tion of Visalberghi (1987) that field observations of capuchin monkeys in the adequate environment will show tool-use for nut-cracking has here been confirmed for the first time.

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Common Woolly Monkeys (*Lagothrix lagotricha*) Feeding on *Chrysophyllum colombianum* (Sapotaceae) in Southern Ecuador

On the 5th December 1990, whilst at the end of a pre-cut trail running through the upper-tropical forest (elevation: 1100 m) approximately 3 km south of the Bombuscara Visitor Centre, Podocarpus National Park (04° 08'S 78° 58' W), Colin Taylor and I encountered a troop of six woolly monkeys. The monkeys were foraging in the canopy (25-30m tall). The group separated, but three individuals, including one juvenile remained in the tall tree that they were eating from. They were screaming and clearly disturbed by our presence and the adults threw fruit they were eating at us. The monkeys had accurate and strong throws, forcing us to dodge the flying fruit. We observed them through binoculars, at a distance of 40 m for five minutes before they moved off. The fruit, about the size of a small peach, and leaves from the tree were collected. Professor Terry Pennington of the Royal Botanic Gardens, Kew, UK, kindly identified species as *Chrysophyllum colombianum* (Aubreville), a Sapotaceae (*v.* Gentry 1993). Fruits from the family Sapotaceae are common monkey foods (Pennington, in litt. 1991) and there are 43 species in the genus *Chrysophyllum* (*v.* Gentry 1993). *Chrysophyllum colombianum* was previously known to occur from Costa Rica to Colombia, so with the help of the woolly monkeys we have extended its range by approximately 1500 km (Pennington, in litt. 1991). The true status of the woolly monkey, known locally as Chrongo, in Podocarpus National Park is unknown due to a lack of surveys, but they are considered rare as the park is in the foothills of the Andes, the extreme western edge of their range. However, they were not present further east in the Rio Nangaritza valley, Cordillera del Condor (04° 20'S, 78° 40'W), which is adjacent to the park, during a brief survey in 1994 (Balchin and Toyne, in press). Indeed, no primates were encountered, presumably due to pressures from hunting by the local Shuar Indians. Elsewhere in the Cordillera del Condor they have been encountered further north at Comainas (*c.* 1700 m) in Peru (Emmons and Pacheco, 1996).

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A New Locality For *Brachyteles Arachnoides* And The Urgency Of Finding New Directions For Muriqui Conservation

The muriqui, *Brachyteles arachnoides*, is an endangered Brazilian Atlantic forest endemic (Strier, 1992a, 1992b), surviving in highly fragmented forests, mostly in the states of São Paulo and Minas Gerais. A number of new localities have been reported in the last two years (Antonietto *et al.*, 1994; Martuscelli *et al.*, 1994; Oliveira, *et al*, 1996; Fontes *et al*, 1996), but for the majority the groups comprise only a few individuals, and some of them are thought to be already extinct (Martuscelli *et al.*, 1994).

On January 20, 1996, during our first survey of the Fazenda

Escorregosa in the region of the Sertão do Poruba, three dead muriquis were found with poachers; one adult female, one subadult male, and another of unidentified sex. The region is of difficult access, reaching altitudes of approximately 800 m. No muriqui or other primate species were ever seen in the lowlands and valley bottom forests of Sertão do Poruba, barely 3 km in a straight line from the mountains where the monkeys were killed, despite several years of work there.

Information on the animals was very difficult to obtain, as the poachers knew that hunting muriquis was illegal. They eventually told us, however, that they are very difficult to find, but once located "it is possible to kill the entire group because they are sluggish and very slow to escape. When you shoot one you have enough time to shoot another". They also reported that they successfully hunt muriquis at least once a year. They killed four individuals in 1995, and in the previous year they had caught seven at once.

This is of course a sad but expected story. Cases such as this are much more common than we think, and the reasons are to be expected. Hunting in this region does not occur because the local people are starving, and is related more to social than to survival reasons. After getting acquainted with the Poruba residents, I realized that they place great value on hunting a single individual of a "prohibited" and large animal when compared to other more common species such as wood quails, tinamous (*Cripturellus*), agoutis or paca, much easier to find and said to taste better. Hunting a large animal such as the muriqui, which is "protected" to boot, is a question of prestige amongst the local communities. Due to this, convincing them not to hunt muriquis is very difficult, being as it is a form of social affirmation. It would seem to me that education programs would not change this in the short term, and protection of the low numbers of muriquis will require strong coercive measures, such as an effective fiscalization in the area. This situation is in contrast with that in the vicinity of Tefé in Amazonia, where hunting is first of all a question of survival, and social affirmation merely a secondary consequence.

Muriquis occur at low densities in all known localities, even in the protected areas referred to below (Pinto *et al.*, 1994). As stated by Mendes (1994), new directions are urgently required for muriqui conservation, with emphasis on identifying the obstacles and limiting factors to the growth of the surviving populations so that practical and effective measures can be taken. I list below some suggestions.

