

## Nematode larvae of hygienic importance infecting *Chaetodipterus faber* (Broussonet, 1782) and *Trachinotus carolinus* (Linnaeus, 1766) (Pisces: Teleostei) in Brazil\*

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**ABSTRACT.** Ribeiro J., São Clemente S.C., Lopes L.M.S. & Knoff M. **Nematode larvae of hygienic importance infecting *Chaetodipterus faber* (Broussonet, 1782) and *Trachinotus carolinus* (Linnaeus, 1766) (Pisces: Teleostei) in Brazil.** [Larvas de nematóides de importância higiênica-sanitária em *Chaetodipterus faber* (Broussonet, 1782) e *Trachinotus carolinus* (Linnaeus, 1766) (Pisces: Teleostei) no Brasil.] *Revista Brasileira de Medicina Veterinária*, 36(2): 121-124, 2014. Laboratório de Helmintos Parasitos de Vertebrados, Instituto Oswaldo Cruz, Fiocruz, Avenida Brasil 4365, Manguinhos, Rio de Janeiro, RJ, 21045-900, Brasil. E-mail: knoffm@ioc.fiocruz.br

From March 2010 to April 2011, thirty-five specimens of the Atlantic spadefish *Chaetodipterus faber*, and thirty specimens of the Florida pompano *Trachinotus carolinus*, were purchased from a fish market of municipality of Niterói, Rio de Janeiro State, Brazil. The fishes were measured, fileted and further had their organs investigated for helminths. In the both species were parasitized by *Hysterothylacium* sp. third-stage larvae nematodes with prevalence of 17.1% and 40%, mean intensity of 2 and 9.6, range of infection of 1-2 and 1-28 and mean abundance of 0.23 and 3.83, respectively. The sites of infection to *C. faber* were piloric cecum, liver, and abdominal cavity, and to *T. carolinus*, piloric cecum, liver, seroses of liver and ovarian, and abdominal cavity. *Hysterothylacium* sp. larvae were reported in *C. faber* for the first time, and is the first report in *T. carolinus* by these nematodes for Brazil, presenting considerations on the sanitary aspects due to the importance in the fish hygiene and public health programs.

**KEY WORDS.** Raphidascarididae, *Hysterothylacium* sp., *Chaetodipterus faber*, *Trachinotus carolinus*.

**RESUMO.** Entre março de 2010 a abril 2011, 35 espécimes de, *Chaetodipterus faber* e 30 espécimes de *Trachinotus carolinus* foram adquiridos do Mercado Municipal São Pedro, Niterói, Estado do Rio de Janeiro, Brasil. Os peixes foram acondicionados em caixas isotermicas contendo gelo e tranferidos para

o Laboratório de Inspeção e Tecnologia de Pesca da Faculdade de Veterinária da Universidade Federal Fluminense, UFF, RJ onde foram mensurados, filetados e seu órgãos analisados. As larvas coletadas foram fixadas em AFA a 60°C, e montadas entre lâmina e lamínula contendo lactofenol para

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identificação. Foram encontradas larvas de terceiro estágio gênero de nematóide *Hysterothylacium* sp. em ambas as espécies dos peixes, com prevalências de 17,1% e 40%, intensidades médias de 2 e 9,6, amplitudes de variação das intensidades de infecções 1 a 2 e 1 a 28 e abundâncias médias de 0,23 e 3,83, respectivamente. Os sítios de infecção para *Hysterothylacium* sp. em *C. faber* foram ceco pilórico, fígado e cavidade abdominal e para *T. carolinus*, ceco pilórico, fígado, serosas do fígado e gônada e cavidade abdominal. Larvas de *Hysterothylacium* sp. foram encontradas pela primeira vez parasitando *C. faber* como também o primeiro registro desse gênero de nematóides para *T. carolinus* no Brasil. O presente estudo apresenta considerações importantes no aspecto higiênico-sanitário de pescado e para programas de saúde pública.

