PANAMJAS
Pan-American Journal of Aquatic Sciences

Scientific Note

Gastrointestinal helminths of *Trachemys dorbigni* Duméril & Bibron, 1835 (Testudines, Emydidae) from artificial urban ponds in southern Brazil

FABIANA F. BERNARDON*, ANA LUISA VALENTE & GERTRUD MÜLLER

*Universidade Federal de Pelotas, Instituto de Biologia, Departamento de Microbiologia e Parasitologia, Programa de Pós-graduação em Parasitologia, Campus universitário s/nº CEP 96010-900, Capão do Leão, Rio Grande do Sul, Brasil. *Corresponding author: fabifedatto@gmail.com*

Abstract. Parasitological studies on the D'Orbigny's slider turtle, *Trachemys dorbigni*, are punctual. This study characterizes the first occurrence of Nematode for this host, in case, *Spiroxys* sp., *Camallanus* sp.. Also does the record of this trematode *Cheloniodiplostomum* sp. parasitizing *T. dorbigni* in Brazil.

Key words: nematode, digenean, chelonianc D'Orbigny's slider turtle

Resumo. Helmintos gastrintestinais de *Trachemys dorbigni* (Testudines: Emydidae) tigre-d'água, de lagos artificiais urbanos, no sul do Brasil. Estudos parasitológicos sobre o tigre d'água, *Trachemys dorbigni*, são pontuais. Este trabalho caracteriza a primeira ocorrência de Nematoda para este hospedeiro, no caso, *Spiroxys* sp., *Camallanus* sp. Além disso faz o registro do trematódeo *Cheloniodiplostomum* sp. parasitando *T. dorbigni* no Brasil.

Palavras chave: nematoda, digenea, quelônio, tigre d'água

Trachemys dorbigni Duméril & Bibron, 1835 D'Orbigny's slider turtle, is a native of Rio Grande do Sul State, Brazil, and it is one of the most abundant turtles in this state (Bujes, 2010). It is often found in wetlands ecosystems, rivers and ponds in urban environments. Its occurrence is also known in Uruguay and Argentina (Lema & Ferreira 1990, Iverson 1992). Parasitological studies on the species are scarce, especially in Brazil.

Four species of Platyhelminthes were recorded associated with *T. dorbigni*: *Polystomoides rhodei* Mañé-Garzón & Holcmann-Spector, 1968 (Polystomatidae) (Lenis & Garcia-Prieto 2009), *Telorchis dubis* Mañe-Garzón & Holcmann-Spector, 1968 (Mañe-Garzón & Holcmann-Spector 1968), *Telorchis achavali* Mané-Garzon & Holcmann-Spector, 1973 (Mané-Garzon & Holcmann-Spector 1973) (Telorchiidae) in Uruguay and *Temnocephala brevicornis*, Monticelli 1889 (Temnocephalidae) in Brazil (Yuki *et al*. 1993).

Due to lack of information about helminth parasite species in this chelonian and to contribute to the knowledge of their diversity in one of the most abundant turtles from the State of Rio Grande do Sul, the study aimed to report the presence of nematodes and digeneans infecting *T. dorbigni* specimens living in two urban ponds in southern Brazil and quantify infections via parameters of prevalence, mean abundance and mean intensity of infection.

Stomach and intestines of 19 adults of *T. dorbigni* were examined. The chelonians were from two urban artificial ponds in the Central Bus Station (31º45'24'' S; 52º21'30'' W) and in Coronel Pedro Osório Square (31º 46'12.34" S; 52º 20' 25.84" W) in the municipality of Pelotas, RS, Brazil. Seventy turtles were removed from the ponds during their annual cleaning and sent to the Núcleo de Reabilitação da Fauna Silvestre e Centro de Triagem de Animais Silvestres at Universidade Federal de

Pelotas (NURFS-CETAS/UFPel). They were kept under quarantine in tanks for four months. During this period, the chelonians received no anthelmintic treatment. The digestive tracts of died turtles were removed, frozen at -20°C, and thawed before analyses.

