

CASE REPORT

***Oncicola luehei* IN A WILD CRAB-EATING RACCOON
(*Procyon cancrivorus*) FROM THE BRAZILIAN
CERRADO SAVANNA**

*Wilson Junior Oliveira*¹, *André Luiz Quagliatto Santos*², *Wilson Viotto de Souza*², *Ana Elizabeth Iannini Custódio*³, *Estevam Guilherme Lux-Hoppe*⁴ and *Fernanda Rosalinski-Moraes*¹

ABSTRACT

The occurrence of *Oncicola luehei* is reported in a road killed crab-eating raccoon (*Procyon cancrivorus*) near the municipality of Uberlândia, Minas Gerais State. The animal was collected as part of a study that monitors wildlife road killing in the Triângulo Mineiro region. In necropsy, a single male acanthocephalan was recovered from the large intestine. The parasite was wrinkled, whitish in color, with a total body length of 15.88mm, globular proboscis (0.71 x 0.81mm) armed with 36 spiraled hooks, long lemniscus (7.30 x 0.81 mm) surpassing the anterior testis. The testes were ellipsoid in shape, disposed in tandem, the anterior measuring 1.44 x 0.53mm and the posterior 1.5 x 0.50mm. At the posterior part of the body, eight cement glands arranged in two rows of four, measuring 0.38 x 0.46 mm each. Based on this, the parasite was classified as *Oncicola luehei*. This study represents a new host and locality records for the parasite.

KEY WORDS: Helminthology; Acanthocephala; wildlife; road killing; Brazil.

Crab-eating raccoons (*Procyon cancrivorus*) are Procyonidae carnivores that occur from southern Central America to northern Argentina, with records in all Brazilian Biomes (Reis et al., 2006). These animals have generalist diets, easily adapting to the resources habitually present and changing food behavior when necessary (Whiteside, 2009).

Road killings of crab-eating raccoons are frequently reported in Brazil (Orlandin et al., 2015) and these carcasses may be used as a rich source of information to expand scientific knowledge about the biology and ecology of this species, including its parasites (Adams, 1983). It is important to note that, despite its wide geographical distribution, this animal is still one of the least studied carnivores (Lima et al., 2010).

1. Laboratório de Doenças Parasitárias, Faculdade de Medicina Veterinária (FMV), Universidade Federal de Uberlândia (UFU), Uberlândia, MG, Brazil.

2. Laboratório de Pesquisa em Animais Silvestres, FMV, UFU, Uberlândia, MG, Brazil.

3. Laboratório de Ecologia de Mamíferos, Faculdade de Ciências Biológicas, UFU, Uberlândia, MG, Brazil.

4. Departamento de Medicina Veterinária Preventiva, Faculdade de Ciências Agrárias e Veterinárias, Universidade Estadual Paulista, Jaboticabal, SP, Brazil.

Corresponding author: Wilson Junior Oliveira. E-mail: wilsonjr2009@hotmail.com

Received for publication: 19/11/2019. Reviewed: 3/1/2020. Accepted: 17/1/2020.

The known helminths of *Procyon cancrivorus*, include the nematodes *Ancylostoma bidens* (Freitas, 1951), *Ancylostoma braziliense* (Faria, 1910), *Dirofilaria immitis* (Vicente et al., 1997), *Dirofilaria* sp., *Diectophyma renale* (Lutz, 1924), *Necator urichi* (Cameron, 1936), *Skrjabinoclava thapari* (Freitas, 1953), *Pearsonema pearsoni* (Freitas & Mendonça, 1960), *Toxocara alienata* (Sprent, 1982), *Toxocara canis* (Stiles & Hassal, 1905), the cestodes *Diphyllobothrium trinitatis* (Cameron, 1936), *Diphyllobothrium* sp., and the trematodes *Alaria alata* (Viana, 1924), *Alaria nattereri* (Lutz, 1933), *Athesmia heterolecithodes* (Freitas, 1962) and *Schistosoma mansoni* (Coelho et al., 1976). In addition to these species, the acanthocephalus *Pachysentis procyonis* is described as the only crab-eating raccoon parasite in Brazil (Schmidt, 1972; Vieira et al., 2008).

This study reports the occurrence of *Oncicola luehei* parasitizing an adult male crab-eating raccoon found dead on the BR-455 highway near the city of Uberlândia, Minas Gerais.

