

KIDNEY LESIONS RELATED TO TREMATODE INFESTATION IN A CABOT'S TERN *THALASSEUS ACUFLAVIDUS* FOUND IN BRAZIL

RAFAELA N.R. CARDOSO¹, HASSAN JERDY², PAULA BALDASSIN³, EULÓGIO C.Q. CARVALHO² & MAX R. WERNECK^{3*}

¹MRCVS, 23 Wyvern Road, Ipswich, Suffolk IP3 9TJ, Great Britain

²Laboratório de morfologia e patologia animal (LMPA) – Setor de anatomia patológica – Universidade Estadual do Norte Fluminense Darcy Ribeiro – UENF, Campos dos Goytacazes, Rio de Janeiro 28013-602, Brazil

³BW Institute, Rua Sueli Brasil Flores 88 Praia Seca, Araruama, Rio de Janeiro 28970-000, Brazil *(max@bwvet.com.br)

Received 26 November 2019, accepted 21 January 2021

ABSTRACT

CARDOSO, R., JERDY, H., BALDASSIN, P., CARVALHO, E.C.Q. & WERNECK, M.R. 2021. Kidney lesions related to trematode infestation in a Cabot's Tern *Thalasseus acuflavidus* found in Brazil. *Marine Ornithology* 49: 179–181.

We describe the occurrence of the trematode *Renicola* sp. associated with kidney lesions in a Cabot's Tern *Thalasseus acuflavidus* from Brazil. During necropsy, we observed renal paleness, subpleural hemorrhage at the edges of the organ, and severe dilation of both ureters. Histological analysis revealed distension of the branches of the ureters, with partial obstruction due to the presence of the parasites and compression of adjacent tubules. The infection did not likely cause the tern's death.

Key words: Brazil, Cabot's Tern, kidney lesions, *Renicola* sp., *Thalasseus acuflavidus*, Trematoda

Cabot's Tern *Thalasseus acuflavidus* has a broad geographic distribution, occurring from the Atlantic coast of the United States to the coast of Argentina (Fracasso *et al.* 2011). Its taxonomic status has been the subject of debate, with the latest proposal classifying it as a *Thalasseus* subspecies based on genetic analysis. Due to recent taxonomic revision (Efe *et al.* 2009), the conservation status of Cabot's Tern has not yet been evaluated, but it may be one of the most vulnerable coastal species in Brazil (Efe & Bonato 2011).

Very little is known about parasites in Cabot's Tern from Brazil, with only two published records of parasitic infection (i.e., *Galactosomum cochlear* and *G. cochleariforme*; see Fernandes *et al.* 2015) in this species. To broaden existing knowledge, this note describes the occurrence of *Renicola* sp. (Trematoda) and associated tissue lesions in an adult Cabot's Tern found on the coast of Rio de Janeiro, Brazil.

In March 2017, a Cabot's Tern was found on Sepetiba Beach (22°58'36.984"S, 043°42'21.744"W), Rio de Janeiro. The bird was a thin adult male weighing 0.200 kg, with underdeveloped pectoral musculature, bilateral pododermatitis, and diarrhea. Though initially alert, despite attempts to feed and hydrate the bird, by the third day it was found dead with no clinical signs of illness beyond those initially described.

Tissue samples were collected, fixed in 10% buffered formalin for at least 48 h, processed according to routine histological techniques, embedded in paraffin, sectioned (5 µm), and stained with hematoxylin and eosin (HE) for subsequent microscopic analysis. The kidneys, heart, liver, and digestive tract were submitted for parasitological analysis by opening each organ and directly analyzing their tissues in a Petri dish under a stereomicroscope.

Renal paleness was verified upon sectioning the kidneys, and parasites were found firmly adhered to the renal medulla, with discrete subpleural hemorrhage on the edges of the organ and severe dilation of both ureters.

The parasites were collected using needles and brushes, transferred to a Petri dish, washed in saline solution, and fixed in 70% alcohol. The helminths were deposited in the Helminthological Collection of the Instituto Oswaldo Cruz (CHIOC number 38966), state of Rio de Janeiro, Brazil. Tissues and samples were analyzed under a microscope (Nikon Eclipse 80i, Kurobane Nikon Co., Ltd., Otawara, Tochigi, Japan) using the NIS-Elements-BR software. The results of the morphometric analysis were expressed in micrometers [mean (range)].

