

REPORT

A FIRST RECORD OF TICKS IN FREE-RANGING GIANT OTTER (*Pteronura brasiliensis*) IN THE BRAZILIAN AMAZON

Fernando César Weber Rosas^{1*}; Tânia Mara Sicsu da Cruz¹; Sérgio Luis Gianizella²; Claudiane dos Santos Ramalheira¹; Thiago Fernandes Martins³

¹ Laboratório de Mamíferos Aquáticos. Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brazil. e-mail: frosas@inpa.gov.br

² Laboratório de Zoologia, Departamento de Biologia, Instituto de Ciências Biológicas. Universidade Federal do Amazonas (UFAM). Manaus, Amazonas, Brazil

³ Departamento de Medicina Veterinária Preventiva e Saúde Animal - Faculdade de Medicina Veterinária e Zootecnia – Universidade de São Paulo. São Paulo, Brazil



(Received 20th October 2015, accepted 10th December 2015)

Abstract: Studies of the biology and ecology of the giant otter (*Pteronura brasiliensis*) have increased considerably during the past few years. However, information on epidemiologic aspects of this species is still scarce in the literature. A series of helminthes were recorded parasitizing giant otters, but they were all endoparasites. To date, there is no record of ectoparasites reported for this species. In the present study, we report for the first time the occurrence of a tick nymph of the morphospecies *Amblyomma cajennense* sensu stricto (s.s.) attached to the lower right lip of a free-ranging giant otter. The location where the tick was attached suggests that other areas of the giant otter body far from the head would preclude hematophagy due to the amount of time otters spend in the water while swimming and feeding. Increased records of *A. cajennense* s.s. parasitizing different hosts in the Amazon basin will contribute to future molecular analysis and to a better taxonomic and geographic knowledge of this species of the Brazilian Amazon, as well as to a better knowledge of the epidemiologic aspects of the endangered giant otter.

Keywords: Amazon, ectoparasite, endangered species, Giant otter, *Pteronura brasiliensis*, tick

The giant otter (*Pteronura brasiliensis*) is a diurnal and social semi-aquatic mammal endemic to the South American continent. The species feeds primarily on fish, and it is therefore morphologically well adapted for swimming (Carter and Rosas, 1997; Rosas et al., 1999; Cabral et al., 2010). However, giant otters also have strong liaisons with terrestrial habitats. They use the banks of water bodies to dig dens, which are used for sleeping and cub rearing. Irregularly shaped patches of land, known as campsites, are also used for defecating (communal latrines), drying out, scent marking, grooming, resting during the day and sometimes for denning activities (Groenendijk et al., 2005; Rosas et al., 2015). All these interactions with terrestrial

habitats put giant otters potentially in close contact with ectoparasites, which live in forest areas.

A series of helminthes have been recorded in the stomach, intestines, heart, lungs, lung artery and under the skin of giant otters. Parasite species previously identified in giant otters include *Alaria clathrata*, *Alaria pseudoclathrata*, *Ancylostoma* sp., *Baschkirovitrema incrassatum*, *Cryptocotyle thapari*, *Cryptosporidium* sp., *Diphyllobothrium* sp., *Diplostomum alarioides*, *Dirofilaria* sp., *Dirofilaria spectans*, *Galeiceps longispiculum*, *Molineus major*, *Paragonimus rudis*, *Strongyloides* sp., *Subulura amazonica* and *Subulura interrogans* (Flügger, 1997; Hagenbeck and Wünnemann, 1992; Wünnemann, 1995; Muniz-Pereira et al., 2009). However, all of the parasite species mentioned are endoparasites and, according to Labruna et al. (2005a), although tick species (*Amblyomma ovale*) have been found infesting the Neotropical otter (*Lontra longicaudis*), tick infestation remains unreported for five of the Brazilian Carnivora species, of which the giant otter (*Pteronura brasiliensis*) is one.

On February 6th, 2014, we caught a free-ranging giant otter at Balbina hydroelectric reservoir (01° 55'00''S, 59° 29'00''W) with the aim to implant a radio-transmitter intraperitoneally for a radio-telemetry study (License N° 27396-6, Ministério do Meio Ambiente, SISBIO/Instituto Chico Mendes de Biodiversidade (ICMBio) and License N° 006/2013 Comissão de Ética em Pesquisa no Uso de Animais (Ethics Committee in the Use of Animals) of the National Institute of Amazonian Research/Ministério da Ciência, Tecnologia e Inovação. The methodology used to catch the otter and to implant the transmitter followed that described by Silveira et al. (2011).

