Júlio César Bicca-Marques and **Cláudia Calegaro-Marques**, Departamento de Ciências da Natureza and Parque Zoobotânico, Universidade Federal do Acre, Caixa Postal 1012, Rio Branco, 69908-210, Acre, Brazil.

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AN UPDATE ON THE LONG-TERM FIELD RESEARCH ON RED HOWLER MONKEYS, *ALOUATTA SENICULUS*, AT HATO MASAGUARAL, VENEZUELA

Introduction: Field studies on the demography and behaviour of red howler monkeys, *Alouatta seniculus*, at Hato Masaguaral, Estado Guarico, Venezuela, have been carried out under the direction of Dr. Rudy Rudran of the Smithsonian Institution since 1976 (Agoramoorthy and Rudran, 1993). Hato Masaguaral is a wildlife preserve and working cattle ranch, located in the central llanos of Venezuela, about 45 km south of the town of Calabozo, approximately 8° 34' N, 67° 35' W. At Masaguaral, the forest and native wildlife species are protected by the owner, Sr. Tomas Blohm, while domestic animals are controlled so as to have a minimal impact on the howlers' habitat and food resources. The vegetation in this area is semi-deciduous, and most trees and shrubs lose their leaves in January and February (Troth, 1979; Crockett and Rudran, 1987a, 1987b). The red howlers in the savanna woodlands and gallery forest are sympatric with wedge-capped capuchin monkeys (*Cebus olivaceus*).

Methods: I have been monitoring some 36 groups in the savanna woodlands and 25 groups in the gallery forest since 1989 on a monthly basis to record demographic data. Most of the home ranges of red howler groups at Hato Masaguaral are already known. I usually record demographic details of group composition, sex of individuals, age classification, physical characteristics (for example, body size, coat color of infants, size and shape of nipples and female genitalia, and the size of the throat/beard of the males), births, emigration and immigration. Between 1989 and 1993, certain howler groups were selected to record data on social interactions. Social interactions of several groups which had been invaded by males were observed from dawn to dusk for five continuous days each month, but were also observed for at least three or four hours per day during the rest of the month. In each case, the identity and approximate age of the invading males, body size and the physical condition of both invading and resident males, and the social interactions between group members were recorded. Social interactions were recorded in three major categories: aggressive, affiliative and sexual. All-occurrences sampling and scan sampling were used as observational methods (Altmann, 1974).

Recent findings: Red howlers have attracted attention in recent years because of the occurrence of infanticide during and after male invasion (Rudran, 1979a, 1979b, 1974; Sekulic, 1983; Crockett and Sekulic, 1984; Agoramoorthy, 1992;

Agoramoorthy and Rudran, 1992, 1993, 1994b). The first evidence for infanticide by a platyrrhine during male invasion was observed among free-ranging red howlers by Rudran (1979a, 1979b). Similarities and some differences were recorded when compared to infanticidal situations described for Old World monkeys (Rudran, 1994). A dozen cases of infanticide have been observed during the period 1989-1994, and most of the one-male groups of red howlers became stable multi-male groups after successful male invasion (Agoramoorthy, 1992; Agoramoorthy and Rudran, 1994b). Within these multi-male troops, estrous females interacted sexually with several males (including the resident(s) and infanticidal/non-infanticidal invaders), and in some cases the resident male(s) stayed with the invader(s) for long periods of time. However, infanticidal males were not always observed to have immediate sexual access to females who had lost infants (Agoramoorthy, 1992; Agoramoorthy and Rudran 1994b; Rudran, 1994).

Three cases of infant adoptions among red howlers were observed for the first time in Venezuela. Two infants were adopted by their relatives and the third one was adopted by a non-relative (Agoramoorthy and Rudran, 1992). Twenty-one males migrated to join new social groups and the majority of them (61.9%) dispersed at or before the attainment of sexual maturity (Agoramoorthy and Rudran, 1993). The age of the dispersing males ranged from 2.3 to 19 years.