The stomach and the small and large intestines were opened and washed through a 150μm sieve. The material retained on the sieve and mucous membranes were inspected under a stereomicroscope with magnification of 10X-40X for collection of helminths. The preparation of helminths followed Amato & Amato (2010), and identification was based on morphological and morphometric characteristic following Vicente *et al*. (1993) and Chabaud (2009) for nematodes, Travassos *et al.* (1969) and Niewidomska (2002) for the digenean. Prevalence, mean abundance and mean intensity were calculated according to Bush *et al*. (1997). The Vouchers were deposited in the Helminthological Collection of the Laboratório de Parasitologia de Animais Silvestres Nº 298 – 302, Instituto de Biologia, Universidade Federal de Pelotas.

Were identified *Spiroxys* sp. (Nematoda, Gnathostomatidae) (n=55), *Camallanus* sp. (Nematoda, Camallanidae) (n=76) and *Cheloniodiplostomum* sp. (Trematoda, Proterodiplostomidae) (n=101). Parasitological parameters and sites of infection are described in Table 1. The material remained frozen for a long time which influenced the morphology of helminths not allowing the satisfactory identification to the specific level of the same. Importantly, the non-reporting of representatives of groups Monogenoidea and Temnocephalida is justified by the fact that no urinary bladder and oral cavity or external body surface have been examined.

In Brazil, there are records of nematodes *Spiroxys figueiredoi* (Freitas & Dobbin, 1962) infecting the stomach of scorpion mud turtle, *Kinosternon scorpioides scorpioides* Linnaeus, 1766 (Testudines, Kinosternidae) from the State of Pernambuco (Freitas & Dobbin 1962) and from Pará State (Vicente 1966). *Spiroxys* sp. was recorded parasitizing Vanderhaege's toad-headed turtle, *Mesoclemmys vanderhaegei* (Bour, 1973) (Testudines, Chelidae) from Mato Grosso State (Ávila *et al*. 2010).

In the State of Rio Grande do Sul, *Spiroxys* sp. was reported parasitizing the stomach and small intestine of *Phrynops hilarii* (Duméril & Bibron 1835) (Testudines, Chelidae) (Bernardon *et al*. 2013). *Spiroxys contortus* (Rudolphi, 1819) and larvae of *Spiroxys* spp. parasitizing the stomach of *Acanthochelys spixii* (Duméril & Bibron 1835) (Testudines, Chelidae) and *S. contortus* in the esophagus, stomach, small and large intestines and the cavity of *Hydromedusa tectifera* Cope, 1870 (Testudines, Chelidae) (Mascarenhas *et al.* 2013).

Infections by species of *Camallanus* in chelonians are known worldwide. In Brazil, *Camallanus amazonicus* Ribeiro, 1940 was found infecting the small intestine of *Podocnemis expansa* (Schweigger, 1812) in Pará State (Ribeiro 1940). In Rio Grande do Sul State *Camallanus* sp. was found parasitizing the stomach and small intestine of *P. hilarii* (Bernardon *et al.* 2013), and small intestine of *H. tectifera* (Mascarenhas *et al.* 2013). Larvae *Camallanus* spp. and *Camallanus* sp. were recorded in the small intestine of *A. spixii* (Mascarenhas *et al.* 2013).

Cheloniodiplostomum comprises a single species, *C. testudinis* (Dubois, 1936) (Niewidomska 2002). Life cycle of this trematode is not known, its taxonomy was originally described as *Herpetodiplostomum* Dubois, 1936 and it was transferred to the current status by Sudarikov in 1960. Infection with *H. delillei* Zerecero, 1948 was quoted in the intestine of turtles *Chelydra serpentina* Linnaeus, 1758 and *Claudius angustatus* Cope, 1865 in Mexico (Thatcher, 1963), species described as *H. delillei* were transferred to the genus *Cheloniodiplostomum*, this inclusion was confirmed in 1979 (Paredes-León *et al.*2008).

In Brazil, *C. testudinis* was reported parasitizing the intestine of a tortoise whose species has not been identified and its provenance was not reported (Travassos *et al.* 1969). In the Rio Grande do Sul State *Cheloniodiplostomum* sp. was recorded in the stomach and small intestine of seven *P. hilarii* (Bernardon *et al*. 2013).

