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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References

Aguirre, A.C. 1971. *O mono* Brachyteles arachnoides *(E.Geoffroy). Situação atual da Espécie no Brasil.* Academia Brasileira de Ciências, Rio de Janeiro.

Anonymous. 1985. In the Brazilian jungle it rises: member's contributions build muriqui breeding facility. *On the Edge, Newsl.Wildl.Preserv.Trust Int.*, (26):1.

Coimbra-Filho, A.F. 1972. Mamíferos ameaçados de extinção no Brasil. In: *Espécies da Fauna Brasileira Ameaçadas de Extinção.* Academia Brasileira de Ciências (ed.), Rio de Janeiro. pp.13-98.

Coimbra-Filho, A.F. 1990. Sistemática, distribuição geográfica e situação atual dos símios brasileiros (Platyrrhini-Primates). *Rev.Brasil.Biol.* 50:1063-1079.

Coimbra-Filho, A.F. 1992. Endangered animals. In: *Ecology in Brazil: Mythes and Reality*, Fundação Pró-natureza (Funatura) (Ed.). Gráfica JB, Rio de Janeiro. pp.120-143.

Coimbra-Filho, A.F., Pissinatti, A. and Rylands, A.B. 1993. Breeding muriquis *Brachyteles arachnoides* in captivity: the experience of the Rio de Janeiro Primate Centre (CPRJ-FEEMA). *Dodo, J.Wildl.Preserv.Trusts*, 29:66-77.

Lemos de Sá, R.M. and Glander, K.E. 1993. Capture techniques and morphometrics for the woolly spider monkey, or muriqui (*Brachyteles arachnoides*, E.Geoffroy 1806). *Am.J.Primatol.* 29: 145-153.

Lemos de Sá, R.M., Pope, T.R., Struhsaker, T.T. and Glander, K.E. 1993. Sexual dimorphism in canine length of woolly spider monkeys (*Brachyteles arachnoides*, E.Geoffroy 1806). *Int.J.Primatol.*, 14(5):755-763.

Rocha e Silva, R.da, Coimbra-Filho, A.F. and Pissinatti, A. 1991. Modelos de comedouros experimentais para espécies das famílias Cebidae e Atelidae (Primates). In: *A Primatologia no Brasil-3*, A.B.Rylands and A.T.Bernardes (eds.), pp.311-315. Sociedade Brasileira de Primatologia and Fundação Biodiversitas, Belo Horizonte.

Rosenberger, A.L. and Strier, K.B. 1989. Adaptive radiation of the ateline primates. *J.Hum.Evol.* 18:717-750.

Strier, K.B. 1992. *Faces in the Forest. The Endangered Muriqui Monkeys of Brazil.* Oxford University Press, Oxford.

Vieira, C.da C. 1944. Os símios do Estado de São Paulo. *Papéis Avulsos, Zoologia, São Paulo* (4):1-31.

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

constructs its nest with wet mud. Whether there was any difference in the composition of the mud of the nest with that on the ground is not known, but there was the evident advantage that the female was not obliged to descend the tree. The nest was located about 10 m above the ground in the fork of an angico tree (*Parapiptadenia rigida*).

Earth-eating has been observed in many Old World (for example, Davies and Baillie, 1988; Goodall, 1965; Hall, 1962; Hladik, 1977a; Inoue, 1987; Lindburg, 1977) and some New World primates, such as *Saguinus mystax* (*v.* Heymann and Hartmann, 1991), *Callithrix jacchus* (in captivity, N.J.Junqueira, pers. comm.), *Alouatta seniculus* (*v.*Izawa, 1975; M.B.Diogenes, pers.comm.), *Alouatta belzebul* (R.Ghilardi Jr, pers.comm), *Ateles belzebuth* (*v.*Izawa *et al.*, 1979); and *Lagothrix lagotricha* (in captivity, M.C.A.G.Fernandes, pers.comm.). At La Macarena, Colombia, *A.belzebuth* and *A.seniculus* have been observed eating soils from "salado" (salty) sites, and in the case of *A.seniculus*, the soil from arboreal termitaria (Hirabuki and Izawa, 1990; Izawa *et al.*, 1990; Izawa and Lozano, 1990), also recorded for chimpanzees (Uehara, 1982). *A.belzebuth*, but not *A.seniculus*, have been observed drinking the water from the "salado" sites (Izawa and Mizuno, 1990; Izawa, 1993).

