

A POTENTIAL ZONOTIC AND ECOLOGICAL THREAT: IS THE REINTRODUCTION OF PRIMATE PETS A SECURE MEASURE?

Uma ameaça ecológica e zoonótica: A reintrodução de primatas provenientes de cativeiro doméstico é uma medida segura?

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RESUMO - Primatas podem ser infectados por patógenos de origem humana, e isso pode ser uma preocupação no sentido de reintroduzir esses animais na vida selvagem, podendo colocar em risco um ecossistema estabilizado. Para determinar este risco e a faixa e a carga de infecções parasitárias entre animais primatas em Acre, Brasil, foram coletadas amostras biológicas apropriadas de todos os primatas conduzidos para o Centro de Triagem de Animais Silvestres (CETAS) no estado do Acre, Brasil, entre os anos de 2011 e 2012. Entre todos os 14 animais que foram confiscados para a liberação na natureza, encontramos dois (14,3%), a ser infectado com *Strongyloides* sp. e pulgas (*Ctenocephalides felis*) em dois (outros) dos primatas avaliada. *Strongyloides* sp. são parasitas zoonóticos. Sugerimos que a descoberta desses endoparasitas zoonóticos indica a necessidade de exame fecal de rotina e, ou vermifugação dos primatas animal de estimação para a segurança para tratadores de animais e pessoas envolvidas na reintrodução de primatas.

PALAVRAS CHAVE: endoparasitas, ectoparasitas, epidemiologia, primatas de cativeiro, Amazônia.

ABSTRACT - *Primates may be infected by pathogens of human origin, and this may be a concern for releasing such back into the wild where they will join troops of wild primates. To determine this risk and the range and burden of endo and ectoparasitic infections among primate pets in Acre, Brazil, we collected appropriate biological samples from all primates conducted to the Screening Center of Wild Animals (CETAS) in the state of Acre, Brazil, during 2011 and 2012. Among all 14 animals which were confiscated for release into the wild, we found 2 (14.3%) to be infected with *Strongyloides* sp. and fleas (*Ctenocephalides felis*) in two (other) of the primates evaluated. *Strongyloides* sp. are zoonotic parasites. We suggest that the finding of these zoonotic endoparasites indicates a need for routine fecal examination and worming of pet primates for the safety for animal handlers and people involved in the reintroduction of primates.*

KEY WORDS: endoparasites, ectoparasites, epidemiology, captive primates, Amazon.

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INTRODUCTION

Neotropical primates remain popular pets in certain regions of Amazonian Brazil¹. This can present threats to human and animal health. Several diseases can be transmitted from primates to humans² and in the particular case of creating household primates the inverse flux can occur, and human diseases can also be transmitted to wild animals such as tuberculosis³.

In the state of Acre, the Screening Center of Wild Animals (CETAS) is intended to receive, triage and treat the wild animals (exotic and native) delivered, collected or seized by the CETAS inspectors. CETAS receives wildlife that were being held captive as domestic pets and works to reintroduce them into the wild or to zoos. The fate of seized animals, provided they are not on the official list of endangered species and according to the degree of domestication, is preferably zoos or breeding farms registered with Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) and research centers. Releases are, whenever possible, linked to specific management programs for different species⁴.

Non-human primates can be infested by several species of intestinal parasites^{1,5} and ectoparasites, including mites and ticks⁶. Many of these parasites have the potential to be transmitted to humans. For the state of Acre/Brazil, no studies have previously been published on endo and ectoparasite infections among resident non-human primates. Nonhuman primates can transmit diseases to humans and vice versa. To obtain relevant data on parasitic infections among pet primates in Acre, Amazonia, Brazil, we conducted a study of parasite burden among primate pets confiscated or otherwise presenting to CETAS.

MATERIAL AND METHODS

Our sample consisted of all pet primates presenting to CETAS from October 1, 2011 to June 1, 2012. Fourteen such primates presented to CETAS during this time period. Ten grams of fresh feces were collected from each animal from their pens and placed into 50 mL fecal sample containers. Samples were kept at 4° C for transportation and until analysis for parasites was conducted. Within 8 hours, fecal samples were examined according to the Foreyt protocol⁷. Flotation and sedimentation method used was that originally designed by Hoffmann. To collect fleas, lice and ticks the animals were inspected manually. Any ectoparasites found were placed in vials with alcohol 70° GL and sent to the Laboratory of Veterinary Parasitology of Veterinary Medicine, Federal University of Acre for sorting, processing, and identification⁸.

