed with this data along with the epsilon-globin data of Schneider et al. (1993). The arrangements observed confirm the monophyly of the family Cebidae; demonstrate that *Saguinus* is the most primitive of the Callitrichinae; and place *Cebuella* unequivocally as a member of the genus *Callithrix*, in the group “pygmaeae”, equivalent to the “argentata” and “jacchus” groups. A model of callitrichine evolution is proposed based on the phylogenetic evidence from this study. According to this model, the ancestral population of *Leontopithecus* and *Callimico-Callithrix* (or *Leontopithecus-Callimico* and *Callithrix*) would have arisen from proto-*Saguinus* stock. The proto-tamarin was deemed to have migrated eastwards, where they were isolated in refugia, becoming the genus *Leontopithecus*. The stock was lost in Amazonia in the present-day *Callimico* and *Callithrix*. The latter genus occupied a vast geographic area, giving rise to the “argentata” and “pygmaeae” groups in Amazonia, and the “jacchus” group in central and eastern Brazil.

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**References**


**VOCAL COMMUNICATION STUDIES AT THE UNIVERSITY OF SÃO PAULO**

A doctoral thesis “Vocal Interactions in the Muriqui (*Brachyteles arachnoides*)” was defended in April 1995, at the Department of Experimental Psychology of the University of São Paulo (USP), by Francisco Dyonísio Cardoso Mendes, under the supervision of Dr. César Ades (USP), and with the collaboration of Dr. Charles Snowdon and Dr. Karen Stier (University of Wisconsin, Madison). It represented the first systematic study on the vocal communication of the muriqui, and the first thesis on primate vocalizations produced in Brazil. As a result, Dr. Ades and Dr. Mendes have established the “Laboratório de Comunicação Acústica” at USP, with the acquisition of digital equipment for acoustic analysis of animal sounds. The laboratory will allow further analyses of muriqui vocalizations, as well as other studies on the vocal communication of different neotropical species.

**Vocal interactions in the muriqui (Brachyteles arachnoides)**

The major interest of the thesis was the interactional aspect of vocal signals. Observations and recordings of spontaneous vocalizations were carried out at the Biological Station of Caratinga, Minas Gerais. Vocal and contextual data were obtained through focal animal samplings and ad libitum. Contextual data included information on the identity of the caller, its behavior, social referents, and vocal and non-vocal
responses from other group members. Digital sonographic procedures and contextual analyses were used in the classification of the main vocal categories of the species' repertoire, with 160 hours of recordings.

Broad categories of vocalizations were initially grouped according to the specificity of eliciting stimuli and evoked behavioral and vocal responses. Twenty-four vocal categories encountered were given exclusively in specific situations, and/or to particular listeners. These categories included: alarm calls emitted in the presence of terrestrial and aerial species; vocalizations given by participants of different types of peer interactions (i.e., play of immature and embraces of adults); categories produced during mother-infant interactions; vocalizations bound to sexually receptive females; vocal signals emitted in isolation or in choruses, during intergroup encounters.

Four other vocalizations frequently evoked antiphonal continuous responses from other individuals. These vocalizations included: "piados", or chirps (Strier, 1986, 1992), usually heard while group members feed in proximity; "piados silábicos" or "kh-kh-kh" (Torres de Assumpção, 1983), usually emitted by resting individuals; "gemidos" and "latidos" (barks-Strier, 1986, 1992; Nishimura et al., 1988) sometimes given by individuals disturbed by the proximity of other groups or other species. A variety of acoustic forms occurred in a yet different pattern of interindividual participation, named sequential exchanges. Typically, one individual vocalized, and others responded with one call each, with little or no overlap between adjacent calls. Sequential exchanges occurred throughout the day, in a variety of contexts. Sequential exchange calls are composed of different recombinations of short emissions (pulsed elements, less than 100 ms duration) and longer emissions (run-on elements of more than 100 ms). Five categories of pulsed elements and nine categories of run-on elements were identified, according to duration, spectral shape, and energy distribution of the emission.

Each element present in a sample of 322 calls was then assigned to one of the fourteen categories of elements. The mean number of elements per call was 10.2 (sd = 4.8), with at least two categories of elements represented in 94% of the sample. Two hundred and two calls (stacattos) were composed exclusively of pulsed elements. The remaining one hundred and twenty calls (neighs) included at least one run-on element.

Cluster analysis, based on call composition, resulted in six patterns of stacattos, and six patterns of neighs, used in sequential exchanges. Stacattos were preferentially used during exchanges of a few nearby individuals, and could not be associated to specific referents. Stacattos dominated by harsh pulsed elements were preferentially used during contexts of intragroup competition, such as when the whole group fed at a single source. Neighs occurred more frequently during exchanges among a larger number of participants, with at least one participant distant from the others (more than 50 m away). Some run-on elements present in neighs were almost exclusively emitted by receptive females, and others showed a strong association with contexts of great intragroup dispersion. Two acoustic patterns were exclusively recorded after the group had spread out following encounters with members of the neighbouring group of marmosets. Sequential exchanges may operate as a system of temporally associated vocalizations that aid intragroup spacing and coordination among both nearby and distant individuals.

Francisco D.C. Mendes, Departamento de Psicologia Experimental, Universidade de São Paulo, Av. Prof. Mello Moraes, 1721, Caixa Postal 66.261, 05508-900 São Paulo, São Paulo, Brazil.

References

Status of South American Spider Monkeys in North American Collections

The 1994 North American Regional Studbook for South American spider monkeys (Ateles belzebuth, A. fusciceps and A. paniscus) was recently published by the Sedgwick County Zoo, Wichita, Kansas, USA. Representatives of all but two of the subspecies of these primates (A. belzebuth marginatus and A. fusciceps fusciceps) are currently maintained. The complete studbook and the status of the living populations (in February 1995) are provided for each species and subspecies.

Concerning South America, the South American Primate Association considers A. fusciceps the World Conservation Directory's possible, viable species.

