

***Learedius learedi* Price 1934 (Digenea, Spirorchiidae) in *Chelonia mydas* Linnaeus 1758 (Testudines, Chelonidae) in Brazil: case report**

[*Learedius learedi* Price 1934 (Digenea, Spirorchiidae) em *Chelonia mydas* Linnaeus 1758 (Testudines, Chelonidae) no Brasil: relato de caso]

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**ABSTRACT**

This study reports the occurrence of *Learedius learedi* Price 1934 (Digenea, Spirorchiidae) in *Chelonia mydas* Linnaeus 1758 (Testudines, Chelonidae) in Brazil. Eleven animals were included in this study, 54.6 % of them were parasitized. Two hundred and fifty five parasite specimens were recovered from heart, liver, spleen, lungs, kidneys, mesenterium, and body wash. Results contribute to the knowledge about the helminthofauna of marine chelonian and their geographical distribution. This is the first report of *L. learedi* in the Southwestern Atlantic.

Keywords: *Learedius learedi*, Spirorchiidae, *Chelonia mydas*, Chelonidae, new host

**RESUMO**

Relata-se a ocorrência de *Learedius learedi* Price 1934 (Digenea, Spirorchiidae) em *Chelonia mydas* Linnaeus 1758 (Testudines, Chelonidae) no Brasil. Onze animais foram examinados e destes, 54,6% estavam parasitados. Duzentos e cinquenta e cinco exemplares de *L. learedi* foram recuperados de órgãos (coração, fígado, baço, pulmões, rins, mesentério) e do lavado corporal dos animais. Os resultados contribuem para o conhecimento da helmintofauna de quelônios marinhos e sua distribuição geográfica. Este é o primeiro registro da ocorrência de *L. learedi* na região do Atlântico Sul Ocidental.

Palavras-chave: *Learedius learedi*, *Chelonia mydas*, Spirorchiidae, Chelonidae, novo hospedeiro

**INTRODUCTION**

The family Spirorchiidae Stunkard 1921 includes a group of trematodes which inhabit the circulatory system of turtles. This family has 100 species grouped in 19 genera (Smith 1997; Platt 2002).

Ten genera of the Spirorchiidae family are described in sea turtles (Platt, 2002). They are found in regions of the Atlantic and Northern Pacific Oceans (Volker et al., 1982; Aguirre et al., 1998), Caribbean (Dyer et al., 1991), Central America (Inohuye-Rivera et al., 2004), and Australia (Glazebrook et al., 1989).

Despite the wide geographical distribution and the large number of trematode species in the family Spirochiidae, there is no report of their presence in the Southwestern Atlantic. The objective of this study was to report the occurrence of *Learedius learedi* Price 1934 in specimens of *Chelonia mydas* Linnaeus 1758 in Brazil.

#### CASE DESCRIPTIONS

The study included 11 juvenile *C. mydas* specimens (mean curvilinear carapace length 37.8cm; mean weight 6.2 kg) from Ubatuba, Northern coast of São Paulo State. The animals were found dead or died at the TAMAR-IBAMA Project Marine Sea Turtle Rehabilitation Center between June and August 2005. Eight animals were found dead after contact with fishing and three were caught floating near the coast.

Necropsies were performed according to Wyneken (2001). After opening the celomatic cavity, heart, spleen, liver, mesenterium, lungs and kidneys, and body wash from each animal were collected and processed according to Snyder and Clopton (2005) adapted technique, recovering the helminthes in a sedimentation flask instead of a separator funnel.

The recovered helminthes were fixed in AFA solution and stained with carmine. Morphometric analysis was performed, using the Leica Qwin Lite 3.1 computerized system. After identification, the specimens were deposited in the Helminthological Collection at the Instituto de Biociências at the Universidade Estadual Paulista (CHIBB-UNESP), Botucatu, State of São Paulo, Brazil (CHIBB n<sup>os</sup>. 1208 to 1225).

Six (54.6%) of the 11 studied animals were parasitized by circulatory system trematodes. Two females were found alive but debilitated (thin, parasites/epibionts, close to death, without

fibropapiloma tumors), and died during treatment. The other four, two females and two males, were found dead after contact with fishing. All the animals showed good body condition and only one had skin formations resembling fibropapiloma tumors.

