

stationary on branches, while others foraged for invertebrates. Most were vigilant and scanned the area frequently, giving alarm calls. After several minutes had passed, the capuchins traveled in the opposite direction to that of the tayra, and resumed their typical activity of foraging and traveling. The howlers remained in the area. Three other incidents involving predator detection and response by capuchins were observed during 280 observation hours. All involved only *Cebus* - no defensive interactions among species were observed.

As reported previously (Boinski, 1988; Chapman, 1986) and supported by the present observation, adult male *C. capucinus* play an active role in group defense. Although the study troop contained two adult males, only one was observed to directly defend the group and approach the predator. A second adult male directed vocalizations and threats from a distance of approximately 3 m. Female white-faced capuchins generally do not become involved in group defense situations (Fedigan, 1993). In the present observation, an adult female carrying an infant was present, vocalizing and directing threats to the tayra. She remained 3-5 m away from the tayra throughout.

This observation illustrates the differing strategies employed by howlers and capuchins when confronting a potential predator. Whereas *Cebus* responses (particularly the adult male's) were active and directed towards the predator, the howlers remained high in emergent trees, vocalizing loudly. Julliot (1994) reported similar behavior by howlers in response to a crested eagle (*Morphnus guianensis*).

**Kim Phillips**, Departments of Psychology and Biology, Hiram College, Hiram, Ohio 44234, USA.

## References

- Boinski S. 1988. Use of a club by a wild white-faced capuchin (*Cebus capucinus*) to attack a venomous snake (*Bothrops asper*). *Am. J. Primatol.* 14: 177-179.
- Chapman, C.A. 1986. *Boa constrictor* predation and group response in white faced *Cebus* monkeys. *Biotropica* 18: 171-172.
- Fedigan, L.M. 1993. Sex differences and intersexual relations in adult white-faced capuchins (*Cebus capucinus*). *Int. J. Primatol.* 14: 853-877.
- Julliot, C. 1994. Predation of a young spider monkey (*Ateles paniscus*) by a crested eagle (*Morphnus guianensis*). *Folia Primatol.* 63:75-77.
- Phillips, K.A. 1994. Resource distribution and sociality in white-faced capuchins, *Cebus capucinus*. Unpublished Ph.D. thesis, The University of Georgia, Athens.

## ON THE OCCURRENCE OF PARASITES IN FREE-RANGING CALLITRICHIDS



From April 1994 to February 1995, 46 individuals of three species of callitrichids (25 black-chinned emperor tamarins, *Saguinus imperator imperator*; 19 saddleback tamarins, *Saguinus fuscicollis weddelli*; and two pygmy marmosets, *Cebuella pygmaea*) were captured in a so-called "Saguinus trap" (Encarnación *et al.*, 1990). The study site, the Zoobotanical Park of the Federal University of Acre (9°56'30" - 9°57'19"S, 67°52'08" - 67°53'00"W; 155 m above sea level, area 100 ha), Rio Branco, Acre, Brazil, is characterized by the presence of secondary forests in different successional stages (Calegario-Marques and Bicca-Marques, 1994). Fecal samples were collected whenever available in order to analyze the presence of ova from gastrointestinal parasites using the Willis method (Matos and Matos, 1981).

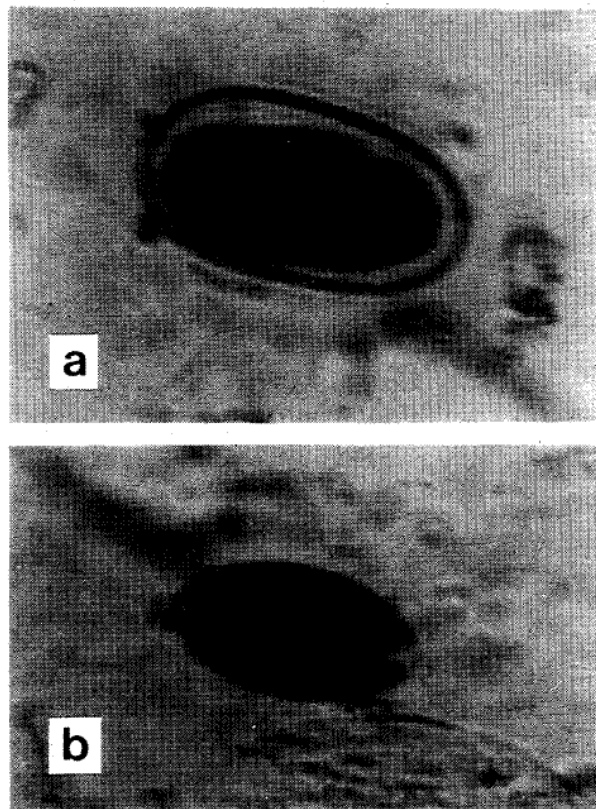


Figure 1. (a) *Ancylostoma* (320x) and (b) *Trichuris* (128x) ova found in *Saguinus fuscicollis weddelli* fecal samples.