Histological analysis revealed accentuated multifocal distension of the branches of the ureter, which were, in places, partially obstructed by one or two parasites and a large quantity of eggs with a brownish wall. Moreover, the renal tubules adjacent to the infected tubules were compressed (Fig. 1).

Parasitological analysis revealed the presence of 13 trematodes. The following aspects were recorded: location in the host; shape (rounded anteriorly and tapered posteriorly); sub-terminal oral sucker; small acetabulum in some specimens; follicles located on the side of the body that extended to near the level of the oral sucker; evident uterine loops that covered a large part of the body; vitellaria not observed due to the uterine loops. The features observed allowed us to identify the parasites found in the kidneys as trematodes of the genus *Renicola* (Digenea: Renicolidae). Unfortunately, despite the number of parasites found, due to their fragile nature, most were damaged or even broken during removal from the tissue, rendering it impossible

to observe intact individuals. Therefore, we were constrained to identify only to the genus level. Based on morphometric data taken from six specimens, the average dimensions of the parasites were as follows: length 1 301 μm (1 062–1 495 μm), width 569 μm (323–709 μm), oral sucker 270 μm , and acetabulum 245 μm (230–260 μm).

All specimens were compatible with the description of the genus proposed by Gibson (2008), specifically the body shape, the presence and location of suckers, and the location of uterine loops in the body. However, the presence of two testicles in tandem, as described by Gibson (2008), was inconclusive due to the numerous uterine loops, which obstructed a large part of the internal structures of the parasites.

Lesions caused by *Renicola* sp. are generally limited to the dilation of ducts in which the parasites are found, tubular compression around the infected collector ducts, and mild inflammatory infiltrate composed of eosinophils, plasmocytes, and lymphocytes (Wright 1954, Jerdy *et al.* 2016). Jacobson *et al.* (1980) described the presence of the genus *Renicola* in a specimen of Royal Tern *T. maximus* found in Florida, USA, but no significant lesions were found in the host beyond compression and occlusion of the adjacent renal parenchyma. Thus, there was no mention of the possible clinical effects on the bird in question. In Magellanic penguins *Spheniscus magellanicus*, additional findings included fibrosis, corneal metaplasia, and dysplasia (Jerdy *et al.* 2016). In the present study, the lesions were mild and were limited to tubular compression caused by ectasia associated with the presence of the parasites; therefore, it is unlikely that they were the cause of death of the bird analyzed.

Very little is known about the presence and effects of the genus *Renicola* in Brazil, with few hosts identified. Wright (1954) described *R. cruzi* in the renal tubules of Royal Tern and South American Tern *Sterna hirundinacea*. The author also described

the occurrence of members of the genus *Renicola* in the renal tubules of Kelp Gull *Larus dominicanus* and Brown Booby *Sula leucogaster*, while Teixeira de Freitas (1955) described *R. mirandaribeiroi* in the kidneys of Brown Booby. Nearly 60 years later, Pinto & Melo (2012) described the occurrence of cercaria of the genus *Renicola* in *Melanoides tuberculata* (Mollusca: Thiariidae). Subsequently, Jerdy *et al.* (2016) described *Renicola* sp. associated with renal lesions in Magellanic penguins found on the coast of Brazil. More recently, Matos *et al.* (2019) described the occurrence of *R. sloanei* in Manx Shearwater *Puffinus puffinus*.

Unfortunately, few animals are routinely screened for the presence of renal trematodes on the Brazilian coast, which makes it difficult to gain a more comprehensive view of trematode parasitosis, including its interactions with and true impacts on marine bird populations. At present, there is little data on trematodes in Cabot's Tern in Brazil, with reports limited to infestation of this marine bird species with *Galactosomum cochlear*, *G. cochleariforme*, and now, trematodes of the genus *Renicola* (current report).

ACKNOWLEDGMENTS

Biological samples were obtained through the beach monitoring project, which is a requirement established by the federal Environmental Licensing Division of the Brazilian Environmental Agency (IBAMA), for the exploration of oil and gas by Petrobras in the Santos Basin Pre-salt Province. BW Institute is a non-governmental organization (NGO) involved with environmental education and veterinary medicine activities. One of our aims is to disseminate scientific studies that may contribute to the conservation of marine organisms. We thank anonymous reviewers for their comments that helped to improve our paper.