PALAVRAS-CHAVE. Raphidascarididae, *Hysterothylacium* sp., *Chaetodipterus faber*, *Trachinotus carolinus*.

## INTRODUCTION

*Chaetodipterus faber* (Broussonet, 1782) is a Ephyppidae teleost fish, commonly known as Atlantic spadefish occurs in the coastal waters. Its flesh is considered of good quality, but the occurrence in the market can be sporadic. They are distributed in the Southern Brazilian coast to New England, USA (Menezes & Figueiredo 1985).

*Trachinotus carolinus* (Linnaeus, 1766) belonging to the Carangidae family and is commonly known as Florida pompano. It is one of the most abundant species of the Brazilian coast. Occurs from Massachusetts to the State of Rio Grande do Sul, Brazil. It is most abundant during the spring and the summer, its occurrence decrease in the fall and in the winter (Menezes & Figueiredo 1980, Vasconcellos et al. 2007, 2010). Nematodes of the family Anisakidae and Raphidascarididae sensu Fagerholm (1991) are parasites, and have the marine mammals as definitive hosts. During its early stages of evolution, they infect teleost fish, and present risk to human health, when they are consumed with the flesh of fish, and larvae can cause gastrointestinal, extra-intestinal and allergic manifestations (Anderson 2000, Valls 2005).

According to Yagi et al. (1996), *Hysterothylacium aduncum* was responsible for causing gastrointestinal disorders in an adult man in Japan, reporting that the parasite has caused reactions during its passage through the man gastrointestinal tract, after it has been expelled alive in their feces, reported such as a rare case of anisakidosis. Caldas et al. (1998) observed cross-reactivity, between anti-

bodies responsible for the development of hypersensitivity reactions, with third-stage larvae of *Anisakis simplex* and *Hysterothylacium aduncum*.

Until 1991 the genus *Hysterothylacium* Ward & Margath, 1917 has belonged to the Anisakidae family and Raphidascarinae subfamily, but according to Fagerholm (1991), the Raphidascarinae subfamily, must be elevated to Raphidascarididae family. Some studies (Yagi et al. 1996, Felizardo et al. 2009) suggest that *Hysterothylacium* sp. has zoonotic potential, and manifestations caused by the larvae continue to be called anisakidosis, regardless its taxonomic classification.

The present investigation aimed the study of the parasitism of a nematode larvae parasite worms infecting the *T. carolinus* and *C. faber*, commercialized in the city of Niterói, State of Rio de Janeiro, Brazil, with data on the helminth species, parasitological indexes, related to prevalence, mean intensity, mean abundance, infection range, sites of infection, and sanitary aspects due to their importance in fish hygiene and public health programs.

## MATERIAL AND METHODS

From March 2010 to April 2011, 35 specimens of *Chaetodipterus faber* (Broussonet, 1782) and 30 of *Trachinotus carolinus*, were purchased from the fish market São Pedro, municipality of Niterói, State of Rio de Janeiro, Brazil. The fish measuring of 21–37 and 22–61 cm total lengths and weighting 0.500–1.200 Kg and 0.420–1.500Kg, respectively. Fish were preserved in isothermal box with ice, further they were transferred to the Laboratory of Inspection and Fishery Technology of the Veterinary School, Fluminense Federal University, Niterói, RJ. Specimens were identified in accordance with Menezes & Figueiredo (1980; 1985). Specimens were submitted to necropsy and filleted. The nematode larvae were recovered in Petri dishes with a 0.65% NaCl solution, fixed with hot (60°C) AFA, preserved in 70%GL-5% ethanol-glycerin, clarified with Aman's lactophenol according to Eiras et al. (2006). The adopted taxonomic classification of the Raphidascarididae follows Fagerholm (1991) and larval identification was obtained after Felizardo et al. (2009). The larvae were observed by means of a Olympus BX-41 brightfield microscope and measurements are in millimeters (mm) with means in parentheses, unless other-wise indicated. Parasitological indexes related to prevalence, mean intensity, range of infection, and mean abundance follow Bush et al. (1997). Representative specimens of the *Hysterothylacium* sp. were deposited in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC).

