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RESEARCH NOTE / NOTA CIENTÍFICA

STYPHLOTREMA SOLITARIA LOOSS, 1899 (DIGENEA, STYPHLOTREMATIDAE) INFECTING *ERETMOCHELYS IMBRICATA* LINNAEUS 1758 (TESTUDINES, CHELONIDAE) IN BRAZIL

INFECCIÓN POR *STYPHLOTREMA SOLITARIA* LOOSS, 1899 (DIGENEA, STYPHLOTREMATIDAE) EN *ERETMOCHELYS IMBRICATA* LINNAEUS 1758 (TESTUDINES, CHELONIDAE) EN BRASIL

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Abstract

The aim of the present study is to report the occurrence of *Styphlotrema solitaria* Looss, 1899 infecting sea turtles of the species *Eretmochelys imbricata* Linnaeus, 1758 found in the North Coast of São Paulo State, Brazil. Only nine *S. solitaria* specimens were found in the hosts studied, with a mean intensity of infection of 4.5. Since 2002, 14 specimens of *E. imbricata* from this region were necropsied and the prevalence of *S. solitaria* was 14.2%. New variations on morphological data were presented for this digenetic species. This is the first occurrence of *S. solitaria* in sea turtles from Brazilian Coast, expanding the information on the helminth fauna of *E. imbricata* and the geographical distribution of *S. solitaria*.

Key words: Brazil - *Eretmochelys imbricata* - sea turtles - *Styphlotrema solitaria* – Trematoda.

Resumen

El objetivo de esta investigación es presentar la ocurrencia de *Styphlotrema solitaria* Looss, 1899 en las tortugas marinas de la especie *Eretmochelys imbricata* Linnaeus 1758 encontradas en el litoral Norte del Estado de São Paulo, Brasil. Apenas nueve especímenes fueron encontrados en los hospederos analizados correspondiendo a una intensidad media de 4,5. Desde el año de 2002, 14 ejemplares de *E. imbricata* provenientes de esta misma región fueron necropsiados lo que corresponde a una prevalencia de 14,2 %. Nuevas variaciones y datos morfológicos se presentan para esta especie de digeneo. Esta es la primera ocurrencia de *S. solitaria* en las tortugas marinas encontradas en el litoral brasileño, ampliando así la información sobre la helmintofauna de *E. imbricata* y distribución geográfica de *S. solitaria*.

Palabras clave: Brasil - *Eretmochelys imbricata* - *Styphlotrema solitaria* - tortugas marinas - trematoda.

INTRODUCTION

The family Styphlotrematidae Baer, 1924 has a considerable complexity due to the numerous taxonomic changes over time. This family includes only the genus *Styphlotrema* Odhner, 1911 with two described species *Styphlotrema solitaria* Looss, 1899, reported in sea turtles, and *Styphlotrema artigasi* Kohn & Fernandes 1982, reported in marine fish (Tkach, 2008).

The present study reports the first occurrence of *S. solitaria* in the sea turtle *Eretmochelys imbricata* from the Brazilian Coast.

MATERIAL AND METHODS

Specimens of *S. solitaria* were collected from the small intestine of two *E. imbricata* individuals found dead after becoming entangled in a fish net in the Northern Coast of the São Paulo State (Southeastern Brazil) in 2009. The first host had a curvilinear carapace length of 41 cm and weighed 7 kg and the second had a curvilinear carapace length of 49 cm and weighed 12 kg.

During the necropsy, the esophagus, stomach, small and large intestines were removed. The contents were washed and sifted (battery of sieves with mesh sizes of 14, 60 and 100). The contents were then examined under a stereomicroscope.

Helminths (n = 9) were fixed in an alcohol-formalin-acetic acid solution, stained with chlorhydric carmine, cleared with eugenol and analyzed using a computer system for image analyzes (QWin Lite 3.1 – Leica). Morphometric values (in millimeters) were expressed as mean and range (minimum – maximum). The helminths were deposited in the Coleção Helmintológica do Instituto de Biociências (CHIBB) of the Universidade Estadual Paulista, Botucatu, São Paulo State, Brazil (CHIBB 6194, 6200, 6213 and 6216). All collections were authorized by federal licenses for activities with scientific purposes (SISBIO 12421-1 and 12431-2).

RESULTS AND DISSCUSION

Styphlotrema solitaria (Fig. 1-5) specimens presented the following characteristics: parasite small; extremities oval-shaped (Fig. 1); tegument without spines (Fig. 2); oral sucker small and subterminal (Fig. 3); pharynx present; esophagus non-sinuous, terminating in cecal bifurcation in initial third of body; ceca thin, slightly sinuous, terminating in middle third of body; acetabulum round and in middle third of body between cirrus sac and metraterm; testis with irregular shape, occupying equatorial region of body; cirrus sac of little volume, occupying area on left side of acetabulum; ovary oval-shaped, anterior to left testicle, uterus long and quite sinuous, initiating near ovary, running long course toward posterior region of body and returning to more central region of parasite, terminating in genital pore near cirrus sac in initial third of body; vitellaria with numerous small follicles extending from equatorial region to testicle level and to posterior region of cecum; excretory system consisting of one pore in posterior region of body and single trunk extending to region near testicle, where it forks and ends in cecum fundus laterally to acetabulum (Fig. 4); eggs oval-shaped (Fig. 5).