REFERENCES

- EFE, M.A. & BONATTO, S.L. 2011. Evaluation of the status of conservation of the Cabot's Tern (*Thalasseus acuflavidus*) in Brazil. *Revista Brasileira de Ornitologia* 19: 358–363.
- EFE, M.A., TAVARES, E.S., BAKER, A.J. & BONATTO, S. L. 2009. Multigene phylogeny and DNA barcoding indicate that the Sandwich tern complex (*Thalasseus sandvicensis*, Laridae, Sternini) comprises two species. *Molecular Phylogenetics and Evolution* 52: 263–267.
- FERNANDES, B.M.M., JUSTO, M.C.N., CÁRDENAS, M.Q., COHEN, S.C. 2015. *South American Trematodes parasites of birds and mammals*. Rio de Janeiro, Brazil: Oficina de Livros.
- FRACASSO, H.A.A., BRANCO, J.O. & BARBIERI, E. 2011. Reproductive biology of Cabot's Terns on Cardoso Island, Santa Catarina, Brazil. *Biota Neotropica* 11: 75–81. doi:10.1590/S1676-06032011000300005
- GIBSON, D.I. 2008. Family Rencolidae. In: R.A. BRAY, R.A., GIBSON, D.I., JONES, A. (Eds.) *Keys to the Trematoda*. Vol. 3. London, UK: CABI Publishing.
- JACOBSON, E.R., RAPHAEL, B.L., NGUYEN, H.T., GREINER, E.C. & GROSS, T. 1980. Avian pox infection, aspergillosis and renal trematodiasis in a Royal Tern. *Journal of Wildlife Diseases* 16: 627–631. doi:10.7589/0090-3558-16.4.627

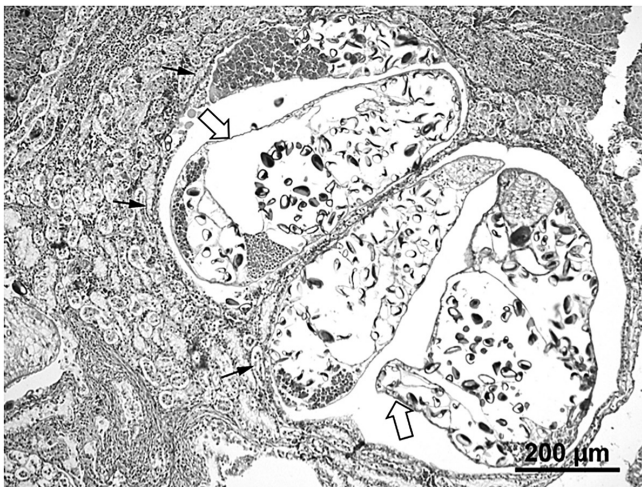


Fig. 1. Histological sections of the kidney showing branches of ureter with accented dilation due to infection with *Renicola* sp. (open arrows), replete with eggs. Peripheral to infected ureters, the renal parenchyma is compressed (closed arrows).

- JERDY, H., BALDASSIN, P., WERNECK, M.R., BIANCHI, M., BITTENCOURT, R.R. & CARVALHO, E.C. 2016. First report of kidney lesions due to *Renicola* sp. (Digenea: Trematoda) in free living Magellanic penguins (*Spheniscus magellanicus* Forster, 1781) found on the coast of Brazil. *Journal of Parasitology* 102: 650–652. doi:10.1645/16-29
- MATOS, A.M.R.N., LAVORENTE, F.L.P., LORENZETTI, E. ET AL. 2019. Molecular identification and histological aspects of *Renicola sloanei* (Digenea: Rencolidae) in *Puffinus puffinus* (Procellariiformes): a first record. *Brazilian Journal of Veterinary Parasitology*. 28: 367–375. doi:10.1590/s1984-29612019025
- PINTO, H.A. & MELO, A.L. 2012. *Melanooides tuberculata* (Mollusca: Thiaridae) harboring renicollid cercariae (Trematoda: Rencolidae) in Brazil. *Journal of Parasitology* 98: 784–787. doi:10.1645/GE-2937.1
- TEIXEIRA DE FREITAS, J.F. 1955. Sobre dois trematódeos parasitos de aves: *Philophthalmum lachrymosus* Braun, 1902 e *Renicola mirandaribeiroi* n. sp. *Arquivos do Museu Nacional Rio de Janeiro* 42: 585–610.
- WRIGHT, C. A. 1954. Trematodes of the genus “*Renicola*” from the kidneys of birds in Brazil. *Revista Brasileira de Biologia* 14: 61–64.
-