The company of a father or a brother appeared to be crucial for the dispersal of immature males because adult males over five years of age dispersed singly. The presence of a sexually mature kin-related female(s) was a factor promoting the dispersal of adult males. Infant killing or infant disappearence resulted after male immigration into groups that had infants except in two cases where the immigrants were related to the resident males. One of the males was observed to play, groom and lick the infants on several occasions (Agoramoorthy, unpubl. video document). This kind of interaction between a male immigrant and infant had not been previously reported for howler monkeys (see Agoramoorthy and Rudran, 1993 for details).

Between 1989 and 1991, 50 howlers monkeys were captured to ear-mark, measure, and collect hair and blood samples for a DNA fingerprinting study. Howlers were immobilized with Telazol or TEL (tiletamine hydrochloride and zolazepam hydrochloride). The mean dosages of TEL used for adult males and adult females were 22.4 (±7.3) mg/kg and 22.5 (±5.0) mg/kg, respectively. Juveniles of both sexes received a mean dose of 30.5 (±5.6) mg/kg. The induction time for TEL ranged from 1 to 6.2 minutes. Total recovery time ranged from 39 to 308 minutes. There were no apparent side effects to the fetuses of two pregnant females. The mean dose of TEL in this study is greater than that reported for mantled howler monkeys (*Alouatta palliata*) in the wild (Glander *et al.*, 1991) and in captivity (Bush *et al.*, 1977). However, wild spider monkeys (*Ateles geoffroyi*) in Costa Rica were immobilized with a mean dose of 22.1 mg/kg (Glander *et al.*, 1991) which is similar to the doses reported here for red howlers. In general, TEL appeared to be a good immobilizing agent for this species (see Agoramoorthy and Rudran, 1994a).

On-going Research Projects: The following research projects are presently being carried out on the red howlers at Hato Masaguaral:

1) Demography and social mobility - R.Rudran and G. Agoramorthy;
2) Social interactions within invaded groups - G.Agoramoorthy;
3) Reproductive physiology involving the study of urinary estrogen - J.Harder, R.Rudran and G.Agoramoorthy;
4) Population genetics and DNA fingerprinting - M.Hsu, R.Rudran and G.Agoramoorthy;
5) Vocal communication - G.Agoramoorthy;
6) Stress and reproduction in adults - R.Lohmann, G.Agoramoorthy and R.Rudran;
7) Field capture and chemical immobilization - G.Agoramoorthy.

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G. Agoramoorthy, Conservation and Research Center, National Zoological Park, Smithsonian Institution, Front Royal, Virginia 22630, USA, and Department of Biology, National Sun Yat-sen University, Kaohsiung 80424, Taiwan, Republic of China.

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News

MURIQUI BIRTHS AT THE RIO DE JANEIRO PRIMATE CENTER

Following the reports on the captive breeding program of the muriqui, *Brachyteles arachnoides*, at the Rio de Janeiro Primate Center (CPRJ) of the Fundação Estadual de Engenharia do Meio-Ambiente (FEEMA) (Coimbra-Filho *et al.*, 1993, 1994), a further three infants have been born, sired by the male *B.a.arachnoides* (CPRJ 1091). The first was a female born on 12 October 1993 to the female *B.a.hypoxanthus* (CPRJ 924). It unfortunately died on the same day. The second, a male (CPRJ 1475), was born to the female *B.a.hypoxanthus* (CPRJ 891) on 25 April 1994. The female CPRJ 924 gave birth again on 24 June 1994 to a female infant CPRJ 1488. Both surviving infants are developing well and are in excellent condition. This brings the total births to six since the beginning of the program three years ago. Four are alive and well; three females and one male. All were births of just two females (Table 1).

Table 1. Muriqui births at the Center

Male CPRJ 1091 x Female CPRJ 891			
30.10.91	CPRJ 1286	Female	
25.04.94	CPRJ 1475	Male	
Male CPRJ 1091 x Female CPRJ 924			
10.09.91	CPRJ 1245	Female	Died 12.09.91
03.06.92	CPRJ 1335	Female	
12.10.93	CPRJ 1430	?	Died 12.10.93
24.06.94	CPRJ 1488	Female	

Source: CPRJ Records.

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