It is most likely that information regarding South American spider monkeys is available from the World Conservation Directory.
subspecies. Age pyramids, and fecundity and mortality reports are also provided. Four A. b. belzebuth (2.2.0) are kept in three institutions and 13 A. b. chamek (5.7.1) in four. A further three collections have three A. belzebuth (2.1.0) but the subspecies remains undetermined. The population of A. b. hybrida is considerably larger, with 35 animals (14.21.0) in 10 institutions. The studbook for A. f. robustus goes back to the late 1950’s and includes records for 248 animals (84.140.24). A total of 123 A. f. robustus (40.76.7) were recorded alive in 25 institutions on 12 February 1995 (in addition to a male for which the subspecies was undetermined). The studbook also provides records for 131 (50.59.22) A. paniscus, of which 17 (8.8.1) in eight collections comprised the living population in February 1995.

Although no A. f. fusiceps occur in North American collections, the European population is sizable and precludes the need for efforts to establish a captive breeding program for this species in the region. However, consideration will be given to the organization of captive populations of the most threatened of the subspecies, A. b. marginatus, after the status of the founder base is determined for Europe and South America.

Concerning the subspecies currently held in North America, the New World Primate Taxon Advisory Group of the American Zoo and Aquarium Association (AZA) has determined that special consideration be given to A. belzebuth hybrida and A. fusiceps robustus, both listed as endangered by the World Conservation Union (IUCN), and which make up most of the holdings. Management will be directed toward retaining as much gene diversity as possible, while minimizing increases in the population size.

It is most important that collection managers use the information in the studbook to aid them in decisions regarding the management of their animals, and, likewise, that institutions maintaining South American spider monkeys supply accurate and regular reports concerning the status of their collections. The studbook keeper would also be grateful for information concerning current research projects on both wild and captive animals.

Krisi Newland, North American Regional Studbook Keeper for South American Spider Monkeys, Sedgwick County Zoo, 5555 Zoo Boulevard, Wichita, Kansas 67212, USA.

Reference

Ateles belzebuth, A. fusiceps, A. paniscus - All Subspecies. Sedgwick County Zoo, Wichita. 121pp.

WHITE-FACED SAKI, Pithecia pithecia, STUDBOOK

The 1993-1994 update for the studbook of the North American populations of the white-faced saki, Pithecia pithecia, organized by Tracy Frampton, was published recently by the Roger Williams Park Zoo, Rhode Island, USA. It includes a list of holding institutions, a studbook of the living animals, a listing of births, deaths, and transfers, population analyses, institution reports and addresses and selected bibliography.

The studbook, current up to 31 December 1994, lists 112 individuals with a 1:1 sex ratio (56.56.0) in 26 collections in North America. The population analyses show that the captive population has been growing since 1979/80. Between 1 January 1993 and 31 December 1994, there were 32 births (two stillborn) and 14 deaths, and 34 animals were transferred between collections.

Tracy Frampton, Studbook keeper, Roger Williams Park Zoo, Providence, Rhode Island 02907, USA.

Reference

GRUPO ESPECIALISTA DO CALLICEBUS PERSONATUS

Durante o VII Congresso Brasileiro de Primatologia, em Natal, 1995, alguns pesquisadores que realizam pesquisas com o guigó, Callicebus personatus, se uniram para criar um "Grupe Especialista do Callicebus personatus". O primeiro passo dessa sociedade informal terá a finalidade de recolher informações sobre os pesquisadores que trabalham com a espécie, as áreas de estudo, interesse científico e a formulação dos objetivos do Grupo. As seguintes pessoas compuseram o grupo fundador: Fabiano Rodrigues de Melo (Universidade Federal de Viçosa, Minas Gerais), Wilson Ferreira de Melo (Universidade Federal do Mato Grosso do Sul, Corumbá), Klaus-Herich Müller (Deutsches Primatenzentrum, Alemanha), Fernanda Maria Néri (Universidade Federal de Minas Gerais, Minas Gerais) e Silvia Beatriz de Souza (Universidade de Campinas, São Paulo). Para maiores informações, favor entre em...
contato com: Klaus-Heinrich Müller, Deutsches Primatenzentrum GmbH, Kellnerweg 4, D-37077 Göttingen, Alemanha, Tel: + 49 551-3851125, Fax: + 49 551 385-1228.

WISCONSIN REGONAL PRIMATE RESEARCH CENTER LIBRARY CHOSEN WLA LIBRARY OF THE YEAR

The Wisconsin Regional Primate Research Center (WRPRC) Library was selected as the 1995 Library of the Year by the Wisconsin Library Association. The award is conferred upon a library “for distinguished achievement in service”. The WRPRC, funded by the National Institutes of Health, is recognized for its programs in primate research, conservation and education. The WRPRC Library has evolved from a small reference library to one that has, with the addition of modern service components, become the largest primate-oriented library collection in the world. The International Directory of Primatology, now in its second edition, is produced by the library staff. The staff also designed and initiated services on the Internet that furnish an open communication system for primatologists and other professionals all over the world. Primate-Talk, established in 1991, provides a free-of-charge, open electronic forum for the discussion of primatology. Primate Info Net, a gopher/World Wide Web Server, was created in 1993 as a permanent electronic repository for materials dealing with primatology.

The WRPRC Library serves a wide range of users. Recently, staff initiated a section of Primate Info Net to highlight primate resources for children and young adults. This was the first University of Wisconsin - Madison library to institute a document delivery program. Its audiovisual archives includes 6,000 slides and 600 videotapes which are loaned internationally.

John D. Wiley, Provost of the University of Wisconsin said, “The level of professionalism, friendly service and knowledge provided by the Staff to all users is an integral part of the success of this library, and contributes greatly to the visibility of the Primate Center, both on campus and around the world.”

The award was presented to the WRPRC Library at the Awards Banquet during the Annual Wisconsin Library Association Conference in Appleton on 25 October 1995. The Wisconsin Library Association is a 1,500-member professional organization made up of public, academic, school, and special librarians, library trustees and others interested in libraries and informational sciences. For more information, contact: Larry Jacobsen, Head of Library Services, WRPRC Library, Tel: 1 (608) 263-3512, Fax: 1 (608) 263-4031, e-mail: jacobsen@primate.wisc.edu.