The otter caught was an adult female of 162 cm long and 21 kg. During physical examination of this animal, we found a tick attached to its right inferior lip. The tick was hand removed, fixed with alcohol 92% and according to Martins et al. (2015) as well as the comparisons with the tick collection of the Laboratory of Zoology of the Universidade Federal do Amazonas (UFAM) it was positively identified as a nymph of *Amblyomma cajennense* sensu stricto (s.s.) (Acari: Ixodidae) (Fabricius, 1787). The nymph was deposited at the Paulo Bhürheim Zoological Collection (CZPB) of the Universidade Federal do Amazonas under the accession number CZPB-IX-00388.

Recent studies on the genetics (Beati et al., 2013), morphology (Nava et al., 2014), ecology (Estrada-Peña et al., 2014) and biology (Labruna et al., 2011; Mastropaolo et al., 2011) carried out in the Americas have shown that *A. cajennense* is a complex of at least six different species, each one associated to its biogeographical area. Currently, *A. cajennense* s.s. is the only species of this complex present in the Brazilian Amazon (Nava et al., 2014; Estrada-Peña et al., 2014).

Amblyomma cajennense s.s. was originally described in French Guiana, and it is distributed in the northwest region of the Amazon basin and found in a series of domestic and wild mammals as well as in human beings (Nava et al., 2014). Labruna et al. (2005b) recorded adults of this tick species in Brazilian tapir (*Tapirus terrestris*), collared peccary (*Tayassu tajacu* = *Pecari tajacu*), horse (*Equus caballus*) and in humans, and nymphs of this species were recorded in domestic dogs (*Canis familiaris*), while free-ranging adults and nymphs were collected in the vegetation of Rondonia State, northern Brazil.

This is the first record of a tick in giant otters and, consequently, it is also the first time *A. cajennense* s.s. has been reported on this host species. It is well known that ticks usually choose areas of difficult access of their hosts for hematophagy. However, the site of infection (lower lip) of the tick in the giant otter is an important fact to observe, as semi-aquatic mammals like giant otters carry out most of their

activities in the water and therefore, the head is the body part which is least present under water. However, even been attached to the otter's lip, and in this way less subjected to hypoxia, the presence of this tick on a giant otter reveals the high adaptability of *A. cajennense* s.s. to perform hematophagy in semi-aquatic mammals and its capacity to withstand periods of oxygen deprivation.

The increased number of individuals and records of *A. cajennense* s.s. from different locations along its distribution and its occurrence in different host species will help to establish the actual range of this ixodid and to elucidate its adaptation to the environment and to the lifestyle of its hosts. Notwithstanding, the occurrence of a tick on a free-ranging giant otter may also contribute to the health aspects of this endangered mammalian species.

Acknowledgements: We thank Fundação Grupo O Boticário de Proteção à Natureza (Project No. 0900_20111), Reserva Biológica do Uatumã (ReBio Uatumã/ICMBio), Amazonas Energia S.A., Philadelphia Zoo/USA, Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq, and Associação dos Amigos para Proteção do Peixe-boi da Amazônia - AMPA (Proj. Mamíferos Aquáticos da Amazônia sponsored by Petrobras Socioambiental) for logistical and/or financial support.

