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Endoparasites of *Steindachinerina brevipinna* (Eigenmann and Eigenmann, 1889), collected in the tributaries Corvo and Guairacá of Paranapanema river, Paraná State, Brazil

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ABSTRACT. *Steindachnerina brevipinna* is a freshwater fish from the Curimatidae family, and its occurrence is restricted to some South American countries (Argentina, Brazil, Paraguay and Uruguay), distributed in the Paraguay, lower and upper Paraná and lower Uruguay rivers. There are no parasitological studies related to this fish. The present study records and illustrates a species of digenean, *Sphincterodiplostomum musculosum* from subfamily Diplostominae, present on the ovary and three species of nematodes, *Cosmoxynema vianai* Travassos, 1949, *Travnema travnema* Pereira, 1938, *Spinoxyuris* sp., of superfamily Oxyuridea, parasitizing the intestine of *S. brevipinna* collected in the tributaries Guairacá and Corvo of the Paranapanema River, Parana State, Brazil.

Key words: oxyuridae, diplostominae, *Steindachnerina brevipinna*, Corvo, Guairacá.

RESUMO. Endoparasitos de *Steindachinerina brevipinna* (Eigenmann e Eigenmann, 1889), coletados nos tributários Corvo e Guairacá do rio Paranapanema, Paraná, Brasil. *Steindachnerina brevipinna* é um peixe dulcícola da família Curimatidae e sua ocorrência é restrita a alguns países da América do Sul (Argentina, Brasil, Paraguai e Uruguai) e estão distribuídos nos rios Paraguai, baixo e alto Paraná e baixo Uruguai. Ainda não existem estudos parasitológicos relacionados a esse peixe. No presente trabalho foram registrados e ilustrados uma espécie de digêneo, *Sphincterodiplostomum musculosum* Dubois, 1936 da subfamília Diplostominae presente no ovário e três espécies de nematodas, *Cosmoxynema vianai* Travassos, 1949, *Travnema travnema* Pereira, 1938 e *Spinoxyuris* sp., pertencentes à superfamília Oxyuridea localizados no intestino, para os espécimes de *S. brevipinna* coletados nos tributários Corvo e Guairacá do rio Paranapanema, Estado do Paraná, Brasil.

Palavras-chave: oxyuridae, diplostominae, *Steindachnerina brevipinna*, Corvo, Guairacá.

Introduction

The parasites of family Diplostomidae Poirer, 1886 when adults are found in birds and mammals, totaling 41 genera distributed in different subfamilies according to their host. The subfamily Alariinae includes 11 genera parasites of mammals, with genera parasitizing birds and divided into three subfamilies, Diplostominae Poirier, 1886; Crassiphialinae Sudarikov, 1960; and Codonocephalinae Sudarikov, 1959 (LUNASCHI; DRAGO, 2006).

Most nematodes of superfamily Oxyuridea Cobbold, 1864 are parasites of neotropical fishes of South America and only a few genera of family Pharyngodonidae occur in marine and freshwater fish of tropical and subtropical regions. There are seven genera known to the superfamily Oxyuridea in South America, with 11 species described (MORAVEC, 1998). The species belonging to the genus *Brasilnema* Moravec, Kohn and Fernandes, 1992, *Cosmoxynema* Travassos, 1949, *Cosmoxynemoides* Travassos, 1949, *Ichthyouris* Inglis, 1969, *Parasynodontidia* Moravec, Kohn and Fernandes, 1992, *Travnema*, Pereira, 1938, are registered to fishes from Brazil (PEREIRA, 1938; TRAVASSOS, 1949; FERNANDES et al., 1983; MORAVEC et al., 1992); two species of Parasynodontidia and Spinoxyuris Petter, 1994, of fishes from Paraguay (PETTER, 1994); and only one species of *Ichthyouris* from Guyana (INGLIS, 1962). One species of Diplostomidae and three species of Pharyngodonidae were found in *Steindachnerina brevipinna* (Eigenmann and Eigenmann, 1889), a freshwater fish of Curimatidae family, which is found in lakes, rivers and channels (GRAÇA; PAVANELLI, 2007). Therefore, due to their feeding habit as detritivores (FINK; FINK, 1978), *S. brevipinna* probably has a greater contact with intermediate hosts and free-living larvae that facilitates parasitism.

There are no publications of parasitological studies related to this fish, but only records of endoparasites of the genus *Diplostomum* sp. for *Steindachnerina insculpta* (PAVANELLI et al., 2004), an endemic species of the upper Paraná river (PAVANELLI; BRITSKI, 1999).

This manuscript reports and illustrates a digenean species of subfamily Diplostominae and two species and one genus of nematodes of superfamily Oxyuridea found in *S. brevipinna* collected in tributaries Guairacá and Corvo of the Paranapanema river.