GRUPO DE ETOLOGIA DE PRIMATAS (PSE) THE UNIVERSITY OF SAO PAULO

The "Grupo de Etnologia de Primatas" is a group of graduate students and researchers interested in primate behavior, recently formed at the Experimental Psychology Department of the University of Sao Paulo. The group promotes weekly discussions on primate social behavior and cognition. Discussions are open to anyone interested in participating, and are centered on recent publications, previously chosen at the beginning of each semester.

A thorough review of the "Machiavellian Intelligence" theory was the topic for the first semester of 1995, and the meetings for the second semester focused on different approaches to cognition, awareness, and decision making in primates. The group is also ministering a University Extension Course on "Primate Social Behavior" to undergraduate and graduate students from Sao Paulo. Outside researchers or students visiting Sao Paulo are welcome to participate in the weekly meetings, and may propose a lecture about their own research projects. For additional information on weekly discussions and courses, please contact: Francisco D. C. Mendes (Dida) or Eduardo Ottoni, Departamento de Psicologia Experimental, Universidade de Sao Paulo (USP), Av. Prof. Mello Moraes, 1721, Caixa Postal 66.261, 05508-900 Sao Paulo, Sao Paulo, Brazil.

PROJETO DINAMICA BIOSOLAR DE FRAGMENTOS FLORESTAIS - VAGAS PARA ESTAGIARIOS

O Projeto Dinâmica Biológica de Fragmentos Florestais (PDBFF) anuncia vagas para estágiarios para trabalhar em projetos de pesquisas ligados a fragmentação florestal na Amazônia. O PDBFF, um projeto binacional entre o Instituto Nacional de Pesquisas da Amazônia e o Smithsonian Institution dos EUA, quantifica as mudanças no ecossistema que ocorrem à medida que a floresta continua é transformada pelo desenvolvimento humano em um mosaic de habitats. O PDBFF é o único estudo integral a longo prazo dos efeitos da presença humana sobre a floresta úmida contínua da Amazônia Central. A pesquisa foi desenhada para estudar comunidades de plantas e animais nas florestas...
PROTECTED AREAS VIRTUAL LIBRARY

Throughout the world, national governments have established systems of national parks and other types of protected areas to fulfil a broad range of needs. Information available on these systems varies widely from country to country, but increasingly information is becoming available through electronic media. The Protected Areas Virtual Library is an information service developed by the World Conservation Monitoring Centre (WCMC), working in close collaboration with the IUCN Commission on National Parks and Protected Areas (IUCN/CNPPA). It is a WWW service, providing links to other Web servers with protected areas information. The URL is: "http://www.wcmc.org.uk/~dynamic/pavl/". Your assistance in further developing the Protected Areas Virtual Library is actively encouraged. Comments, the identification of other relevant WWW servers, or the provision of material which WCMC can incorporate, funds allowing, are very welcome.

For further information: Jeremy Harrison, Head of Information Services, World Conservation Monitoring Centre (WCMC), 219 Huntingdon Road, Cambridge CB3 0DL, UK. Tel: +44 (0)1223 27 37 14, Fax: +44 (0)1223 27 71 36, e-mail: jerry.harrison@wcmc.org.uk, WWW: http://www.wcmc.org.uk.

XIII ENCONTRO ANUAL DE ETOLOGIA - BRAZIL

The "XIII Encontro Anual de Eologia" was held in Pirassununga, São Paulo, Brazil, from 2-4 November 1995. More than 300 scientists and students from 11 Brazilian states and five countries participated. As has been the case since the first of these meetings, participation was multidisciplinary, including the fields of Psychology, Biology, Animal Production, Zoology, Anthropology, Physiology and Ecology.

Special homage was paid to Beatriz T. Gardner, the Swiss researcher recently deceased, who together with her husband Allen Gardner, was a pioneer in teaching sign language to chimpanzees. Beatriz, who lived part of her childhood in Brazil, was remembered in a talk given by Dr. Gardner, along with a film on Washoe, the world famous chimp, the first of her species to learn sign language. Other talks were given by Drs. M. and K. Tomonaga, Japanese scientists working on face recognition and tool use in chimpanzees, and Dr César Ades (University of São Paulo) gave a talk on his findings concerning how university students see animal minds.

NEW ADDRESS FOR THE PRIMATE INFORMATION CENTER

The Primate Information Center, which publishes the monthly bibliographical review Current Primate References, has changed it's address. As from 1 November 1995 all mail should be sent to: Primate Information Center, Regional Primate Research Center Westlake Facility, University of Washington, 1101 Westlake Avenue North, Seattle, Washington 98109, USA. Tel: (206) 543-4376, Fax: (206) 616-1540, e-mail: pic@bart.rprc.washington.edu.

Neotropical Primates 3(4), December1995
Five symposia considered a good part of the Scala Naturae, from invertebrates to primates. The highlights were those on Animal Communication, examining cricket songs to primate spacing, and on The Marmoset as a Model for Ethological Studies, in which three researchers from the Federal University of Rio Grande do Norte and one from the Federal Rural University of Pernambuco discussed reproduction, dominance, infant care, and group stability in wild and captive marmosets. Finally a round table on the teaching of Ethology confirmed the diversity and ample range of this research field. Representatives from Psychology, Biology, and Animal Production graduate and undergraduate programs were present, besides a senior high school teacher, who has been the first to introduce the study of animal behavior as part of a High School Biology course, using it especially for the understanding of anatomical and physiological differences, and in mechanisms of gene transmission and natural selection.

Eighty-nine posters, provided by participants from 50 institutions, completed the meeting. Such a demonstration of vitality, and the need to meet the demands of students and research topics, will result, we expect, in an increase in the number of courses on Ethology and related disciplines in Brazilian graduate and undergraduate programs in the near future.

Maria Emília Yamamoto, Departamento de Fisiologia, Universidade Federal do Rio Grande do Norte, Caixa Postal 1511, 59072-970 Natal, Rio Grande do Norte, Brazil.