REFERENCES

- Beati, L., Nava, S., Burkman, E.J., Barros-Battesti, D., Labruna, M.B., Guglielmone, A.A., Cáceres, A.G., Guzmán-Cornejo, C.M., León, R., Durden, L.A., Faccini, J.L.H. (2013). *Amblyomma cajennense* (Fabricius, 1787) (Acari: Ixodidae), the Cayenne tick: phylogeography and evidence for allopatric speciation. *BMC Evol. Biol.* **13** (267): 1-20.
- Cabral, M.M.M., Zuanon, J., de Mattos, G.E., Rosas, F.C.W. (2010). Feeding habits of giant otters *Pteronura brasiliensis* (Carnivora: Mustelidae) in the Balbina hydroelectric reservoir, Central Brazilian Amazon. *Zoologia* **27** (1):47-53.
- Carter, S.K., Rosas, F.C.W. (1997). Biology and conservation of the giant otter *Pteronura brasiliensis*. *Mammal Rev.* **27** (1):1-26.
- Estrada-Peña, A., Tarragona, E.L., Vesco, U., de Meneghi, D., Mastropaolo, M., Mangold A.J., Guglielmone, A.A., Nava, S. (2014). Divergent environmental preferences and areas of sympatry of tick species in the *Amblyomma cajennense* complex (Ixodidae). *Int. J. Parasitol.* **44**: 1081-1089.
- Flügger, M. (1997). Haltung, zucht und erkrankungen von Riesenottern (*Pteronura brasiliensis*) in Carl Hagenbecks Tierpark. *Verh Ber Erkg Zootiere* **38**:125-130.
- Groenendijk, J., Hajek, F., Duplaix, N., Reuther, C., Van Damme, P., Schenck, C., Staib, E., Wallace, R., Waldemarin, H., Notin, R., Marmontel, M., Rosas, F.C.W., de Mattos, G.E., Evangelista, E., Utreras, V., Lasso, G. Jacques, H., Matos, K., Roopsind, I., Botello, J.C. (2005). Surveying and monitoring distribution and population trends of the giant otter (*Pteronura brasiliensis*): Guidelines for a standardization of survey methods as recommended by the giant otter section of the IUCN/SSC Otter Specialist Group. *Habitat* **16**: 1-100.
- Hagenbeck, C., Wünnemann, K. (1992). Breeding the giant otter (*Pteronura brasiliensis*) at Carl Hagenbeck's Tierpark. *Int. Zoo Yearb.* **31**: 240-245.
- Labruna, M.B., Jorge, R.S.P., Sana, D.A., Jácomo, A.T.A., Kashivakura, C.K., Furtado M.M., Ferro, C., Perez, F.A., Silveira, L., Santos Jr., T.S., Marques, S.R., Morato, R.G., Nava, A., Adania, C.H., Teixeira, R.H.F., Gomes, A.A.B., Conforti, V.A., Azevedo, F.C.C., Prada, C.S., Silva, J.C.R., Batista, A.F., Marvulo, M.F.V., Morato, R.L.G., Alho, C.J.R., Pinter, A., Ferreira, P.M., Ferreira, F., Barros-Battesti, D.M. (2005a). Ticks (Acari: Ixodida) on wild carnivores in Brazil. *Exp. Appl. Acarol.* **36** (1-2): 149-163.
- Labruna, M.B., Camargo, L.M.A., Terrassini, F.A., Ferreira, F., Schumaker, T.T.S., Camargo, E.P. (2005b). Ticks (Acari: Ixodidae) from the state of Rondonia, western Amazon, Brazil. *Syst. Appl. Acarol.* **10**: 17-32.
- Labruna, M.B., Soares, J.F., Martins, T.F., Soares, H.S., Cabrera, R.R. (2011). Cross-mating experiments with geographically different populations of *Amblyomma cajennense* (Acari: Ixodidae). *Exp. Appl. Acarol.* **54**: 41-49.
- Martins, T.F., Nunes, P.H., Terassini, F.A., Barbieri, F.S., Camargo, L.M.A., Labruna, M.B. (2015). Descrição morfológica da ninfa de *Amblyomma cajennense* sensu stricto (Acari: Ixodidae) utilizando microscopia óptica e eletrônica de varredura [Morphological description of nymphs of *Amblyomma cajennense* sensu stricto using optical and scanning electron

- microscopy]. Abstracts of I Simpósio Nacional e IV Simpósio Estadual de doenças transmitidas por carrapatos. Indaiatuba, São Paulo, 12-14 August, 2015, Brazil, p. 21.
- Mastropaolo, M., Nava, S., Guglielmo, A.A., Mangold, A.J. (2011).** Biological differences between two allopatric populations of *Amblyomma cajennense* (Acari: Ixodidae) in Argentina. *Exp. Appl. Acarol.* **53**: 371-375.
- Muniz-Pereira, L.C., Vieira, F.M., Luque, J.L. (2009).** Checklist of helminth parasites of threatened vertebrate species from Brazil. *Zootaxa* **2123**: 1-45.
- Nava, S., Beati, L., Labruna, M.B., Cáceres, A.G., Mangold, A.J., Guglielmo, A.A. (2014).** Reassessment of the taxonomic status of *Amblyomma cajennense* (Fabricius, 1787) with the description of three new species, *Amblyomma tonelliae* n.sp., *Amblyomma interandinum* n.sp. and *Amblyomma patinoi* n.sp. and reinstatement of *Amblyomma mixtum* Koch, 1844 and *Amblyomma sculptum* Berlese, 1888 (Ixodida: Ixodidae). *Ticks Tick-borne Dis.* **5**: 252-276.
- Rosas, F.C.W., Zuanon, J.A.S., Carter, S.K. (1999).** Feeding ecology of the giant otter *Pteronura brasiliensis*. *Biotropica* **31** (3): 502-506.
- Rosas, F.C.W., Ramalheira, C.S., Bozzetti, B.F., Palmeirim, A.F., Cruz, A.D., Pathek, D.B., Cabral, M.M.M. (2015).** Sleeping sites used by giant otters (*Pteronura brasiliensis*) in the Balbina hydroelectric reservoir, Central Brazilian Amazon. *Aquatic Mammals* **41** (2): 143-148.
- Silveira, L., Furtado, M., Rosas, F.C.W., Silva, L.C.L., Cabral, M.M.M., Tôrres, N.M., Sollmann, R., Kouba, A., Jácomo, A.T.A. (2011).** Tagging giant otters (*Pteronura brasiliensis*) (Carnivora, Mustelidae) for Radio-telemetry Studies. *Aquatic Mammals* **37**: 208-212.
- Wünnemann, K. (1995).** Giant otter husbandry. In: **Partridge, J.** (Ed.). *Husbandry Handbook for Mustelids*. Association of British Wild Animal Keepers: Bristol, UK, pp. 181-184.

