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The success of the return may have been facilitated by our ability to identify the infant and to release her near her mother. Furthermore, by not feeding the infant immediately prior to her release, she may have been hungry and therefore more responsive to her mother's initiative.

We recognize that similar recoveries of wild primates may not always be merited. In particular, if a primate has had extended contact with humans, it may be risky to return it to the wild, because it may transmit infectious pathogens. Similarly, if a dependant infant cannot be returned to its biological mother, releasing it in the wild may be condemning it to starvation. However, the success of our release indicates that such efforts are feasible and, under circumstances similar to those we describe, may be desirable, particularly for species as endangered as the muriqui.

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MURIQUIS AT THE RIO DE JANEIRO PRIMATE CENTRE

Very few muriquis, *Brachyteles arachnoides*, have been kept in captivity. Without exception, these were housed in inappropriate cages and lacked adequate husbandry, often being maintained alone, or in conditions which were unfavourable for reproduction, and receiving diets which in no way corresponded to their nutritional requirements. The continuing and drastic degradation and loss of habitat for these monkeys, the Brazilian Atlantic forest from the states of Bahia to Paraná (see Aguirre, 1971; Coimbra-Filho, 1972; Strier, 1992), has long since obviated the urgent need for an *ex situ* breeding program, and in 1984 the Rio de Janeiro Primate Centre (CPRJ/FEEMA) completed the construction of a large enclosure, designed specifically for the species (Anon., 1985; Coimbra-Filho *et al.*, 1993). It was financed by Wildlife Preservation Trust International (WPTI). It consists of a large exercise area (15.4 x 5.8 x 4.7 m), with a lean-to at each end, one for preparing food and the other as a retreat for the animals and to facilitate their capture. Part of one end of the exercise area is covered to provide shade and shelter from the rain. As such, the enclosure took into account the need to maximize space, and opportunities for exercise were also provided by positioning poles and supports in such a way that they could fully use their capacity for semi-brachiation.

The experimental colony obtained its first member,

an immature female of 3-4 months (Registration No.850), on the 11 September 1987. It arrived with breathing and gastrointestinal problems, and also showed signs of an abnormal "imprinting" on humans. It was being kept as a pet, its mother having been shot for food, in a village in the east of the state of Minas Gerais. It died on the 25 July 1990. Two other subadult females (Nos. 891 and 924) were acquired in January and July 1988, also from the state of Minas Gerais. As with the first female, they arrived in terrible condition, but recovered well following intensive veterinary care. The two females were first introduced to each other and to the cage, on the 15th May 1989. They demonstrated immediate affiliative behaviour (embracing) and vocalizing, either hanging by the tail side-by-side, or sitting beside each other emitting low friendly sounds. Subsequently two immature males (Nos. 1012 and 1091) were acquired from the state of São Paulo, in May 1989 and January 1990. The still infant male (No.1012) was introduced to the three females on the 19th June 1989. He was accepted immediately, the females repeatedly touching him without any signs of aggression. Although still of an age, none of the three females attempted to carry him. The second male (No.1091) was introduced on the 5th January 1990, with a similar outcome. The group has remained completely stable.

Muriquis are folivore-frugivores (Strier, 1992), and the most folivorous of the atelines (*sensu* Rosenberger and Strier, 1989), excepting *Alouatta*. The foods provided for the captive muriquis reflect this high degree of folivory, and leaves of species preferred by wild populations are mixed with the commercial foods included in the diet. They include garapa, (*Apuleia leiocarpa*), jacaranda-branco (*Platypodium elegans*), bicuiba (*Virola* sp.), young embauba leaves (*Cecropia* sp.) and a number of other smaller trees, including for example cana-de-macaco (*Costus* spp.). These trees have been planted in the grounds of the Primate Centre. The commercial fruits and leaves in the diet include cabbage, chicory, bananas, mangos, and apples. A special feeder has been developed in order to minimize waste as well to facilitate provisioning (Rocha e Silva *et al.*, 1991). This diet has been highly successful, evidenced by the recovery and now excellent state of health of the subadult females, and by the rapid growth of the young males and infants (see below). The young males now weigh over 15 kg.