## RESULTS

From 35 specimens of *C. faber* collected, 17.1% were parasitized by the third-stage larvae of *Hystero-*

Table 1. Prevalence (P), mean intensity (MI), mean abundance (MA), range of infection (RI), infection site and CHIOC deposit number of third-stage larvae *Hysterothylacium* sp. recovered from *Chaetodipterus faber* (Broussonet, 1782) and *Trachinotus carolinus* (Linnaeus, 1766), commercialized in the State of Rio de Janeiro, from March/2010 to April/ 2011.

| Fish species                 | <i>Hysterothylacium</i> sp. |     |      |      |                       |                                |
|------------------------------|-----------------------------|-----|------|------|-----------------------|--------------------------------|
|                              | P (%)                       | MI  | MA   | RI   | Infection site        | CHIOC                          |
| <i>Chaetodipterus faber</i>  | 17.1                        | 2   | 0.23 | 1-2  | L, PC, and AC         | 35795                          |
| <i>Trachinotus carolinus</i> | 40                          | 9.6 | 3.83 | 1-28 | L, PC, LS, OS, and AC | 35791, 35792, 35793, and 35794 |

L = liver; PC = piloric cecum; LS = liver serosa; OS = ovarian serosa; AC= abdominal cavity.

Table 2. Morphological and morphometric data on third-stage larvae of *Hysterothylacium* sp. recovered from *Chaetodipterus faber* (Broussonet, 1782) and *Trachinotus carolinus* (Linnaeus, 1766), commercialized in the State of Rio de Janeiro, from March/2010 to April/2011.

| <i>Hysterothylacium</i> sp. | <i>Chaetodipterus faber</i> | <i>Trachinotus carolinus</i> |
|-----------------------------|-----------------------------|------------------------------|
| Total length                | 12.60-13.70 (13.10)         | 11.16-19.02(14.86)           |
| Total width                 | 0.34-0.35 (0.34)            | 0.21-0.43(0.30)              |
| Larval tooth                | absent                      | absent                       |
| Excretory pore              | opens beneath nerve ring*   | opens beneath nerve ring*    |
| Nerve ring                  | 0.30-0.31(0.30)             | 0.16-0.43(0.30)              |
| Esophagus length            | 0.98-1.00(0.99)             | 0.65-2.20(1.07)              |
| Esophagus width             | 0.11-0.13(0.12)             | 0.08-0.13(0.10)              |
| Ventriculus                 | 0.13-0.14(0.13)             | 0.07-0.17(0.11)              |
| Ventricular appendix        | 0.80-1.22(1.01)             | 0.48-1.08(0.75)              |
| Intestinal Cecum            | 0.35-0.60(0.47)             | 0.11-0.45(0.31)              |
| Tail                        | 0.14-0.21(0.17)             | 0.12-0.27(0.20)              |
| Mucron                      | 2.5-4(3.5) µm               | 3.1-4(3.6) µm                |

\* Inconspicuous in some specimens.

*thylacium* sp., with a total of eight parasites founded. This is the first report of this nematode in *C. faber*.

From 30 specimens of *T. carolinus* collected, 40% were infested with larvae of the third stage of *Hysterothylacium* sp., with a total of 115 parasites collected. This is the first report of this nematode infecting *T. carolinus* in Brazil.

The parasitological index related to prevalence, mean intensity, range of infection, mean abundance, as well as the infection sites and the CHIOC deposit numbers are depicted in Table 1.

The morphological and morphometric data of the third-stage larvae of *Hysterothylacium* sp. were obtained from eight specimens from *C.faber* and 10 specimens of *T. carolinus* and are presented in Table 2.