Fourteen samples were examined and three nematode genera were found: *Ancylostoma* (Fig. 1a) and *Trichostrongylus*, Strongylidae, and *Trichuris* (Fig. 1b), Trichuridae (Table 1). Three *S. f. weddelli* infested with *Ancylostoma* sp. presented yellow cutaneous papules of about 2-4 mm in diameter in the abdominal region, which may be related a similar infection in cats and dogs (Freitas, 1977). These papules were found in just one *S. i. imperator*, but no fecal sample was examined for this individual. Another *S. i. imperator* naturally eliminated an adult male acanthocephalan parasite: *Prosthenorchis* (Fig. 2), Gigantorhynchidea.

Infection with these parasites can be oral (all genera) or through the skin during lactation and pregnancy in the case of *Ancylostoma* (Freitas, 1977). The higher infection of *Ancylostoma* in *S. f. weddelli* when compared to *S. i. imperator* may be related to the species' behavior. *S. f. weddelli* at the study site use mainly the lower strata of the forest, from 0 to 10 m (Azevedo *et al.*, 1994), often going to the ground. On the ground it may be more vulnerable to infectious larvae that actively penetrate through the skin. The occurrence of the parasitic nematodes in this

Table 1. Occurrence of nematoid ova in the fecal samples examined in three callitrichid species.

Species	No. of Samples	No (%) of Positive Samples			No. (%) of Negative Samples
		<i>Ancylostoma</i>	<i>Trichostrongylus</i>	<i>Trichurus</i>	
<i>S. f. weddelli</i>	7	5 (71)	-	1 (14)	2 (29)
<i>S. i. imperator</i>	6	-	1 (17)	-	5 (83)
<i>C. pygmaea</i>	1	-	-	-	1 (100)

callitrichid community may be related to the relatively intense use of the Park by humans in at least some of the areas. Natural infection of callitrichids by acanthocephalans seems to occur through ingestion of insect prey, the probable intermediate hosts (Hershkovitz, 1977).

**Acknowledgements:** We thank Francisco Luiz França for his help during the initial stages of the captures. We are also grateful for financial support provided by the Brazil Science Council (CNPq), the Federal University of Acre, S.O.S Amazonia, and the Fundação o Boticário de Proteção à Natureza (Project No. 158/94-A).

**Francisco G. de Araújo Santos, Júlio César Bicca-Marques, Cláudia Calegari-Marques, Elvira M.P. de Farias and Maria Aparecida de O. Azevedo,** Departamento de Ciências da Natureza, and Parque Zoológico, Universidade Federal do Acre, 69915-900 Rio Branco, Acre, Brasil.

## References

- Azevedo, M.A.O., Bicca-Marques, J.C. and Calegari-Marques, C. 1994. Levantamento das populações de primatas diurnos do Parque Zoológico, Rio Branco - AC. Paper presented at 1<sup>a</sup> Jornada Nacional de Iniciação Científica and 46<sup>a</sup> Reunião Anual da Sociedade Brasileira para o Progresso da Ciência (SBPC), Vitória, Espírito Santo. 17-22 July, 1994.
- Calegari-Marques, C. and Bicca-Marques, J.C. 1994. Ecology and social relations of the black-chinned emperor tamarin. *Neotropical Primates* 2(2):20-21.
- Encarnación, F., Moya, L., Soini, P., Tapia, J. and Aquino, R. 1990. La captura de Callitrichidae (*Saguinus* y *Cebuella*) en la Amazonia Peruana. In: *La Primatología en el Perú*, N.E. Castro-Rodríguez (ed.). pp.45-56. Proyecto Peruano de Primatología, Iquitos.
- Freitas, M.G. 1977. *Helminthologia Veterinária*. 3rd Edition. Rabelo & Brasil Ltda., Belo Horizonte.
- Hershkovitz, P. 1977. *Living New World Monkeys (Platyrrhini), With an Introduction to the Primates, Vol. 1*. University of Chicago Press, Chicago.
- Matos, M.S. and Matos, P.F. 1981. *Laboratório Clínico Médico Veterinário*. Arco-Iris, Salvador.

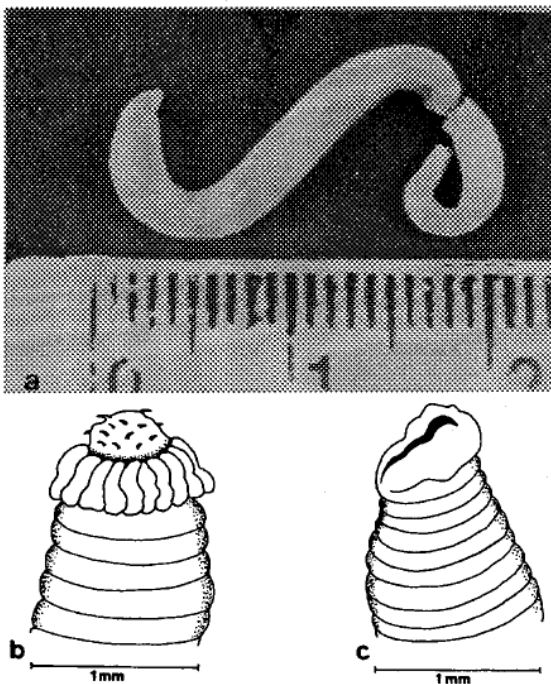


Figure 2. (a) An adult male *Prosthenorchis*, which was naturally eliminated by a *Saguinus imperator imperator*, and details of its (b) anterior and (c) posterior regions.