Five explanations have been proposed to interpret the occurrence of geophagy: 1) as a dietary mineral supplement (Clutton-Brock, 1977; Davies and Baillie, 1988; Heymann and Hartmann, 1991; Hirabuki and Izawa, 1990; Izawa *et al.*, 1990; Johns and Duquette, 1991; Jolly, 1985; Mahaney *et al.*, 1990; Oates; 1977; Ozaki *et al.*, 1989; Waterman, 1984), although the mineral concentrations available in soil samples analysed frequently do not exceed those present in many common foods and give no indication of elements which may be influencing the soil-eating habits (see Goodall, 1965; Hladik, 1977a, 1977b; Hladik and Gueguen, 1974; Jolly, 1985, Lindburg, 1977; Schaller, 1965); 2) the clay may act as an adsorbent of tannins frequently found in small quantities in leaves, and thus reduce their inhibitory effects on protein absorption, as well as increasing detoxification capacity for poisonous secondary compounds (Hladik, 1977a, 1977b; Johns and Duquette, 1991); 3) the earth provides some mechanical aid to digestion (Jolly, 1985); 4) alleviation of digestive disorders, such as forestomach acidosis (Davies and Baillie, 1988) - chemical analyses of soils eaten by *A.seniculus* showed that they had higher pH values than those which were not (Hirabuki and Izawa, 1990); and 5) the soil of termite mounds eaten by chimpanzees may provide information on the reproductive state of the termites (Uehara, 1982).

In our case of oven-bird nest eating, any of the first four explanations are possible. In comparison to *A.seniculus*, however, this was evidently a very rare behavior (Izawa and Lozano, 1990). Another possibility is that geophagy may be related to infestations of internal parasites. In the Amazonian state of Acre, where red howling monkeys (*A.seniculus*) have been observed frequenting "barreiros" (the Brazilian equivalent of "salado" sites, see Ayres and Ayres, 1979) to eat soil, an analysis of the digestive tract of one individual showed a very large quantity of earth and a very high infestation of worms in the stomach, whereas other digestive tracts analysed presented few worms and little soil (F.L.França, unpubl.data). The black howling monkeys we studied had large numbers of cestode worms in the feces.

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References

Ayres, J.M. and Ayres, C.M. 1979. Aspectos da caça no alto rio Aripuanã. *Acta Amazonica*, 9(2):287-298.

Bicca-Marques, J.C. 1990. A new southern limit for the distribution of *Alouatta caraya* in the Rio Grande do Sul state, Brazil. *Primates*, 31:449-451.

Clutton-Brock, T.H. 1977. Some aspects of intraspecific variation in feeding and ranging behaviour in primates. In: *Primate Ecology*, T.H.Clutton-Brock (ed.), pp.539-556. Academic Press, London.

Davies, A.G. and Baillie, I.C. 1988. Soil-eating by red leaf monkeys (*Presbytis rubicunda*) in Sabah, northern Borneo. *Biotropica*, 20:252-258.

Goodall, J. 1965. Chimpanzees of the Gombe Stream Reserve. In: *Primate Behavior*, I.de Vore (ed.), pp.425-473. Holt, Rinehart and Winston, New York.

Hall, K.R.L. 1962. Numerical data, maintenance activities and locomotion in the wild chacma baboon, *Papio ursinus*. *Proc.Zool.Soc.Lond.*, 139:181-220.

Heymann, E.W. and Hartmann, G. 1991. Geophagy in moustached tamarins, *Saguinus*

mystax (Platyrrhini, Callitrichidae), at the Rio Blanco, Peruvian Amazonia. *Primates*, 32:533-537.

Hirabuki, Y. and Izawa, K. 1990. Chemical properties of soils eaten by wild red howler monkeys (*Alouatta seniculus*): a preliminary study. *Field Studies of New World Monkeys, La Macarena, Colombia*, 3:25-28.

Hladik, C.M. 1977a. A comparative study of the feeding strategies of two sympatric species of leaf monkeys: *Presbytis senex* and *Presbytis entellus*. In: *Primate Ecology*, T.H.Clutton-Brock (ed.), pp.324-353. Academic Press, London.

Hladik, C.M. 1977b. Chimpanzees of Gabon and chimpanzees of Gombe: some comparative data on the diet. In: *Primate Ecology*, T.H.Clutton-Brock (ed.), pp.481-501. Academic Press, London.

Hladik, C.M. and Gueguen, L. 1974. Géographie et nutrition minérale chez les primates sauvages. *C.r.Acad.Sci.*, 279D:1393-1396.