Material and methods

Sixty-three specimens of *Steindachnerina brevipinna* were collected between April and September 2006 in the tributaries Guairacá and Corvo, in the lower Paranapanema river, a region flooded by the reservoir of the Rosana hydroelectric power plant (Figure 1) (22º36´S; 52º52'W), state of Paraná, Brazil (CESP, 1998).

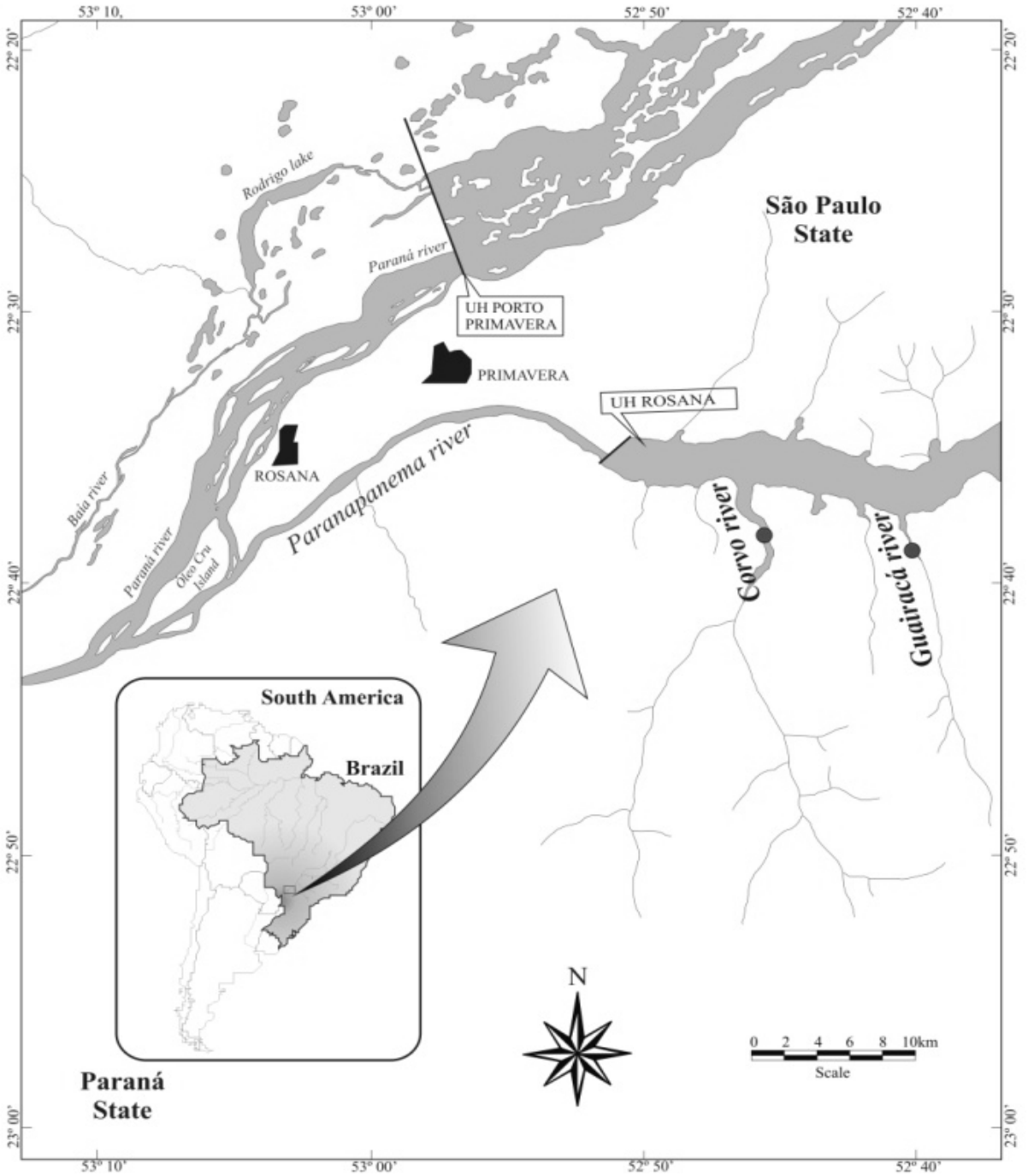

Figure 1. Location of the rivers Corvo and Guairacá, (tributaries of the low Paranapanema river) and of the reservoir of the Rosana hydroelectric power plant.

Gills nets with different mesh sizes were used for capturing the fish, disposed for a period of 24 hours, with collections every eight hours. Parasites were collected and processed according to Eiras et al. (2006)

The measurements were standardized in millimeters and the illustrations were made with the aid of a drawing tube attached to a Nikon YS 2 microscope. Representative specimens were deposited in the Helminthological Collection of the Oswaldo Cruz Institute, Rio de Janeiro, Rio de Janeiro State, Brazil.