II CURSO NACIONAL DE BIOLOGIA DA CONSERVAÇÃO E MANEJO DE VIDA SILVESTRE

O Instituto de Pesquisas Ecológicas (IPÊ) e a Smithsonian Institution, com apoio financeiro do Fundo Nacional do Meio Ambiente (FNMA), estão organizando, de 27 de maio a 28 de junho de 1996, na Estação Experimental de Assis, do Instituto Florestal de São Paulo, o II Curso Nacional de Biologia da Conservação e Manejo de Vida Silvestre. O número de vagas é limitado e para a seleção os interessados em se candidatar deverão enviar ao IPÊ, os seguintes documentos: carta de intenções, carta de recomendação e curriculum vitae, até 29 de março de 1996. Poderão se candidatar profissionais que trabalhem com conservação de vida silvestre, alunos de mestrado em áreas afins e alunos de graduação em final de curso. O curso oferece alojamento, alimentação e, em casos especiais, transporte até a E. E. de Assis. Para maiores informações, favor contactar: Eduardo Humberto Ditt (Coordenador do Curso), IPÊ -Instituto de Pesquisas Ecológicas, Av. dos Operários 587, 13416-460 Piracicaba, São Paulo. Tel. / Fax : (0194) 38 72.59, e-mail: edhuditt@carpa. ciagri.usp.br.

WARREN KINZEY FUND

This fund, to sponsor field work on primates by graduate students, was established in memory of Warren G. Kinzev, who died in 1994 (see Neotropical Primates, 2(4), pp.18-23, 1994). Graduate students are invited to apply for small grants from this fund, from which two awards of up to $500 each are available. Applicants should send a statement of no more than two pages to Dr. John Oates, Department of Anthropology, Hunter College, City University of New York, 695 Park Avenue, New York, NY 10021, USA. This statement should: (a) explain the nature of the project (including location, species, aims, timetable and a brief description of methods); (b) state how grant funds will be used; and (c) include a brief Curriculum Vitae. Applications will be reviewed by a small committee of Warren Kinzev’s colleagues and research associates. In making awards, preference will be given to proposals involving areas, species, and/or topics that were of special interest to Warren Kinzev. Deadline: October 13. From: ASP Bulletin 19(3): 1, September 1995.

THE WHITLEY AWARD FOR ANIMAL CONSERVATION

The Whitley Animal Protection Trust and the Royal Geographical Society have joined forces to establish an annual award that will make a substantial contribution to field projects directly concerned with the protection and conservation of animals in their habitat. The aim of the award is to provide an annual prize for the best animal conservation project submitted to the Trust each year. Applicants are open to conservationists from any country working in conjunction with the host country. One prize is awarded each year up to a value of £15,000. This should cover the major costs of the winning project, enabling it to proceed without having to wait to secure other funds. The research programme: the main criterion is that the project’s objectives should make a practical, lasting and substantial contribution to the protection and conservation of animals in their habitat. Applicants will be asked to explain the origin of the project, provide detailed costings, evidence of support from the host government or local non-government organisations, and a statement on how the project is going to make a practical contribution to animal conservation. Applicants should note that they could apply for The Whitley Award either by a single visit to the host country or by linking an ongoing involvement of their institution with the Whitley Award. Any country, rather than individual, are rarely eligible, but the majority of applicants are likely to be restricted to this group. The winner must be able to describe and quantify the appropriate reference points and objectives safely, and we intend that the reports of the winning project will be published in order to avoid having to wait a long time for a budget detailing project costs. The project’s budget must be demonstrated to be feasible in the home country or the same will not normally be considered. Applications may be made by a project, providing that the same project from the Whitley Animal Protection Trust and the Royal Geographical Society. Discussion papers and research papers are invited and should be submitted for projects planned for the same year as the award. Deadline: February, and the winner will be announced at the end of February.

If you wish to receive the Whitley Award form for The Whitley Award, please contact: Whitley Animal Protection Trust, c/o RGS, 27 Pall Mall, London SW 1Y 5HD, England. Tel.: 0171 235 8191. Fax: 0171 235 8399.

ERRATUM: E. S. REÚNITA

The editors would like to announce that an erratum has been printed in the article "Se han detectado..." Repúlica ASCII.

80 Alouatta caraya... should have read: 80 Starmir simi...
country or by living there for a longer period. Close involvement of the host country and links with local institutions are essential. The applicant and team: The Whitley Award supports multi-disciplinary teams rather than individuals, so that one-person ventures are rarely eligible. The applicant may be from any nation and must be aged over 25. Multi-national teams of any age group are encouraged. Applicants will not be restricted to qualified scientists, but the Award Winner must be able to compile a written report to describe and quantify the success of their work with appropriate references. Undergraduate expeditions are not eligible, but may apply separately to the Royal Geographical Society’s expedition grant scheme, if the majority of the team are British. Teams must demonstrate that they have done sufficient planning and allowed enough time in the field to achieve their objectives safely and efficiently. The Award: It is intended that the award should cover the major costs of the winning project, enabling it to proceed without having to wait to secure other funds. An itemised budget detailing income and expenditure is required. The project’s budget should be realistic and attainable, demonstrating whether these monies are to be spent in the home or host country. Salaries for scientists will not normally be included. How to apply: All applications must be made on the forms obtainable from the Whitley Award Office at the Royal Geographical Society. Forms and supporting documents should be submitted by the 10th January for projects planning to be in the field after 1st April in the same or subsequent year. A short list of applicants will be called for interview in early February, and the Award Winner will be notified by the end of February.

If you wish to receive guidelines and the application form for The Whitley Award, send a letter with your name, address, postcode, telephone (day & evening), and fax: to: The Whitley Award, Royal Geographical Society, 1 Kensington Gore, London SW7 2AR. UK.