The nematodes found in this study showed a relatively high prevalence (Table 1) with low intensity of infection while *Cheloniodiplostomum* sp. showed high intensity of infection with low prevalence, because only one host was positive for their digenean. Unfortunately it was not possible to compare the parasitological indices with other studies, because the number of hosts examined were different or the information was non-existent.

According to Anderson (2000), species of *Camallanus* and *Spiroxys* have heteroxenous cycles, one of their known intermediate hosts is the species of copepod of the genus *Cyclops*. They are present in waterways and can easily be ingested accidentally or intentionally along with vegetation resulting in infection of the definitive host.

Therefore it is reported, for the first time, the occurrence of the nematode *Camallanus* sp. and

Spiroxys sp. and digenean *Cheloniodiplostomum* sp. parasitizing *Trachemys dorbigni* in Brazil, contributing and expanding the knowledge of parasite diversity of chelonian.

Table 1. Parasitological indices and site of infection of helminths of nineteen specimens of *Trachemys dorbigni* Duméril & Bibron, 1835 (Testudines, Emydidae) collected in ponds of a urban area in Pelotas, Rio Grande do Sul, Brazil.

Helminths	Site of Infection	Prevalence (%)	Mean Abundance of infection (±SD)	Mean Intensity of infection (±SD)
Nematoda				
Spiroxys sp.	Stomach and SI	68.40	2.89 ± 4.94	4.23 ± 5.91
Camallanus sp.	SI	78.90	4.0 ± 7.36	5.06 ± 7.99
Trematoda				
Cheloniodiplostomum sp.	SI	5.26	5.31	101

SI = Small intestine
SD = standard deviation

Acknowledgments
We thank the Núcleo de Reabilitação da Fauna Silvestre e Centro de Triagem de Animais Silvestres from the Pelotas Federal University (NURFS-CETAS/ UFPel) for kindly donating the material to the Laboratório de Parasitologia de Animais Silvestres, so that the work could be done.

References

Amato, J. F. R. & Amato, S. B. 2010. Técnicas gerais para coleta e preparação de helmintos endoparasitos de aves. Pp. 367-397. *In:* **Ornitologia e conservação: ciência aplicada, técnicas de pesquisa e levantamento.** Technical Books, Rio de Janeiro, Brazil, 516p.

Anderson, R. C. 2000. **Nematode Parasites of Vertebrates: Their Development and Transmission.** CABI International, London, UK, 650 p.

Ávila, R. W., Brito, E. S., Barrella, T. H., Strussmann, C., & Silva, R. 2010. Endoparasites new to the neotropical freshwater turtle, *Mesoclemmys vanderhaegei* (Bour, 1973) (Testudines, Chelidae) from central Brazil. **Pan-American Journal of Aquatic Sciences**, 5(3): 478**–**480.

Bernardon, F. F., Valente, A. L. & Müller, G. 2013. Gastrointestinal helminthes of the Argentine side-necked turtle, *Phrynops hilarii* (Duméril & Bibron, 1835) (Testudines, Chelidae), in south Brazil. **Pan-American Journal of Aquatic Sciences**, 8(1): 55–57.

Bujes, C. 2010. Os testudines continentais do Rio Grande do Sul, Brasil: taxonomia, história natural e conservação. **Iheringia, Série Zoologia**, 100(4): 413–424.

Bush, A. G., Lafferty, K., Lotz, J. & Shostak, A . 1997. Parasitology meets ecology on its own terms: Margolis *et al.* revisited. **Journal of Parasitology,** 83: 575–583.

Chabaud, A. G. 2009. Spirurida: Camallanoidea, Dracunculoidea, Gnathostomatoidea, Physalopterodea, Rictularoidea and Thelazioidea Pp. 334–360. *In:* Anderson, R. C., Chabaud, A. G. & Willmott, S. **Keys to the Nematode Parasites of Vertebrates.** Archival Volume, British Library, London, UK, 463p.