Results and discussion

Class Trematoda

Subclass Digenea

Family Diplostomidae Poirier, 1886

Subfamily Diplostominae Poirier, 1886

***Sphincterodiplostomum musculosum* Dubois, 1936 (Figure 2)**

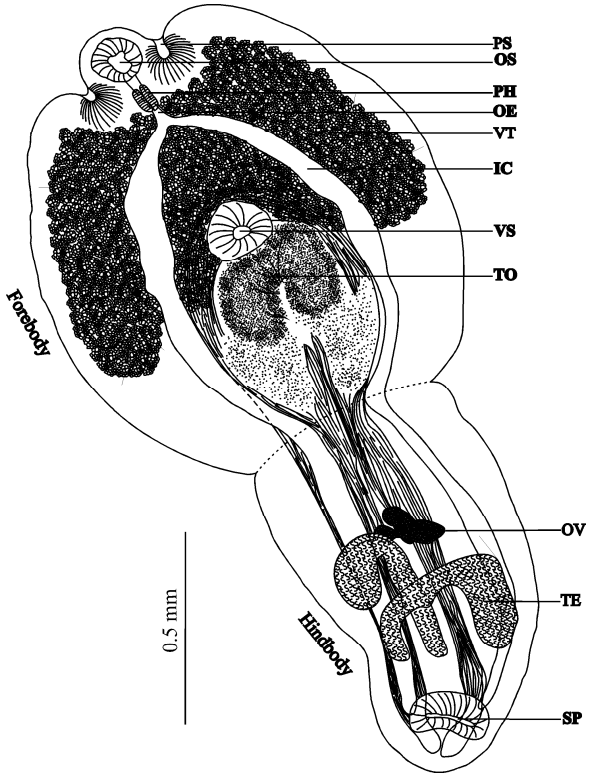

Figure 2. *Sphincterodiplostomum musculosum* (metacercariae) Dubois, 1936. PS – pseudosuckers; OV – oral sucker; PH - pharynx; OE – oesophagus; VT – vitellaria; IC – intestinal caeca; VS – ventral sucker; TO – tribocitic organ; OV – ovary ; TE – testes; SP – sphincter.

Measurements based on 15 specimens.

Body, 1.775 – 3.075 (2.553) long and 1.075 – 1.675 (1.396) wide, *forebody*, 1.150 – 1.900 (1.530) long and 1.075 – 1.675 (1.508) wide; *hindbody*, 0.600 – 1.375 (1.033) long and 0.500 – 0.800 (0.665) wide, with a dense vitellaria concentration in the anterior region of *foreboby*. Pharynx 0.084 – 0.117 (0.104) long and 0.045 – 0.084 (0.054) wide, located after an subterminal oral sucker, 0.100 – 0.200 (0.145) long and 0.130 – 0.200 (0.213) wide, wich two laterals pseudosuckers. Ventral sucker, 0.130 – 0.210 (0.162) long and 0.180 – 0.250 (0.213) wide, above of tribocitic organ, 0.290 – 0.440 (0.384) long 0.350 – 0.650 (0.490) wide, located in medio-posterior region of *forebody*. Subterminal sphincter, one ovary and a pair of testes in tandem, posterior teste with 0.210 – 0.400 (0.290) long and 0.200 – 0.510 (0.410) wide and anterior teste with 0.130 – 0.390 (0.217) and 0.250 – 0.350 (0.307), located in medio-posterior region of *hindbody*.

Taxonomic Summary

Host: *Steindachnerina brevipinna* (Eigenmann and Eigenmann, 1889).

Site: Ovary.

Locality: Tributaries Guairacá and Corvo of the low Paranapanema river, Paraná State, Brazil.

Material: CHIOC: no. 37263a-c

Mean Intensity of infection: 52.63, being found up to 320 parasites in a single host.

Prevalence: 90.47 %

Others hosts: *Cyphocharax gilbert* (ABDALLAH et al., 2005) and *Hemisorubim platyrhynchos* to *Sphincterodiplostomum* sp. (GUIDELLI et al., 2003).

Distribution

Sphincterodiplostomum musculosum first described by Dubois (1936) in fishes of Neotropical region (NIEWIADOMSKA, 2002). Was found also in Guandu river, Rio de Janeiro State, Brazil (ABDALLAH et al., 2005), in Paraná river, Brazil, as *Sphincterodiplostomum* sp. (GUIDELLI et al., 2003) and their adult form in birds of Formosa Province, Argentina (LUNASCHI; DRAGO, 2006).