Primate Societies

VII CONGRESSO BRASILEIRO DE PRIMATOLOGIA

No período de 23 a 28 de julho foi realizado com grande êxito o VII Congresso Brasileiro de Primatologia na Universidade Federal do Rio Grande do Norte. Pela primeira vez, o Congresso foi realizado fora do âmbito do Congresso de Zoologia, e seu sucesso significa que temos alcançado o grau de maturidade suficiente para fazer nossas reuniões independentemente. O Congresso contou com a participação de renomados pesquisadores estrangeiros que trouxeram valiosas contribuições. Foram apresentados sete sessões coordenadas com 33 trabalhos, sete sessões de painéis com 56 trabalhos, quatro minicursos, sete palestras, duas mesas redondas e três sessões de vídeo. No futuro, o Congresso Brasileiro de Primatologia será bimural, alternando-se com o Congresso da Sociedade Internacional de Primatologia (IPS).

NOVA DIRETORIA DA SOCIEDADE BRASILEIRA DE PRIMATOLOGIA (SBPr)

Na assembleia geral da Sociedade Brasileira de Primatologia realizada no dia 26 de julho de 1995, durante o VII Congresso Brasileiro de Primatologia, foram aprovadas modificações do Estatuto da Sociedade (a nova versão foi enviada aos sócios em dezembro de 1995) e eleita a nova diretoria: Presidente - Carmen Alonso (Universidade Federal da Paraíba); Vice-Presidente - Alcides Pissinatti (Centro de Primatologia do Rio de Janeiro), Primeira Secretaria - Aurora Costa (Universidade Federal da Paraíba); Segunda Secretaria - Simone Porfírio (Universidade Federal da Paraíba); Primeiro Tesoureiro - Pedro Bias (Universidade Federal da Paraíba); Segunda Tesoureira - Maria Adélia Monteiro da Cruz (Universidade Federal Rural de Pernambuco). O Conselho Fiscal e os suplentes continuam sendo os eleitos em 1994.

A primeira reunião da nova diretoria realizou-se no dia 17 de outubro de 1995, após ter recebido o material.

ERRATUM: EL COMERCIO DE PRIMATES EN LA REPÚBLICA ARGENTINA, C. BERTONATTI

The editors would like to call attention to an error printed in the article “El Comercio de Primates en La República Argentina” by Claudio Bertonatti, Neotropical Primates 3(2), June 1995. On page 36, first paragraph, the following sentence was printed: “Se han detectado cargamentos de 50 Saimiri sciureus, 80 Alouatta caraya y 250 Callithrix jacchus.” This should have read: “Se han detectado cargamentos de 95 Saimiri sciureus, 80 Alouatta caraya y 150 Callithrix jacchus.” The editors apologize for the error.
with a number of people travelling from abroad to join us.

The enjoyment of the occasion was facilitated by an excellent table of PSGB goods for sale personnel by a dedicated group of helpers; a professional book display (Wisepress); posters on the activities of PSGB and their Captive Care and Conservation Working Parties, in addition to information about the IUCN; and an opportunity to visit the animal collection at the zoo. The Napier Medal of the Society, one that is award bi-annually in honour of our founding President, Professor John Napier, for an outstanding recent Ph.D. thesis, was awarded to Carlos Drews from Cambridge University. Unfortunately Dr. Drews was unable to attend but his medal was collected for him by Carlos Perez. Very happily, on this occasion, Dr. Prue Napier, herself a distinguished primatologist and widow of John Napier, presented the medal and received a long and sincere ovation. The Society also took the opportunity to present a gift to Greta Mitchell of Top Copy, the publisher of Primate Eye for so many years, to mark the help and friendship of both herself and her husband, Tony, who died earlier this year. The day ended with a wine reception and the auction of an exceedingly fine drawing of Jambo, the silverback gorilla, which was kindly donated for the occasion by the artist Richard Johnston-Scott of the Jersey Wildlife Preservation Trust.

Hilary O. Box, President, Primate Society of Great Britain (PSGB), Department of Psychology, University of Reading, Reading RG6 2AL, England, UK, and Hannah Buchanan-Smith, PSGB Membership Secretary, Department of Psychology, University of Stirling, Stirling FK9 4LA, Scotland, UK.

CONSERVATION PROGRAMS OF THE AMERICAN SOCIETY OF PRIMATOLOGISTS - AN APPEAL

"The American Society of Primatologists (ASP) works to save primate lives and to arrest the terrifying shrinkage of primate populations worldwide". As the premier organization in the United States for primate scientists, ASP holds annual meetings to exchange information on scientific research and primate conservation, sponsors the American Journal of Primatology, and raises funds for four kinds of awards.

Subscription Awards: The American Journal of Primatology carries articles in all areas of primatology, from details of basic biology to behavior in the wild. Journal subscriptions are awarded to
worthy individuals from countries with native primates where little access to primate information is available. Conservation Small Grants: In the past, one to four small grants of $500 have been awarded each year for research, education or emergency projects. The number and size of these grants needs to be increased. They can be add-ons to ongoing projects. These small grants are especially helpful for individuals or communities in primate habitat countries. An example is an add-on grant for a joint US/Colombia project in which the plight of the endangered cotton-top tamarin is used to raise community conservation awareness. High school students are trained in the field biology of a Colombian nature reserve, and then lead groups of young children on educational tours of the reserve. Conservation Award: The purpose of this $500 award is to encourage conservation efforts of outstanding students, young investigators and educators in habitat countries. They are presented in public ceremonies to stress the importance of primate conservation and habitat preservation. Senior Biology and Conservation Award: Ensuring the well-being and survival of primates takes skills and dedication from people serving in many capacities, such as field assistants, research facilitators, animal caretakers, park rangers, and administrators. A $500 honorarium is awarded annually to an outstanding individual without a postgraduate degree who has a long and respected history devoted to primate well-being or conservation. Honoring such individuals encourages others to follow in their footsteps. One award recipient played a central role in the establishment and operation of major primate breeding centers in the Amazon basin. It was presented by the Scientific Counselor of the American Embassy, who noted that the awardee’s work improved public support of primate conservation by impressing upon legislators and administrators the national-resource value of their country’s animal life.