The animal was a road killing victim on the BR-455 highway and collected as part of a study that monitors wildlife road killing in the Triângulo Mineiro region. The necropsy was performed at the Wild Animal Research Laboratory (LAPAS) of the Federal University of Uberlândia. All the procedures adopted in this study were approved by the Chico Mendes Institute for Biodiversity Conservation (SISBIO protocol 70460-1) and the Uberlândia Federal University Animal Use Ethics Committee (CEUA/UFU protocol nº A015/19).

The abdominal and thoracic cavities were opened and the organs of the cardiopulmonary system, liver, gallbladder, kidneys and bladder carefully inspected visually and under stereoscopic microscope in search for parasites.

The gastrointestinal portions (stomach, duodenum, jejunum, ileum, cecum, colon and rectum) were removed, individualized, slit open on a metallic tray and thoroughly washed. The resulting material was sieved in 100 µm mesh and the retained solution fixed in Railliet & Henry solution for subsequent collection of parasites under the stereoscopic microscope.

The only helminth found was recovered from the large intestine, fixed in 70% ethanol and stored in an identified vial for later identification. The parasite was clarified with beech creosote and mounted on slides for specific identification. Taxonomic evaluation was based on morphological and morphometric assessment compared to Machado Filho (1950). Images and morphometric data were obtained with an Olympus BX-51 microscope attached to a Q Color 3 camera (Olympus, Tokyo, Japan) and processed by ImagePro Plus v. 4.0 software. The adult helminth was identified as *Oncicola luehei*.

Oncicola luehei (Travassos, 1917)

General Description (1 male): Wrinkled, curved body, 15.88mm long and 1,68 mm wide. Globular proboscis armed with six rows of six spiral hooks measuring 0.71 x 0.81mm, proboscis sheath measuring 0,73 mm (Figures 1A and 1B). Long lemnisci (7.30 x 0.81 mm) extending beyond the anterior testicular edge (Figure 1C). The genital tract consists of ellipsoid, tandem pair of testes (anterior testis: 1.44 x 0.53mm; posterior testis: 1.5 x 0.50mm) located in the median region of the body (Figure 1C); eight cement glands (averaging 0.38 x 0.46 mm and their group 1.91 and 1.88 mm) arranged in two rows of four (Figure 1D), followed by a large ejaculatory duct. Blunt tail ending (Figure 1E). The morphological and morphometric characteristics of the parasite are compatible with *Oncicola luehei* (Machado Filho, 1950). Vouchers were deposited in the helminthological collection of the Parasitic Diseases Laboratory (LADOP) at the Federal University of Uberlândia.

This acanthocephalan species was originally described by Travassos (1917) in the large intestine of *Nasua nasua* in the municipalities of Franca and Piedade, São Paulo State. Later, this parasite was described in a ring-tailed coati from São Joao and Salobra, Mato Grosso State, Lassance, in Minas Gerais State, and Belém, Pará State, (Travassos et al., 1927; Lent & Freitas, 1938; Machado Filho, 1940; Machado Filho, 1950). The acanthocephalan described in crab-eating raccoons, *Pachysentis procyonis*, is easily distinguished from the diagnosed helminth by the shape and length of the lemniscus, and dimensions of the testes and cement glands (Machado Filho, 1950).

Even though the time between the roadkill and the parasitological assessment of the animal is unknown, the advanced autolysis of the carcass indicates death occurred a few days before collection. Even so, well preserved helminth specimens were collected, adequate for morphological analyses. Therefore, carcasses resulting from road killing events may be an important source of information on wildlife parasitology.

Host related factors such as body weight, diet, metabolic rate and population density may influence the diversity of parasite species in their populations (Nunn et al., 2005). Coatis (*Nasua nasua*) and raccoons (*Procyon cancrivorus*) have a similar diet composed of small arthropods such as beetles, spiders and crabs (Whiteside, 2009), allowing the transmission of acanthocephalus through ingestion of these intermediate hosts infected with the larval form of the parasite (cystacanth). These procyonids can still live in sympatry, contributing to the exchange of helminth species between the two animal species.

This paper is the first formal description of *Oncicola luehei* in a crab-eating raccoon (*Procyon cancrivorus*), representing a new host and locality report.