The two debilitated animals were in poor condition, with color alterations all over the carcass (paleness); in one of these 1-2 mm diameter numerous dark linear nodules were seen on the serous surface of both small and large intestines (Fig.1 and 2). The others only showed respiratory lesions (emphysema and pulmonary edema), suggesting drowning.

Two hundred and fifty five trematodes were collected from the parasitized animals. These helminthes were collected from heart (47.4%), liver (3.5%), spleen (0.8%), right lung (12.5%), left lung (3.9%), right kidney (0.4%), left kidney (1.2%), mesenterium (1.2%), and body wash (29.1%). They belonged to the *L. learedi* species (Fig. 3). Their body were elongated, flattened, with rounded extremes and mild constriction at ventral sucker level. Tegumental spines and oral sucker terminal were present. Prepharynx and pharynx were absent. They showed long, narrow, sinuous esophagus with bulbous end; intestinal cecum bifurcated anterior to the ventral sucker, with a small anterior loop, ending in the body posterior end; pedunculated circular ventral sucker in the body equatorial region; numerous testes of variable shape (intercecal, pre-ovarian, and post ventral sucker); external transversally elongated pre-ovarian seminal vesicle; well developed cirrus sac with a small internal seminal vesicle; *pars prostatica* and ejaculatory duct; lobed ovary in the posterior region; short uterus; vitelline follicles extending from the cecal bifurcation to the body posterior region, fusiform eggs with unequal bipolar processes (Fig. 4) and terminal excretory pore. Tab. 1 shows morphometric data.



Figure 1. General view of a *Chelonia mydas* specimen with numerous dark linear nodules in both large and small intestines.



Figure 2. Detail of dark linear nodules on the serous surface of the small intestine of a *Chelonia mydas* specimen.

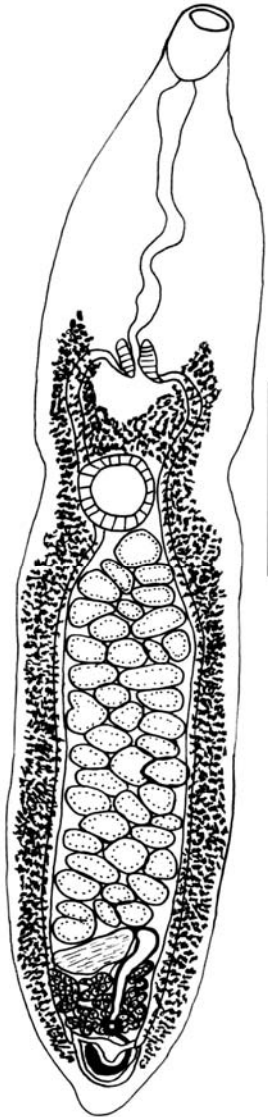


Figure 3. *Learedius learedii* (Digenea, Spirorchiidae) specimen collected from a *Chelonia mydas* (Testudines, Chelonidae) in Brazil (bar = 1mm).

### DISCUSSION

The *Learedius* genus includes five species: *L. learedi*, *L. similis* Price 1934, *L. europaeus* Price 1934, *L. orientalis* Mehra 1939, and *L. loochooensis* Takeuti 1942 (Smith 1997). However, Dyer et al. (1991) reported *L. learedi* and *L. orientalis* as synonymous, since the only

difference between them was testicular morphology, which according to these authors would not justify their division. Inouhuye-Rivera et al. (2004) reported that *L. europaeus* is also synonymous with *L. learedi*. These data show that the taxonomy of this genus is still confusing.

Marine turtles have been reported as *Learedius* trematode hosts. *Learedius learedi* was found in *C. mydas*, *Eretmochelys imbricata* Linnaeus 1766 (Glazebrook et al., 1989) and *Caretta caretta* Linnaeus 1758 (Wolke et al., 1982). These trematodes were reported in regions of the Atlantic and Northern Pacific Oceans (Wolker et al., 1982; Aguirre et al., 1998), Caribbean (Dyer et al., 1991), Central America (Inouhuye-Rivera et al., 2004), and Australia (Glazebrook et al., 1989). There was no previous report of them in the Southwestern Atlantic, therefore this is the first finding for that region. These data contributes to the knowledge and geographical distribution of helminthofauna in marine chelonia.