RESULTS AND DISCUSSION

During the study period, 14 animals of different species (*Callicebus moloch* (Hoffmannsegg, 1907), *Cebus albifrons* (Humboldt, 1812), *Lagothrix lagotricha* (Humboldt, 1812), *Sapajus apella* (Linnaeus, 1758), *Callimico goeldii* (Thomas, 1904), *Alouatta seniculus* (Linnaeus, 1766), *Ateles chamek* (Humboldt, 1812), *Saguinus labiatus* (É. Geoffroy in Humboldt, 1812), *Saimiri boliviensis* (I. Geoffroy & de Blainville, 1834) and *Pithecia irrorata* (Gray, 1842)) were submitted to parasitological examinations. Gastrointestinal parasites were identified in two (14.3%) of the 14 primates examined. In a fecal sample from *Sapajus apella* (Linnaeus, 1758) we found eggs of *Strongyloides* sp., and in a fecal sample from a *Saimiru boliviensis* (I. Geoffroy & de Blainville, 1834) we found eggs and larvae of *Strongyloides* sp. No other endo-parasites were found. We found fleas (*Ctenocephalides felis* (Bouché, 1835)) and flea feces adhered to by the two primates *Cebus albifrons* (Humboldt, 1812). No animal showed suspicion of parasitic otitis, scabies or any other dermatological problem. The identification of arthropod was performed according key proposed by Taylor et al.⁹ and Foyert⁷.

We identified gastrointestinal parasites only two of the 14 studied primates. This result is consistent with the rates found in pet non-human primates in a study from Para, where only 2% of the animals had some type of parasites with zoonotic potential, *Strongyloides stercoralis* occurring in 17.2% cases, and in 3.4% of cases this was associated with the parasite *Giardia lamblia*. Separately, *Giardia lamblia* and *Entamoeba histolytica* were, respectively, 3.4% and 10.3% of the cases studied¹.

The low rates of observation of endoparasites in pet nonhuman primates, described in the literature¹ and those found in this study may be due to the age of the animals seized (adults), good hygeineic practice of owners, possible worming, or other undetermined

factors. 64.3% primates were already in adulthood, and thus more resistant to parasitic infections⁹.

Strongyloides sp. found in a fecal sample from *Sapajus apella* (Linnaeus, 1758) and from *Saimiru boliviensis* (I. Geoffroy & de Blainville, 1834). Strongyloidiasis is an intestinal parasitic zoonotic disease. The parasite has a higher frequency in tropical and subtropical regions¹. This parasite presents a greater health threat to HIV-infected individuals¹⁰, and this has been reported from the northern regions of the Brazil¹¹.

Nonhuman primates can be infected by several species of ectoparasites including mites and ticks⁶. Labruna et al. identified nine species of ticks, included three genera in 51 wild animals of nine species, including primates from *Alouatta caraya* (Humboldt, 1812) and *Sapajus apella* (Linnaeus, 1758) species⁶. In the present study we did not identify any species of tick in the 14 animals studied. The difference in results between the two studies may be attributed to the type of population studied. While Labruna et al. worked with free-living animals captured at the Porto-Primavera Hydroelectric power station area, between the states of São Paulo and Mato Grosso do Sul⁶, the animals in this study were collected of domestic captivity in Acre with different rearing conditions and low to no contact with other wild animals.

Fleas (*Ctenocephalides felis* (Bouché, 1835)) and flea feces adhered to by the two *Cebus albifrons* (Humboldt, 1812) primates, suggesting the transmission of ectoparasites from domestic animals such as dogs and cats. In this case, domestic primates kept in captivity can be infected by urban pathogens, introducing new parasite species in the wild, threatening the diversity of animals by introducing a new pathogen.

CONCLUSIONS

This study is the first to provide statistical information on parasite burden among pet primates in Acre, Brazil. The sample size of our study may not be representative of the entire population of captive pet monkeys, however as a first study provides important findings for public health and possible ecological threat.

Despite the low occurrence of endo and ectoparasitic infection found in our study, we recommend routine screening and worming of captured primates and confiscated pet primates because of the potential of infection of these animals with zoonotic endoparasites such as *Strongyloides* species.

Future approaches may provide more information on other zoonotic diseases with a larger and more representative sample. This will bring more information about its risks and the zoonotic potential in the state of Acre.

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