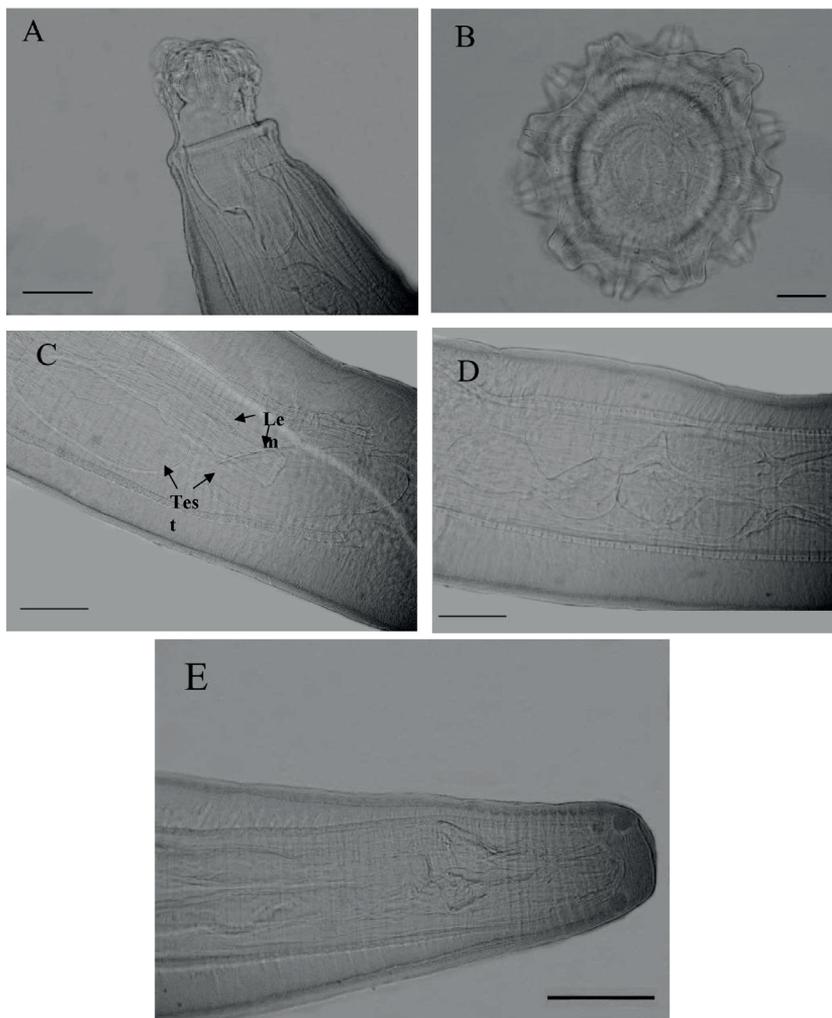


Figure 1. (A) Male anterior extremity. 40x magnification. Bar: 500 μ m. (B) Proboscis cross-section showing the six spearhead-like hooks. 100x magnification. Bar: 200 μ m. (C) Lemniscus (Lem) reaching the posterior testis. Pair of testes (Test) arranged in tandem. 40x magnification. Bar: 500 μ m. (D) Cement glands (Cg). 40x magnification. Bar: 500 μ m. (E) Male posterior extremity. 40x magnification. Bar: 500 μ m.