Freitas, J. F. T. & Dobbin Jr., J. 1962. Contribuição ao estudo de *Spiroxys figueiredoi*. **Atas da Sociedade de Biologia**, 1: 1–14.

Iverson, J. 1992. A revised checklist with distribution maps of the turtles of the world. **Richmond: Editado pelo autor**, 363 p.

Lema, T. & Ferreira, M. T. S. 1990. Contribuição ao conhecimento dos testudines do Rio Grande do Sul (Brasil**)** – Lista sistemática comentada. **Acta Biologica Leopoldensia,** 12(1): 125–164.

Lenis, C. & García-Prieto, L. 2009. *Polystomoides magdalenensis* n. sp. (Monogenoidea: Polystomatidae), a parasite of bucal cavity of *Trachemys callirostris callirostris* (Testudinata: Emydidae) from Colombia. **Journal of Parasitology,** 95 (4): 850–854.

Mañé-Garzón, F. & Holcman-Spector, B. 1968. Trematodos de las tortugas del Uruguay, VIII. Uma nueva especie del género *Telorchis* (Lühe, 1900) del intestino de *Pseudemys*

dorbigni (Dum. & Bib.). **Comunicaciones Zoologicas del Museo de Historia Natural de Montevideo**, 9(121): 1– 4.

Mañé-Garzón, F. & Holcman-Spector, B. 1973. Trematodos de las tortugas del Uruguay, X. *Telorchis achavali* n.sp. del intestino delgado de *Pseudemys dorbigni* (D. & B.). **Revista de Biologia del Uruguay,** 1: 5–9.

Mascarenhas, C. S., Souza, J. D., Coimbra, M. A. A. & Müller, G. 2013. Nematode parasites of Chelidae (Testudines) from Southern Brazil. **Parasitology Research, 112(9): 3365-3368.** Available in: http://link.springer.com/article/10.1007/s00436-013-3503-3 (10/09/2013).

Niewidomska, K. 2002. *In:* Gibson, D. I., Jones, A. & Bray, R. A. Pp. 215-229. **Keys to the Trematoda (1)**. CAB International and the Natural History Museum, London, UK, 521p.

Paredes-León, R., García-Prieto, L., Guzmán-Cornejo, C., León-Regagnon, V. & Pérez, T. M. 2008. Metazoan parasites of Mexican amphibians and reptiles. **Zootaxa,** 166p.

Ribeiro, D. J. 1940. Pesquisas helmintológicas realisadas no Estado do Pará VIII - *Camallanus amazonicus* n. sp. parasito de *Podocnemis expansa* (Schw.). **Memórias do Instituto Oswaldo Cruz,** 35(4): 723–727.

Thatcher, V. E. 1963. Trematodes of turtles from Tabasco, México, with a description of a new species of *Dadaytrema* (Trematoda: Paramphistomidae). **The American Midland Naturalist,** 70(2): 347–355.

Travassos, L., Freitas, J. F. K. & Kohn, A. 1969. Trematódeos do Brasil. **Memórias do Instituto Oswaldo Cruz,** 67(1): 886.

Vicente, J. J., Rodrigues, H. O., Gomes, D. C. & Pinto, R. M. 1993. Nematóides do Brasil, Parte III: Nematóides de répteis. **Revista Brasileira de Zoologia**, 10(1): 19–168.

Vicente, J. J. 1966. Contribuição ao estudo de *Spiroxys figueiredoi* Freitas & Dobbin, 1962 (Nematoda, Spiruroidea). **Atas Sociedade de Biologia,** 10(1): 7–8.

Yuki, V. L. F., Damborenea, M. C. & Mallmann, M. T. O. 1993. *Acanthocehlys spixii* (Duméril *et* Birbron, 1835) (Chelidae) e *Trachemys dorbigni* (Duméril *et* Bibron, 1835) (Emydidae) (Testudines) como hospedeiros de *Temnocephala brevicornis* Monticelli, 1889 (Temnocephalidae) (Platyhelminthes). **Comunicações do Museu de Ciências da PUCRS Série Zoológica,** 6: 75– 83.

Received November 2013
Accepted May 2014
Published online May 2014