The morphometric data from this study are in agreement with *L. learedi* (Price 1934; Caballero et al., 1955; Inouhuye-Rivera et al., 2004). The only difference regarding the literature was a slightly longer cirrus sac. These may only be individual species variations and do not invalidate their identification.

Snyder and Clopton (2005) adapted technique was used to collect *L. learedi* specimens, substituting the separator funnel with a sedimentation flask. This facilitated the trematode collection. It was also observed that when heart was positive, other organs of the same animal could also be positive. However, when heart was negative, no other organ had the parasite. This suggests that heart is the main organ for analysis in this helminthiasis diagnosis.

No eggs were seen in the parasite uterus. However at necropsy performed on one animal, several tissue lesions contained a large quantity of eggs. Analysis of these eggs showed that their morphology was similar to *Learedius* trematodes (Wolke et al., 1982).

Data from this study contribute to the knowledge about the helminthofauna of marine chelonian and their geographical distribution.

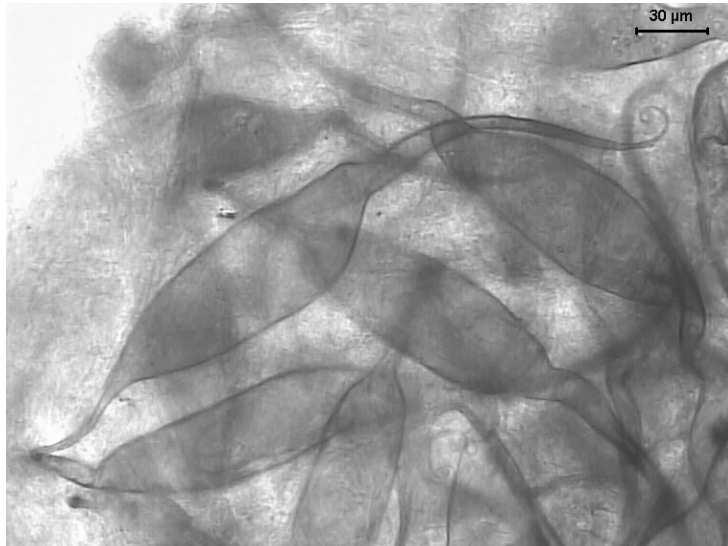


Figure 4. *Learedius learedii* (Digenea, Spirorchiidae) egg collected from *Chelonia mydas* (Testudines, Chelonidae) in Brazil.

Table 1. Morphometric data of *Learedius learedii* (Digenea, Spirorchiidae) collected from *Chelonia mydas* specimens (Testudines, Chelonidae) in Brazil

Variable (n = 10)	Morphometric data (µm)		
	Mean	Minimum	Maximum
Total length	4,184.3	3,250.8	5,434.3
Width	920.8	681.1	1248.1
Oral sucker			
Length	318.3	287.9	365.3
Width	288.2	257.3	324.4
Acetabulum			
Length	463.8	445.2	498.6
Width	477.9	475.0	504.1
Acetabulum – oral sucker length ratio	1.5	1.3	1.6
Acetabulum – oral sucker width ratio	1.5	0.8	1.8
Esophagus			
Length	1233.0	1007.4	1379.6
Width	85.4	44.0	128.7
Esophagus bulb			
Length	278.0	212.4	382.5
Width	176.2	113.4	313.6
Distance from genital atrium to posterior end	389.8	300.2	507.9
Testis			
Number	30	26	36
Length	138.5	54.3	301.2
Width	107.4	54.6	171.5
Cirrus pouch			
Length	654.6	515.1	813.7
Width	76.0	41.0	117.2
Seminal vesicle			
Length	277.6	160.1	486.5
Width	106.7	20.3	170.0
Ovary			
Number of lobes	7	6	8
Length	349.0	231.7	440.2
Width	330.0	274.7	436.3
Eggs			
Length	334.3	279.1	356.2
Width	51.9	44.3	60.2

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