Protection of native areas and translocation

There are three protected areas where research and conservation efforts have been concentrated: The Fazenda Intervales and the Carlos Botelho State Park in São Paulo, and the Caratinga Biological Station, Minas Gerais. Other smaller populations are known from protected areas such as the Parque Estadual do Ibitipoca, the Parque Estadual do Rio Doce, and the Mata do Sossego Biological Station

Fig. 1. Hunter with a muriqui at the Fazenda Escorregosa, Sertão do Poruba, state of São Paulo. January 1996.

in Minas Gerais, as well as on private land that has been proposed for conservation, such as São Sebastião do Ribeirão Grande, Pindamonhangaba, São Paulo, where a management plan has been prepared (see Oliveira, 1996). Further protected areas are needed for this species.

However, it is fortunate that muriquis already occur in a number of reserves, and the key to future action lies in their consolidation and active management, with translocation being an important option for the future. The populations of the nominate subspecies in Carlos Botelho and Intervales are large enough for a long-term survival program. São Francisco Xavier is an area where efforts could be intensified to create a new protected area between the Serra do Mar and the Serra da Mantiqueira, which would also serve as an adequate site for translocation of small, isolated and threatened populations elsewhere. Populations of the subspecies *hypoxanthus* are small and isolated. The largest protected areas are the Rio Doce State Park in Minas Gerais, and the Augusto Ruschi Biological Reserve in Espírito Santo, but densities in these sites are very low, indicating that they too could benefit from translocating groups from other areas (for example, the threatened population in the Fazenda Esmeralda, Rio Casca, confined to 47 ha).

Captive Management

Programs involving translocation to protected areas or for increasing the captive population should consider the following: a) the size and composition of the groups involved (Mendes 1994); b) the size and status of the population; c) if there are poachers in the area; d) the benefits in demographic and genetic terms and e) the options for the creation of new protected areas, as stated above. It is evident that some muriqui populations are so small that waiting three or more years to decide on management options will not be possible.

Translocation to zoos or primate centers is rarely considered. However, today the maintenance and reproduction of muriqui in captivity is not the problem it was (Valle *et al.*, 1983; Coimbra-Filho *et al.*, 1994). They are being kept successfully at the Rio de Janeiro Primate Center (FEEMA/CPRJ), the São Paulo Zoo, and in a private collection in Paraná. CPRJ is, however, the only governmental institution to be successful in breeding them, and relatively little research has been carried out on their husbandry and care in captivity. Careful consideration should be given to the convenience or otherwise of supplementing conservation efforts in the wild with an organized captive breeding program.

Environmental Education

Some protected areas maintain environmental programs which focus on the muriqui, and they have had excellent results. Programs of this sort should be extended to other areas, notably Poruba, with one of the main goals being the establishment of a tradition in which it becomes socially unacceptable to hunt muriquis for whatever reason. With the considerable amount of data available from research efforts in the wild (see, for example, Nishimura *et al.*, 1988; Strier, 1992a, 1992b), the growing numbers in captivity, and the relatively high proportion of localities where muriquis are merely suspected or reported in extremely low numbers, the creation of a database for the species would facilitate the organization of strategies for muriqui conservation.

Whatever the measures to be taken, there is considerable urgency, because, at least in the Poruba region, it is quite probable that there will soon be no muriquis at all to serve even as status symbols.

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News

Alouatta Vulval and Scrotal Sizes

Dr. Clara B. Jones would like to receive descriptions of relative vulval sizes (in particular the presence or absence of female genital hypertrophy) and relative scrotal size for *Alouatta* species. She is particularly interested in reports on *A. fusca* and *A. belzebul*, but all responses will be appreciated and acknowledged. Thank you for any attention. Please write to: Clara B. Jones, Ph.D., 1406 East Front Street, Plainfield, New Jersey 07062, USA, e-mail: cebus@intac.com.

Ecology and Behavior of the Brown Howling Monkey, *Alouatta fusca*

In July 1997, Denise de Alemar Gaspar completed her Master's Dissertation in Zoology at the Universidade Estadual Paulista (Unesp), at Rio Claro, state of São Paulo, Brazil. She studied the ecology and behavior of a group of eight brown howlers, *Alouatta fusca clamitans* (Geoffroy, 1812), between April 1995 and March 1996, in the Ribeirão Cachoeira forest (234 ha), near Campinas, São Paulo. The research was supervised by Prof. Nivar Gobbi (Unesp) and Dr. Eleonore Z. F. Setz (Unicamp), and was financed by the Brazil Science Council (CNPq), the Brazilian Higher Education Authority (Capes) and the Campinas State University Teaching and Research Fund (*Fundo de Amparo a Ensino e Pesquisa da Unicamp - Faep*). Scan sampling was used to examine the activity patterns and diet on each sample day, with scans of three minutes at ten-minute intervals, and the "all occurrences" method was used to sample behavior. Seed germination tests were conducted on samples of feces to determine the role of the howlers as seed dispersers. The home range was estimated by mapping daily travel paths. The phenology of 200 trees was followed in order to determine seasonal variation in food resources. Twenty-four complete days of observation were analyzed, yielding 228 hours of animal-observer contact, 1754 scans and 1894 feeding records. The study group was composed of an adult male, a subadult male, two juvenile males, three adult females and one juvenile female. On average, the group rested for 63% of the day, and feeding, travelling and other behav-