Raphidascarididae (Hartwich, 1954) *sensu*  
Fagerholm, 1991

*Hysterothylacium* Ward & Margath, 1917  
*Hysterothylacium* sp.

Description based on 8 third-stage larvae from *C. faber* and 10 third-stage larvae from *T. carolinus*;

cuticle with lateral alae extending along the body with a wedge-shaped support, devoid of basal extension. Anterior extremity with a dorsal and two poorly developed ventro-lateral lips. Nine cephalic papillae, two pairs in the dorsal lip together with a large papilla and a pair in each ventro-lateral lip. Boring tooth absent. Excretory pore opening below the nerve ring, inconspicuous in some specimens. Ventriculus nearly spherical. Ventricular appendix twice longer than the esophagus. Intestinal cecum present. Four subspherical rectal glands. Tail conical, mucron present.

## DISCUSSION

The third-stage larvae found in two fish species studied, have similarity to the description of Felizardo et al. (2009), indicating that the larvae are in agreement with the description presented by other authors, who have named it such as *Hysterothylacium* sp. no. 2 (Petter & Maillard 1988), *Hysterothylacium* MD (Deardorff & Overstreet 1981), and *Hysterothylacium* KB (Peter & Sey 1997), in papers from different world regions, and in Brazil were also called such as *Hysterothylacium* MD (Pereira Jr et al. 2004).

Sánchez-Ramírez & Vidal-Martínez (2002) have analyzed *T. carolinus* from the Peninsula of Yucatan, Mexico, collected of different regions from the peninsula in order to study the infracommunities metazoan parasites, they reported *Hysterothylacium* sp. with prevalences of 13 to 33%, considering the different regions of the species collected, such data are lower than those of the present study. And the parasites were present in the pyloric cecum, stomach, intestines and mesentery, data similar to those found in the present study. The fish studied by Sánchez-Ramírez & Vidal-Martínez (2002) ranged from 24-47 cm in length, the fish sizes were similar from collected on the present study.

González-Solis et al. (2002) analyzed 51 specimens of *T. carolinus*, collected from the Peninsula of Yucatan, Mexico, measuring between 26 and 39 cm. Nematode species were collected from families Cucullanidae, Capillaridae, Cystidicolidae, Gnathostomatidae, and Anisakidae family, was represented with the third-stage larvae *Hysterothylacium* sp. with 4.976 to 11.448 mm in length, presenting measures smaller than those of the present study. These authors reported for this species of fish as infection sites, mesentery and abdominal cavity, unlike the present work, where there was a greater diversity of sites of infection. González-Solis et al. (2002) reported a prevalence of 19% and intensity



of infection of 1-15 nematodes per fish, lower than the present study, which showed a 40% prevalence and intensity of infection of 1-28 parasites per fish. This difference suggests that it is related to ecological factors of these different regions.

Although the nematodes are present in the viscera and abdominal cavity, we can not rule out the risk to public health, since these larvae are capable of migrating to the musculature of the fish, this migration can occur in live fish or after capture, especially during long periods of waiting in boats and warehouses. Therefore, it has been recommended the evisceration on board, to minimize the migration of these larvae in accordance of Dias et al. (2011). Follow this concept it must to be reinforced the necessity to better inform those in charge of the fish hygienic-sanitary control as well as the staffs dealing with mass production activities, from capture to final consumers about the anisakidosis and prophylactic approaches with the improvements of sanitary educational programs reaching different levels.

It is suggested the adoption of the sanitary programs during the steps of mass production, aiming the elimination, avoidance, or risks reduction, in order to provide a qualified and safe final product and in this case, with fish evisceration on board, warehouses, industries, or retail dealers with appropriate discharges. Multidisciplinary researches are to be developed in the evaluation symptoms in patients with gastrointestinal lesions and/or allergic reactions suggesting anisakidosis and their relation with the ingestion or manipulation of raw fish.

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