REFERENCES

1. Adams CE. Road-killed animals as resources for ecological studies. *Am Bio Teach* 45: 256-261, 1983.
2. Cameron TWM. Studies on the endoparasitic fauna of Trinidad. III Some parasites of Trinidad Carnivores. *Can J Res* 14: 25-38, 1936.
3. Coelho PMZ, Dias M, Mayrink W, Magalhaes PA, Melo MN, Costa CA. Crab-eating Raccoon, *Procyon cancrivorus nigripes* (Mivart 1885) (Carnivora: Procyonidae) Naturally Infected with *Schistosoma mansoni* in Minas Gerais State, Brazil. *J Parasitol* 62: 748, 1976.
4. Faria G. Contribuição para a sistemática helmintológica brasileira. III. *Ancylostomum braziliense* n. sp. Parasito dos gatos e cães. *Mem Inst Oswaldo Cruz* 2: 286-293, 1910.
5. Freitas, JF. Alguns “Strongyloidea” parasitos de “*Procyon cancrivorus*” (Cuv.) (Nematoda). *Rev Brasil Biol* 11: 189-202, 1951.
6. Freitas JFT. “Echinuriinae” parasito de mamífero (Nematoda, Spiruroidea). In: Dayal, J., Singh, KS. *Thapar Commemoration Volume. A collection of articles presented to Prof. G.S. Thapar on his 60th Birthday*. University of Lucknow. Lucknow, 1953.
7. Freitas JF, Mendonça J. Novo nematódeo parasito de *Procyon cancrivorus* Cuv.: *Pearsonema pearsoni* gen. Nov., sp. Nov. (Trichuroidea, Capillariidae). *Atas Soc Biol Rio de Janeiro* 4: 63-66, 1960.
8. Freitas JFT. Notas sobre o gênero *Athesmia* Looss, 1899. *Arq Mus Nac* 52: 85-104, 1962
9. Lent H, Freitas JFT. Pesquisas helmintológicas realizadas no estado do Pará. VI. Acanthocephala. *Mem Inst Oswaldo Cruz* 33: 455-459, 1938.
10. Lima VR, Pereira FC, Pereira KF. Estudo morfológico dos músculos do antebraço de mão-pelada, *Procyon cancrivorus* Cuvier, 1798. *Biosc J* 26: 109-114, 2010.
11. Lutz A. *Dioctophyme renalis* (*Eustrongylus gigas*). *Cr Séances Soc biol Ses fil* 90: 696, 1924
12. Lutz A. Considerações sobre o *Distomum tetracystis* Gastaldi e formas semelhantes, erroneamente chamadas Agamodistomos. *Mem Inst Oswaldo Cruz* 27: 33-49, 1933.
13. Machado Filho DA. Pesquisas helmintológicas realizadas no estado de Mato Grosso -Acanthocephala. *Mem Inst Oswaldo Cruz* 35: 593-601, 1940.
14. Machado Filho DA. Revisão do gênero *Prostenorchis* Travassos 1915 (Acanthocephala). *Mem Inst Oswaldo Cruz* 48: 495-544, 1950.
15. Nunn C, Altizer S, Jones KE, Sechrest WA, Cunningham A. Latitudinal gradients of parasite species richness in primates. *Divers Distrib* 11: 249-256, 2005.
16. Orlandin E, Piovesan M, Favretto MA, D’Agostini FM. Mamíferos de médio e grande porte atropelados no Oeste de Santa Catarina, Brasil. *Biota Amazonia* 5: 125-130, 2015.
17. Reis NR, Peracchi AL, PedroWA, Lima IP. *Mamíferos do Brasil*. Editora Universidade Estadual de Londrina. Londrina, 2006.
18. Schmidt GD. Revision of the Class Archiacanthocephala Meyer, 1931 (Phylum Acanthocephala) with Emphasis on Oligacanthorhynchidae Southwell et Macfie, 1925. *J Parasitol* 58: 290-297, 1972.
19. Sprent JF. Ascaridoid nematodes of South American mammals, with a definition of a new genus. *J Helminth* 56: 275-295, 1982.
20. Stiles W, Hassal A. *The determination of generic types, and a list of roundworm genera with their original and type species*. Government Print Office. Washington, 1905.
21. Travassos L. Contribuições para o conhecimento da fauna helmintológica brasileira: VI Revisão dos acantocéfalos brasileiros, parte I Giganthorhynchidae Hamann, 1892. *Mem Inst Oswaldo Cruz* 9: 5-62, 1917.

22. Travassos L, Pinto C, Muniz J. Excursão científica ao Estado de Matto Grosso na Zona do Pantanal (margens dos rios S. Lourenço e Cuyabá) realizada em 1922. *Mem Inst Oswaldo Cruz* 20: 249-269, 1927.
23. Vicente JJ, Rodrigues HO, Gomes DC, Pinto RM. Nematóides do Brasil. Parte V: Nematóides de Mamíferos. *Rev Bras Zool* 14: 1-452, 1997.
24. Viana L. Tentativa de catalogação das espécies brasileiras de trematodeos. *Mem Inst Oswaldo Cruz* 17: 95-227, 1924.
25. Vieira FM, Luque JL, Muniz-Pereira LC. Checklist of helminth parasites in wild carnivore mammals from Brazil. *Zootaxa* 1721: 1-23, 2008.
26. Whiteside DP. Nutrition and Behavior of Coatis and Raccoons. *Vet Clin North Am Exot Anim Pract* 12: 187-95, 2009.