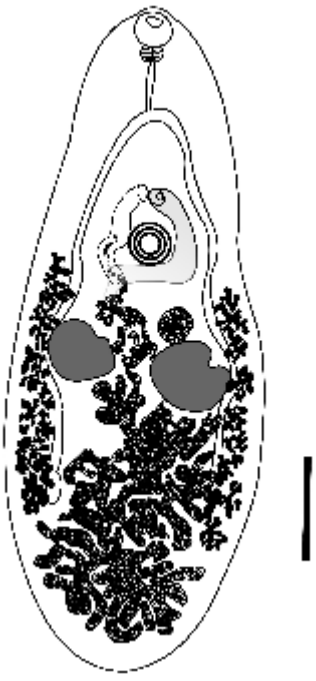

Figure 1. *Styphlotrema solitaria* Looss, 1899 (Digenea, Styphlotrematidae) from *Eretmochelys imbricata* (Testudines, Chelonidae) in Brazil (Bar: 1 mm).

Table 1. Morphometric data (in millimeters) of *Styphlotrema solitaria* (Digenea, Styphlotrematidae) of *Eretmochelys imbricata* (Testudines, Chelonidae) from Brazil.

Variables	Groschaft *et al.* (1977)	Present Study
Host	*Eretmochelys imbricata*	*Eretmochelys imbricata*
Locality	Gulf of Guanahacabides, Cuba	São Paulo State, Brazil
Site	ESO, EST, INT	SI
Number of parasites	99 (20 measured)	9 (4 measured)
Total length	2.09 – 3.21	4.86 ± 0.14 (4.70 – 4.99)
Total width	0.78 – 1.48	1.78 ± 0.12 (1.60 – 1.85)
Oral sucker length	0.133 – 0.198	0.275 ± 0.023 (0.254 -0. 306)
Oral sucker width	0.133 – 0.207	0.318 ± 0.018 (0.301 ± 0.335)
Pharynx length	0.052 – 0.103	0.116 ± 0.06 (0.111 – 0.124)
Pharynx width	0.089 – 0.148	0.165 ± 0.09 (0.154 – 0.171)
Esophagus length	0.089 – 0.170	0.344 ±0.028 (0.312 – 0.369)
Esophagus width	0.022 – 0.029	-
Acetabulum length	0.148 – 0.288	0.355 ± 0.017 (0.340 -0. 380)
Acetabulum width	0.133 – 0.244	0.345 ± 0.024 (0.309 – 0.361)
Right testis length	0.163 – 0.288	0.502 ± 0.037 (0.471 – 0.556)
Right testis width	0.170 – 0.370	0.493 ± 0.116 (0.412 – 0.666)
Left testis length	0.133 – 0.370	0.486 ± 0.028 (0.452 – 0.520)
Left testis width	0.177 – 0.303	0.514 ± 0.067 (0.425 – 0.590)
Cirrus pouch length	0.333 – 0.888	1.172 ± 0.046 (1.107 – 1.209)
Cirrus pouch width	0.103 – 0.199	0.235 ± 0.037 (0.199 – 0.286)
Ovary length	0.111 – 0.177	0.254 ± 0.016 (0.239 – 0.273)
Ovary width	0.133 – 0.236	0.322 ± 0.010 (0.311 – 0.337)
Seminal receptacle length	-	0.231 ±0.07 (0.224 – 0.240)
Seminal receptacle width	-	0.284 ± 0.036 (0.238 – 0.322)
Left vitelline fields length	0.357 – 1.123	1.610 ± 0.271 (1.428 – 2.013)
Rigth vitelline fields length	0.357 – 1.123	1.666 ± 0.196 (1.546 – 1.958)
Egg length	0.038 – 0.049	0.047 ±0.003 (0.040 – 0.054)
Egg width	0.019 – 0.024	0.021 ± 0.002 (0.017 – 0.025)

ESO - Esophagus; EST - stomach; INT- intestine, SI - Small intestine.

Since the year 2002, 14 individuals of *E. imbricata* from the Northern Coast of São Paulo State, Brazil, have been necropsied. Specimens of *S. solitaria* were found in only two hosts, corresponding to a prevalence of 14.2% and the mean intensity of infection observed was 4.5.

Only two species are known for the genus *Styphlotrema*: *S. solitaria*, described infecting the sea turtles *Caretta caretta* in the State of Florida, USA (Luhman, 1935; Byrd *et al*., 1940) and Italy (Santoro *et al*., 2010), and also in *E. imbricata* from Porto Rico (Fischthal & Acholonu, 1976) and Cuba (Groschaft *et al*., 1977). *Styphlotrema artigasi* was described based on a single specimen reported in *Guavina guavina* (Valenciennes, 1837), which is a marine fish of the family Eleotridae found on the Coast of Rio de Janeiro State, Brazil (Kohn & Fernandes, 1982).