Conservation education is a high priority of ASP: education that permeates entire habitat-country communities and becomes favorably known to the country’s scientific, business, and political leadership, and thereby multiplying the effectiveness of small amounts of money by many orders of magnitude. Aside from a few indirect costs, all monies received go directly into a fund that finances awards and grants. Administrative support, communications, and selection of award winners are done by ASP members as a service to conservation. The Society can contact members already working in habitat countries and encourage them to add a conservation dimension to existing projects. Such add-ons are a bargain because they support conservation research and education by committed professionals without having to pay for international or domestic travel, subsistence, equipment, site development, site operations, etc., etc.

Contributions to primate conservation can be made via the Conservation Fund of ASP. Society members contribute thousands of dollars to this fund each year, but ASP needs additional contributions from other concerned individuals, businesses, and institutions, if it is to expand its conservation activities. Contributors of $500 or more will be listed in the ASP Bulletin. Please send donations to the “ASP Conservation Fund” to Dr. Ramon J. Rhine, Chair, ASP Conservation Committee, Psychology Department, University of California, Riverside, CA 92521, USA.

Recent Publications

ANAIS DA ACADEMIA BRASILEIRA DE CIÊNCIAS - SUPLEMENTS

The Proceedings of the First International Workshop on Ecology and Biodiversity, organized by the Brazilian Academy of Sciences and held in Rio de Janeiro, 22-24 August 1994, were published (June 1995) in two special supplements of volume 66 (1994) of the Anais da Academia Brasileira de Ciências. The supplements were edited by Affonso Guidão Gomes, and sponsored by the Academy, the Financiadora de Estudos e Projetos (FINEP), Rio de Janeiro, and the Ministério da Ciência e Tecnologia (MCT), Brasilia. All articles are in English. Part I, pp.1-147, includes 14 articles under the following titles: General theory, Limnology, Chemical Botany, Forest, Meteorology, and Water.
Part 2, pp.149-276, includes a further 14 articles under the following titles: Cerrado, Herpetology, Soil, and Energy. For further information: Academia Brasileira de Ciências, Rua Anfílofo de Carvalho 29, 3o Andar, 20030-060 Rio de Janeiro, Rio de Janeiro, Brazil.

**JOURNAL OF PRACTICAL ECOLOGY AND CONSERVATION**

The Journal of Practical Ecology and Conservation is a new, independent, twice-yearly publication which covers all aspects of practical ecology and conservation. The annual subscription is £10 individual, £20 overseas, and £20 for institutions, plus postage and packing (£2 Great Britain, £6 overseas). For further details contact: Dr. Ian Rotheram, Managing Editor, Sheffield Center for Ecology and Environmental Management, Town Hall Chambers, 1 Barkers Pool, Sheffield S1 1EN, UK.

**BES JOURNALS ON COMPACT DISK (CD-ROM)**

The Blackwell Science, with the agreement of the Publications Committee of the British Ecological Society (BES) are be publishing all four BES journals on CD-ROM, four times a year from March 1995. The journals on CD have the advantage of access to full searching of the contents, abstracts, and key words, and bit-mapped images. The bit-mapped images will allow the journal page to appear on screen or be printed out as hardcopy in exactly the same format as in the paper journal, including figures. There will also be unlimited access to the tables of contents of all other journals included in the service. Journals on CD-ROM also reduce storage space.

The new product Ecofile will contain over 25 ecological journals, including the four of the BES. Access to each of the journals on CD will be obtained by paying the appropriate subscription (in the case of BES journals equal to the subscription for the journal on paper) plus an annual CD premium to cover the CD production costs. The CD premium for individuals will be £25 ($40), no matter how many journals are subscribed to on the disk.

The British Ecological Society is one of the first of its kind to begin to publish in this way. For a copy of the demonstration version of the CD, or information on how to subscribe to other journals through Ecofile, contact: Anna Rivers, Blackwell Science Ltd., Osney Mead, Oxford OX2 0EL, UK.

**BOOKS**


Neotropical Primates 3(4), December 1995


Ape, Man, Apeman: Changing Views since 1600, edited by Raymond Corbey Tilburg University and Leiden University) and Bert Theunissen (Utrecht University), 1995, 411 pp. Department of Prehistory, Leiden University, Leiden. ISBN 90-73368-057. The Evaluative Proceedings of the Symposium "Ape, Man, Apeman: Changing Views since 1600", held in Leiden, The Netherlands, 28 June - 1 July, 1993. This fine volume contains 32 papers contributed by philosophers, primatologists, historians, historians of science, paleolithic archeologists, animal activists, ethicists, literary scholars and anthropologists - many of them prominent. Four areas are covered in this abundantly illustrated book: 1) Interpreting Apes - views of nonhuman (and human) primates in the West since the middle ages; 2) Apish Ancestors - the history of interpretations of human origins and early hominids; 3) Ape Ethnozoolgy, Apelore, Ape Imagery - the ritual, cultural and symbolic roles of apes and monkeys in nonwestern as well as western cultures; and 4) Apes and Ethics - moral issues pertaining to human practices vis-a-vis apes and monkeys. The 32 essays show how radically views of apes have started to change recently. As such they are significant expressions of the continuing, and, hopefully, changing history of our dealings with our closest relatives in nature. A fascinating book, and highly recommended. Contact: Dr. R. Corbey, Department of Prehistory, P. O. Box 9515, NL 2300 RA, Leiden, The Netherlands. Fax: 31 71 272928, or 272429.