Recent studies have demonstrated the likelihood of two subspecific forms of muriqui, a southern nominal form from the state of São Paulo and the northern form, *B.a.hypoxanthus*, from Espiríto Santo and Minas Gerais. The existence of two muriqui subspecies was first argued by Vieira (1944). Based on observations of the captive colony at CPRJ, we recognised the validity of his supposition (Coimbra-Filho, 1990, 1992) and studies of some genetic and morphological characters of populations from the south of its range in the state of São Paulo and from Minas Gerais have also reinforced this (see Lemos de Sá and Glander, 1993; Lemos de Sá *et al.*, 1993). Lemos de Sá *et al.* (1993) suggest that the Rios Grande and Paraíba do Sul and the Serra da Mantiqueira divide the two populations.

The two females from Minas Gerais and the two males from São Paulo in the CPRJ colony show marked differences. The nominal southern form is more robust, the skin is uniformly pigmented black (notable on the hairless parts of the face, and scrotum or vulva), and lacks a rudimentary thumb. Lemos de Sá and Glander (1993) confirmed the lack of a thumb in two individuals captured in the Fazenda Barreiro Rico, São Paulo. The skin of the northern subspecies, *B.a.hypoxanthus*, is mottled black interspersed with numerous pinkish patches and spots, and all individuals from the north of the species' range that we have observed have a rudimentary thumb (illustrated in Rosenberger and Strier, 1989; p.723). Lemos de Sá and Glander (1993) recorded a small thumb on all of 10 individuals captured in the Fazenda Esmeralda, Minas Gerais. Lemos de Sá *et al.* (1993) also found a regional difference in canine length. Strong sexual dimorphism was found for individuals belonging to populations south of 22^{o} latitude but none for individuals north of 21^{o} latitude. Studies of genetic distance and similarity between the Minas Gerais (Fazenda Esmeralda) and São Paulo (Fazenda Barreiro Rico) muriquis have also indicated a high level of divergence between the populations (T.R.Pope, manuscript submitted, cited in Lemos de Sá and Glander, 1993).

The first birth occurred on the 10th September 1991, the result of a mating between the black-faced male (No.1091) of the subspecies *B.a.arachnoides* and the female (No.924) of the subspecies *hypoxanthus*. The skin of the neonate was dark grey with a slightly purple tone. The ventral parts were also well pigmented but a little paler. The face was entirely pigmented black. In general, the fur was sparse, and dull yellowish, and denser on the back and crown, particular on the forehead and above the eyes. The hairs on the limbs and tail were short and sparse, particularly on the inner parts. The tail was hairless on the

ventral distal parts, and already functionally prehensile. The hands and feet were relatively large. Most significant was the presence of an outline of a rudimentary thumb, characteristic of the northern subspecies *B.a.hypoxanthus*. The infant unfortunately died two days after its birth. The second infant, a female (No.1286), was born on the 30th October 1991. The parents were the wild-born male *B.a.arachnoides* (No.1091) and the wild-born female *B.a.hypoxanthus* (No.891). The female *B.a.hypoxanthus* No.924 gave birth again to a female (No.1335) on the 3rd June 1992. As in the previous two births, the father was the male wild-born *B.a.arachnoides* No.924. On two occasions it was necessary to carry out veterinary care for inflammations caused by botfly infections. This may have been a reflection of a certain lack of care on the part of the mother. Both this and the second infant were born uniformly pigmented and with small thumbs, typical of *B.a.hypoxanthus*.

The recent evidence consolidating the arguments for two subspecies (see above) has led to the realization that our initial births have been hybrids. Unfortunately, we have as yet been unable to acquire a founder population at CPRJ which could permit separate programmes, a vital next step which will depend on the collaboration of field researchers in setting up management programs for the isolated populations and which will include measures for the consolidation and diversification of the captive founders, without of course in any way prejudicing the survival of surviving wild populations.

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A Case of Geophagy in the Black Howling Monkey *Alouatta caraya*

A case of geophagy by a black howling monkey was observed during a 12-month (August 1989-July 1990) field study on the ecology and behavior of a group in a seminatural forest of two hectares at the southernmost geographical limit of the species ($29^{o}37'S$, $56^{o}17'W$) (Bicca-Marques, 1990). It occurred on 9 September 1989, when a juvenile female was observed nibbling on a small quantity of clay from a deserted, unfinished nest of an ovenbird (*Furnarius rufus*). The ovenbird