Styphlotrema solitaria is a generalist species only found in sea turtles. This species has been reported in *C. caretta* in the Mediterranean, with a prevalence of 4.5% and mean intensity of infection of 9.0 (Santoro *et al*., 2010). In *E. imbricata*, this helminth is reported with a prevalence of 14.2% and mean intensity of infection of 6.0 (Fischthal & Acholonu, 1976). The present data and those from reports in the literature corroborates that this species occurs with low prevalence in sea turtles.

The morphometric analysis of the specimens reported herein (Table 1) reveals that all measurements are larger than those described for

the specimens studied by Groschaft *et al*. (1977). Only the measurements of length and width of eggs are similar to those reported in both studies. These data contribute to the morphological characterization of this digenetic species.

Approximately 50 species of helminths distributed among 10 families are recognized as parasites of *E. imbricata* (Dyer *et al*., 1995). However, little is known on the helminth diversity of this species in Brazil, for which only *Cricocephalus albus* (Travassos *et al.*, 1969), *Amphiorchis caborojoensis* and *Carettacola stunkardi* (Werneck *et al.*, 2008a) were reported.

Unfortunately little is known about the *E. imbricata* helminthes found on the Brazilian coast, this report describes the occurrence of the fourth species of parasites reported in this host for this region. Therefore further studies should be performed to identify the *E. imbricata* helminthes parasites found on the Brazilian coast.

This is the first report of *S. solitaria* in sea turtles on the Brazilian Coast, contributing for the knowledge of geographical distribution of *S. solitaria* and also for the helminth fauna of *E. imbricata*.

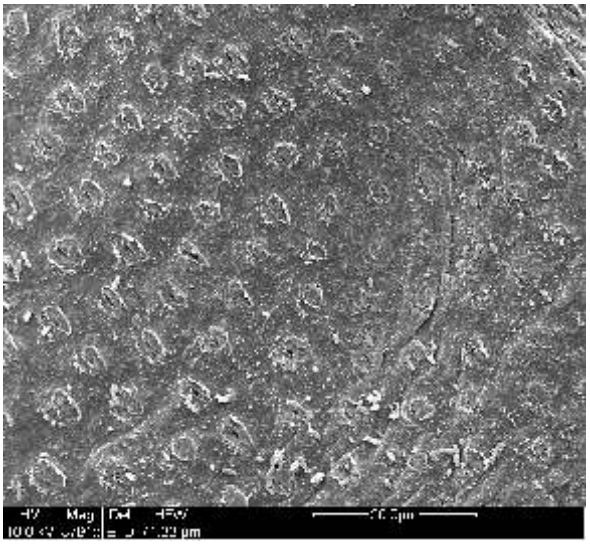

Figure 2. Tegument of *Styphlotrema solitaria* Looss, 1899 (Digenea, Styphlotrematidae) of *Eretmochelys imbricata* (Testudines, Chelonidae) from Brazil.

Figure 3. Oral sucker of *Styphlotrema solitaria* Looss, 1899 (Digenea, Styphlotrematidae) of *Eretmochelys imbricata* (Testudines, Chelonidae) from Brazil.

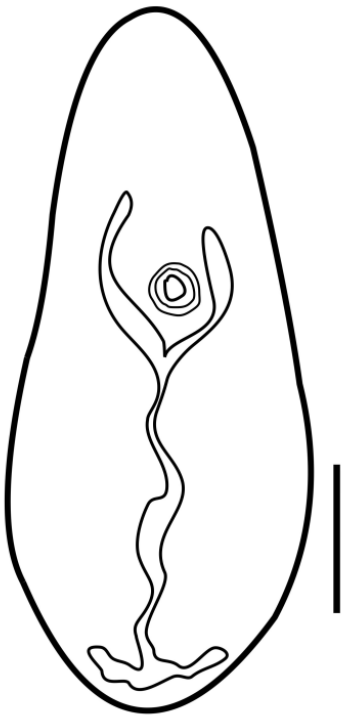

Figure 4. Excretory system of *Styphlotrema solitaria* Looss, 1899 (Digenea, Styphlotrematidae) of *Eretmochelys imbricata* (Testudines, Chelonidae) from Brazil (Bar: 1 mm).

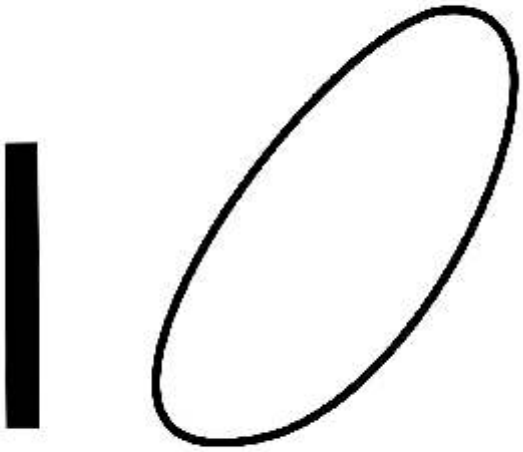

Figure 5. Egg of *Styphlotrema solitaria* Looss, 1899 (Digenea, Styphlotrematidae) of *Eretmochelys imbricata* (Testudines, Chelonidae) from Brazil.

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