cultivadas - V. M. Viana; Dos procesos de planificación comparados: La Reserve de La Biosfera del Beni, Bolivia y La Zona Reservada Tambopata-Condado, Peru - A. Chichón; Mamiruá: riebinheiros e a preservação da biodiversidade da várzea amazônica - D. L. Ayres, J. M. Ayres; Area protegidas na Amazônia Brasileira - A. B. Rylands; Extremismo vegetal e reservas extrativistas - limitações e oportunidades - A. B. Anderson; Costos y beneficios del establecimiento de una extracción de recursos mas sostenible en la Amazonía Occidental - R. E. Bodmer, J. W. Penn, E. Durand; Pecuária na Amazônia Oriental: situação atual e tendências futuras - E. Arima, C. Uhl; Organización campesina y conservación comunitaria de recursos naturales del tropico seco en Chilapa, Guerrero - J. Aguilar; Deforestación, desarrollo rural y marginación social: un estudio de caso en el Cofre de Perote, Veracruz, México - P. Gerez-Fernandez; Plan de Manejo de La Zona Costera Patagónica - GEF/PNUD: un enfoque integral para la protección de la biodiversidad - P. Yorio; PROBIDES: el desafío de un programa integral para la conservación de la biodiversidad y el desarrollo sustentable de los humedales del este, Rocha, Uruguay - A. Diaz; Incentivos económicos y de conservación para el manejo de las zonas de amortiguamiento: la iniciativa AMISCONDE - T. E. Lacher, Jr., J. C. Calvo-Alvarado, M. Ramirez Umaña, J. D. Maldonado. Available from: Luiz Paulo de Souza Pinto, Conservation International de Brasil, Avenida Antônio Abrahão Caram 820/302, 31275-000 Belo Horizonte, Minas Gerais, Brazil. Tel: +55 31 441-1795, Fax: +55 31 441-1795, e-mail: ci@brasil@ax.apc.org.


STUDBOOKS


ARTICLES


Hutchinson, D. W. and Cheverud, J. M. 1995. Fluctuating asymmetry in tamarin (*Saguinus*) cranial morphology: intra- and interspecies comparisons be-


ABSTRACTS


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1. Stier, K. B. Sex and reproduction in muriquis (Brachyteles arachnoides). p.4


4. Carla-Campa, M. C. Ardito, G., Crovella, S., Montagnon, D. et al. Comparative analysis of alpheid DNA restriction patterns in selected species of New and Old World primates. p.4


In: Folia Primatologica 64(1-2), 1995.


Ludes, E. and Anderson, J. R. Use of different foraging substrates by captive white-throated capuchins (Cebus capucinus). pp. 84-85.

MacLarnon, A. M. and Ross, C. Allometry and ecology of infant growth rates and alloparenting. p. 97.

Yiolatos, D. Preliminary observations on the locomotion and postural behaviours of the red-handed tamarin (Saguinus midas midas) in French Guiana. p. 94.

Meetings

1995

Workshop “The Implications of Non-Invasive and Remote Monitoring Techniques for Non-Human Primate Research and Husbandry”, 6-8 December 1995, Deutsches Primatenzentrum (DPZ), Göttingen. Sponsored jointly by the European Primate Research Network (EUPREN), and the European Marmoset Research Group (EMRG). Includes symposia and poster sessions on non-invasive methods and remote monitoring, and demonstrations on transponder identification/temperature monitoring - Pexxx (NL), activity monitoring - Octec (UK), telemetry - Data Sciences Int. (USA), and behavioural recording - Noldus (NL). Contact: L. Scott, Medical Countermeasures, CBDE, Porton Down, Salisbury, SP4 0JQ, UK, Fax: +44 (0)1980 613741, or C. R. Schnell, CIBA, Klybeckstrasse 141, K-125.2.08, CH-4002 Basel, Switzerland, Fax: 061 696 62-42.

1996

XXI Congresso Brasileiro de Zoologia, 5-9 February 1996, Porto Alegre, Rio Grande do Sul. Organized by the Brazilian Zoological Society. Contact: Secretaria Executiva, Departamento de Zoologia, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Avenida Paula Gama 40, 90040-060 Porto Alegre, Rio Grande do Sul, Brazil. Tel: (051) 228-1633 x 3108 or 3126, Fax: (051) 226-7191 or (051) 227-5529, e-mail: backup@vortex.ufrgs.br.


Tel: (051) 336-8399 x 6733, Fax: (051) 336-2011, e-mail: trof@ifl.if.ufrgs.br.

Workshop – Disseminating Biodiversity Information, 24-27 March 1996, organised by the European Science Foundation (ESF) - Systematic Biology Network, The Institute of Systematics and Population Biology (University of Amsterdam), and the Expert Center for Taxonomic Identification (ETI-UNESCO), Amsterdam. Key theme: Organisation and subsequent world-wide dissemination of information on the earth’s biological diversity. Contact: UVA Conference Office, Spui 21, 1012 WX Amsterdam, The Netherlands, Tel: +31 20 525 2946, Fax: +31 20 525 4799, e-mail: congres@bdu.uva.nl, or Wouter Los, Zoological Museum Amsterdam, PO Box 94766, 1009 GT Amsterdam, The Netherlands, Tel: +31 20 520 6499, Fax: +31 20 520 5402, e-mail: los@bio.uva.nl.

1st International Symposium on Tropical Savannas, VIII Simpósio sobre o Cerrado, 24-29 March 1996, sponsored by EMBRAPA - Brazilian Agricultural Research Corporation, CPAC - Cerrados Agricultural Research Centre, Brasilia, Brazil. The program will consist of lectures, discussion panels and poster sessions on the central theme of “Biodiversity and Sustainable Production of Food and Fibers in the Tropical Savannas”. For more information: 1st International Symposium on Tropical Savannas/VIII Simpósio sobre o Cerrado, Att. Ms. Luciene M. Andrade, EMBRAPA - CPAC, Caixa Postal 08.223, Planaltina, DF 73301-970, Brazil. Tel: +55 (61) 389-1171, Fax: +55(61)3892953, e-mail: simperez@sede .embrapa.br.

Population and Community Dynamics in the Tropics, 1-3 April 1996, British Ecological Society Annual Symposium, Cambridge University, Cambridge, U. K. Contact: Dr. D. M. Newbery, Unit of Tropical Forest Ecology, Department of Biological and Molecular Sciences, University of Stirling, Stirling FK9 4LA, Scotland, UK. Tel: +44 (0)1786 467809, Fax: +44 (0) 1786 46 68 93, e-mail: d.m.newbery@ stirling.ac.uk.