Inoue, M. 1987. Soil-eating in Japanese macaques (*Macaca fuscata*) at Arashiyama, Kyoto. *Primate Research*, 3:103-111.

Izawa, K. 1975. Foods and feeding behavior of monkeys in the upper Amazon basin. *Primates*, 16:295-316.

Izawa, K. 1993. Soil-eating by *Alouatta* and *Ateles*. *Int.J.Primatol.*, 14:229-242.

Izawa, K. and Lozano, H.,M. 1990. Frequency of soil-eating by a group of wild howler monkeys (*Alouatta seniculus*) in La Macarena, Colombia. *Field Studies of New World Monkeys, La Macarena, Colombia*, 4:47-56.

Izawa, K. and Mizuno, A. 1990. Chemical properties of special water drunk by wild spider monkeys (*Ateles belzebuth*) in La Macarena, Colombia. *Field Studies of New World Monkeys, La Macarena, Colombia*, 4:38-46.

Izawa, K., Kimura, K. and Samper-Nieto, A. 1979. Grouping of the wild spider monkeys. *Primates*, 20:503-512.

Izawa, K., Kimura, K. and Ohnishi, Y. 1990. Chemical properties of soils eaten by red howler monkeys (*Alouatta seniculus*), II. *Field Studies of New World Monkeys, La Macarena, Colombia*, 4:27-37.

Johns, A.D. amd Duquette, M. 1991. Detoxification and mineral supplementation as functions of geophagy. *Am.J.Clin.Nutr.*, 53:448-456.

Jolly, A. 1985. *The Evolution of Primate Behavior*. 2nd Ed., Macmillan Publishing, New York.

Lindburg, D.G. 1977. Feeding behaviour and diet of rhesus monkeys (*Macaca mulatta*) in a Siwalik Forest in north India. In: *Primate Ecology*, T.H.Clutton-Brock (ed.), pp.223-249. Academic Press, London.

Mahaney, W.C., Watts, D.P., and Hancock, R.G.V. 1990. Geophagis by mountain gorillas (*Gorilla gorilla beringei*) in the Virunga monutains, Rwanda. *Primates*, 31:113-120.

Oates, J.F. The guereza and its food. 1977. In: *Primate Ecology*, T.H.Clutton-Brock (ed.), pp.275-321. Academic Press, London.

Ozaki, M. Ishii, T., Funo. R. Torii, C., Ichiki, Y, and Hagiwara, Y. 1989. Effect of soil-eating on cobalt-vitamin B_{12} deficiency in lambs. *Bull.Fac.Agric. Tamagawa Univ.*, 29:69-80.

Schaller, G.B. 1965. The behavior of the mountain gorilla. In: *Primate Behavior*, I.de Vore (ed.), pp.324-367. Holt, Rinehart and Winston, New York.

Uehara, S. 1982. Seasonal changes in the techniques employed by wild chimpanzees in the Mahale Mountains, Tanzania, to feed on termites (*Pseudacanthotermes spiniger*). *J.Hum.Evol.*, 37:44-75.

Waterman, P.G. 1984. Food acquisition and processing as a function of plant chemistry. In: *Food Acquisition and Processing in Primates*, D.J.Chivers, S.A.Wood and A.Bilsborough (eds.), pp.177-211. Plenum Press, New York.

MORE UNTUFTED CAPUCHINS IN SOUTHEASTERN AMAZONIA?

Until the description of *Cebus kaapori* Queiroz 1992 from the Brazilian State of Maranhão, the known distribution of untufted capuchins (*Cebus albifrons* and *Cebus nigrivittatus*) in the Amazon basin was restricted to the north and west of the Amazonas/Tapajós river system. Lopes and Ferrari (1993) extended the range of *C.kaapori* as far west as the Rio Tocantins, but it remains unclear whether untufted capuchins occur further west. If an untufted capuchin does occur west of the Tocantins, its absence from the literature may be a consequence of the same two factors which contributed to that of *C.kaapori* prior to 1992: exceptionally low population densities (Queiroz, 1992; Lopes, 1993) and a restricted geographical distribution.

With this in mind, the region to the south of Cametá on the left or west bank of the Tocantins was visited in July and September 1993 in an attempt to confirm, or otherwise, the occurrence of an untufted capuchin in the lower Tocantins/Xingú interfluvium (fieldwork supported by the Universidade Federal do Pará). During interviews, only about one in ten residents reported the