RÉSUMÉ

UN PREMIER CAS DE PRESENCE DE TIQUES SUR DES LOUTRES GEANTES (*Pteronura brasiliensis*) EN AMAZONIE BRESILIENNE

Les études sur la biologie et l'écologie de la loutre géante du Brésil (*Pteronura brasiliensis*) se sont beaucoup enrichies ces dernières années. Cependant, les informations sur les aspects épidémiologiques de cette espèce restent rares. Seules des espèces d'helminthes endoparasites ont été signalées dans cette espèce. Jusqu'à présent, aucune espèce d'ectoparasite n'a été signalée dans cette espèce. Dans cette étude, nous rapportons pour la première fois, la présence d'une nymphe de tique de l'espèce *Amblyomma cajennense* sensu stricto (s.s.) attachée à la lèvre inférieure droite d'une loutre géante sauvage. La localisation où la tique était fixée, c'est-à-dire sur la tête, suggère que les autres parties du corps d'une loutre géante n'autoriseraient pas l'hématophagie du fait du temps passé dans l'eau pour nager et se nourrir. De nouveaux signalements de *A. cajennense* s.s. parasitant différents hôtes dans le Bassin Amazonien contribueront à une future analyse moléculaire, une meilleure approche taxonomique et à une meilleure connaissance de la répartition de cette espèce dans l'Amazonie Brésilienne, tout autant qu'à une meilleure connaissance des aspects épidémiologiques des loutres géantes.

RESUMEN

PRIMER REGISTRO DE GARRAPATAS EN NUTRIAS GIGANTES (*Pteronura brasiliensis*) EN ESTADO SILVESTRE, EN LA AMAZONÍA BRASILEÑA

En los últimos años se han incrementado considerablemente los estudios sobre la biología y la ecología de la nutria gigante (*Pteronura brasiliensis*). Sin embargo, la información sobre aspectos epidemiológicos de esta especie es aún escasa en la literatura. Han sido registrados una serie de helmintos parasitando nutrias gigantes, pero han sido todos endoparásitos. Hasta hoy, no se han informado ectoparásitos para esta especie. En el presente estudio, informamos por primera vez la ocurrencia de una ninfa de garrapata de la morfoespecie *Amblyomma cajennense* sensu stricto (s.s.), sujeta al labio inferior de una nutria gigante en estado silvestre. La localización en la cual la garrapata estaba sujeta sugiere que otras áreas del cuerpo de la nutria gigante

alejadas de la cabeza, precluirían la hematofagia debido a la cantidad de tiempo que las nutrias están en el agua, nadando y alimentándose. Registros adicionales de *A. cajennense* s.s. parasitando distintos huéspedes en la cuenca amazónica, contribuirían a un futuro análisis molecular y a un mejor conocimiento taxonómico y geográfico de esta especie de la Amazonía Brasileira, así como a un mejor conocimiento de los aspectos epidemiológicos de la amenazada nutria gigante.

RESUMO

PRIMEIRO REGISTRO DE CARRAPATO EM ARIRANHA DE VIDA LIVRE (*Pteronura brasiliensis*) NA AMAZÔNIA BRASILEIRA

Nos últimos anos os estudos da biologia e ecologia da ariranha (*Pteronura brasiliensis*) têm sido intensificados. No entanto, embora ameaçada de extinção, ainda são escassas as informações acerca dos aspectos epidemiológicos desta espécie. Do ponto de vista parasitológico, uma série de helmintos foi registrada na ariranha. Todos, porém, endoparasitas e nenhum registro de ectoparasita havia sido reportado para esta espécie. No presente estudo registramos pela primeira vez a ocorrência de uma ninfa de carrapato pertencente à morfoespécie *Amblyomma cajennense* sensu stricto (s.s.) aderida ao lábio inferior direito de uma ariranha de vida livre revelando que *P. brasiliensis* também é suscetível à infestação por carrapatos. O local de fixação do carrapato sugere que outras áreas do corpo da ariranha distantes da cabeça tornariam a hematofagia impossível dado ao tempo que a ariranha permanece com o corpo submerso durante atividades de pesca e deslocamentos na água. O aumento de registros de exemplares de *A. cajennense* s.s. na bacia Amazônica parasitando diferentes espécies contribuirá para futuras análises moleculares e para o melhor conhecimento taxonômico e geográfico desta espécie na Amazônia brasileira, bem como contribuem para um melhor entendimento dos aspectos epidemiológicos na ariranha.