ASAB General Spring Meeting, 2-3 April 1996, Association for the Study of Animal Behaviour, Bolot Institute Primate Research Team, Bolton Institute, UK. Organized by Geoff Hoose and other members of the Primate Research Team. Offers of papers and posters invited, send title plus rough statement of content. Further information: Marie Jacques, Primate Research Team, Division of Psychology and Biology, Bolton Institute, Deane Road, Bolton BL3 5AB, Lancashire, UK, Tel: 01204 528851, ext. 3145, Fax: 01204 399074, e-mail: mjl@bolton.ac.uk.
New World Primate Taxon Advisory Group, 19 May 1996. Denver, Colorado, USA. Focus: New World primate genetics. Contact: Jean Dubach, Brookfield Zoo, Department of Conservation Biology, Laboratory of Genetics, 3300 Golf Road, Brookfield, IL 60513, USA. Tel: 1 708 485-0263, ext. 502, Fax: 1 708 485 3532, e-mail: bzconbio@ix.netcom.com.

Changing Images of Primate Societies: The Role of Theory, Method, and Gender, 15-23 June 1996, Hotel Rosa dos Ventos, Teresópolis, Rio de Janeiro, Brazil. Supported by The Wenner-Gren Foundation for Anthropological Research, Inc., New York. Organized by Shirley C. Strum (University of California, San Diego) and Linda M. Fedigan (University of Alberta). Session topics: Primate studies: influence of theory, method, and gender; Comparative perspective: psychology, animal behavior, cultural anthropology, paleoanthropology, archeology; Larger context: science studies, feminism, and popular culture. For more information, please contact: Shirley C. Strum, at Tel: (619) 944-3453, Fax: (619) 944-2809/534-5946, or Linda M. Fedigan at Tel: (403) 492-5899, Fax: (403) 492-5273, e-mail: linda.fedigan@ualberta.ca, or Wenner-Gren Foundation, 220 Fifth Avenue, 16th Floor, New York, NY 10001, USA, Tel: (212) 683-5000, Fax: (212) 683-9151.

ASAB Summer Meeting - Individual Behaviour and Population Processes, 24-26 July 1996, University of East Anglia, Norwich, UK. Organized by W. Sutherland and J. Reynolds. The meeting will focus on the relationship between animal behaviour and population ecology, including the role of individual decisions in foraging, predator avoidance, territoriality, and breeding behavior in determining spatial patterns of habitat use and temporal changes in populations. Discussions on both empirical and theoretical research will contribute to providing a synthesis between animal behaviour and population biology with implications for management and conservation. Contact: Bill Sutherland or John Reynolds, School of Biological Sciences, University of East Anglia, Norwich NR4 7TJ, UK. Tel: 01603 592266, Fax: 01603 592250; e-mail: w.sutherland@uea.ac.uk or j.reynolds@uea.ac.uk.

 XVIth Congress of the International Primatological Society & 19th Conference of the American Society of Primatologists, 11-16 August 1996, University of Wisconsin, Madison, hosted by the Wisconsin Regional Primate Research Center. Contact: Edith Chan, Coordinator/Information, Wisconsin Regional Primate Research Center, 1220 Capitol Court, Madison, Wisconsin 53715-1299, USA. Tel: (608) 263-3500, Fax: (608) 263 4031, e-mail: ipsasp-info@primate.wisc.edu.

Meeting of the Association of Primate Veterinarians, 16-17 August 1996, University of Wisconsin, Madison. Contact: Edith Chan, Coordinator/Information, Wisconsin Regional Primate Research Center, 1220 Capitol Court, Madison, Wisconsin 53715-1299, USA. Tel: (608) 263-3500, Fax: (608) 263 4031, e-mail: ipsasp-info@primate.wisc.edu.

Ecological Summit 96, 19-23 August 1996, Copenhagen, Denmark. Organized by Elsevier Science, Journal Editors Robert Costanza (Ecological Economics), Sven E. Jorgensen (Ecological Modelling), William J. Mitsch (Ecological Engineering) and David Rapport (Ecosystem Health). In collaboration with the International Society of Ecological Modelling, International Ecological Engineering Society, International Society of Ecosystem Health, International Society of Ecological Economics, SAS Institute Denmark, and International Lake Environmental Committee. For information contact: Ecological Summit 96, Conference Secretariat, Elsevier Science Ltd., The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK. Tel: +44 (0)1865 843643, Fax: +44 (0)1865 843958, e-mail: g.spear@elsevier.co.uk.

6th International Behavioural Ecology Congress, 29 September - 4 October 1996, Canberra, Australia. Details from: Andrew Cockburn, Division of Botany and Zoology, Australian National University, Canberra ACT 02000, Australia. Fax: 61 6249 5773, e-mail: andrew.cockburn@anu.edu.au.


68th IUCN Species Survival Commission - Full Meeting, 11-12 October 1996, Montreal, Canada. Theme: Communicating the value of the SSC - its worldwide presence, scientific knowledge, expert advice, and ongoing work, and its relevance to the conservation of biodiversity. Plenary sessions: SSC advice to intergovernmental bodies; Biodiversity conservation information system; SSC Specialist Group Reports. Round table discussion: SSC at the regional and country levels. Workshops: IUCN categories of threat; SSC communications strategy;
Contributions

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

Please send contributions to: ANTHONY RYLANDS, Departamento de Zoología, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Brazil, Fax: (031) 441-1412, or c/o Conservation International do Brasil, Avenida Antônio Abrahão Caram 820/302, Pampulha, 31275-000, Belo Horizonte, Minas Gerais, Brazil, Tel/Fax: (031) 441-1795 or ERNESTO RODRÍGUEZ-LUNA, Parque de La Flora y Fauna Silvestre Tropical, Universidad Veracruzana, Apartado Postal 566, Xalapa, Veracruz 91000, México, Fax: 52 (28) 12-5748.

LILIANA CORTÉS-ORTIZ (Universidad Veracruzana) and MIRIAM MENEZES LIMA (Conservation International, Belo Horizonte) provide invaluable editorial assistance. LUDMILLA AGUIAR, Conservation International do Brasil, Belo Horizonte (address above), is responsible for the distribution of Neotropical Primates. Please keep us informed of any address changes.

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Design and Composition - ALEXANDRE SEIJI DINNOTTI - Conservation International do Brasil.
A stuffed toy of the white uakari. Sales will support ecological studies on Amazonian inundated forests.

Please write to
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