Comments

Quoy and Gaimard in 1824 described this species parasitizing the eyes of *Cyphocharax gilbert*. In *S. brevipinna* was found in large quantities in the ovaries, being the most prevalent endoparasite. The adult form was described by Lunaschi and Drago (2006), parasitizing the intestine of *Ardea alba*, Linneaus 1758.

The illustration shows clearly the body bipartite in *forebody* and *hindbody*. The anterior region has vitellaria concentrated, oral sucker, pseudosuckers, ventral suckers and tribocitic organ. In posterior region has one ovary, one pair of testes and one subterminal sphincter.

Filo Nematoda

Family Pharyngodonidae Travassos, 1919

Superfamily Oxyuridea Cobbold, 1864

***Cosmoxynema vianai* Travassos, 1949 (Figure 3)**

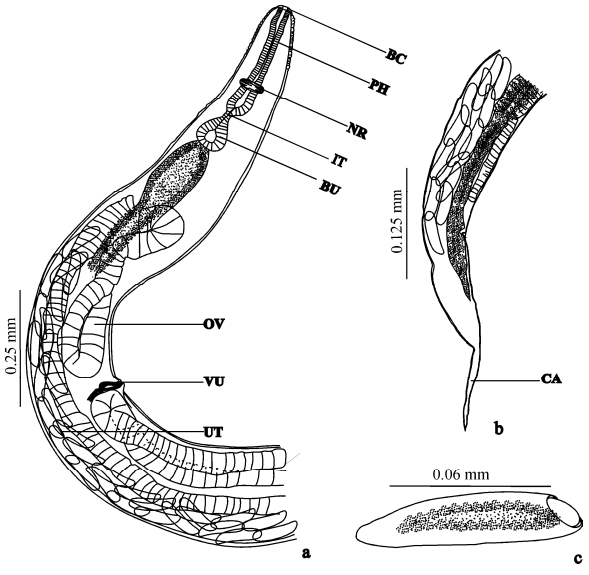

Figure 3. *Cosmoxynema vianai* Travassos, 1949. a) (anterior region): BC – buccal capsule; PH – pharynx; NR – nerve ring; IT – isthmus; BU – Bulb; OV – ovary; VU – vulva; UT – uterus with eggs .b) (posterior region): CA – caudal region. c) Egg.

Measures based on 15 specimens.

Female: Elongated body with a abrupt decrease of diameter after anus, forming a thin and long tail, 2.325 – 4.225 (3.368) long and 0.096 – 0.270 (0.158) wide; buccal capsule absent of teeth and well developed; oesophagus, 0.280 – 0.390 (0.320) long and 0.048 – 0.091 (0.069) wide, elongated and divided in: anterior region of oesophagus, 0.288 – 0.390 (0.327) long and 0.038 – 0.069 (0.047) wide; Isthmus, 0.012 – 0.021 (0.015) long and 0.090 – 0.024 (0.016) wide; and bulb, 0.062 – 0.088 (0.074) long and 0.048 – 0.091 (0.069) wide; vulva situated at the end of first quarter of body, 0.600 – 1.020 (0.739) of anterior end until the vulva; egg asymmetric, elongated with a small operculum, 0.079 – 0.187 (0.146) and 0.024 – 0.048 (0.037).

Male: Unknown.

Taxonomic Summary

Host: *Steindachnerina brevipinna* (Eigenmann and Eigenmann, 1889).

Site: Intestine.

Locality: Tributaries Guairacá and Corvo of the low Paranapanema river, Paraná State, Brazil.

Material: CHIOC: no. 37260, no. 37261.

Mean Intensity of infection: 1.33, being found maximum three parasites in a single host.

Prevalence: 28.75%.

Others hosts: *Pseudocurimata gilberti* (= Cyphocarax gilbert) and *Pseudocurimata* sp. (MORAVEC, 1998).

Distribution

Species originally described by Travassos (1949), in Barra Seca river and Juparana Lake, Espírito Santo State, Brazil. Later recorded in Paraná and Mogi Guaçu river, São Paulo State, Brazil by Vicente et al. (1985) and Moravec et al. (1992) respectively.

Comments

The genus *Cosmoxynema* was described by Travassos in 1949, and has only one species (MORAVEC, 1998). Of all nematodes found in *S. brevipinna*, *Cosmoxynema vianai* showed most long. In most cases only two parasites were found in a single host, always female. There was no record for males.

According Moravec (1998), Travassos not find the male of the species. The same is true for genus *Cosmoxynemoides*, very similar to the *Cosmoxynema*.

The illustration shows in the anterior region, cuticle striated, oesophagus and nerve ring, eggs distributed only in one region of the body, ovary and muscular vagina; in posterior region and an abrupt decrease of diameter after anus, forming a thin and long tail.

***Travnema travnema* Pereira, 1938 (Figure 4)**

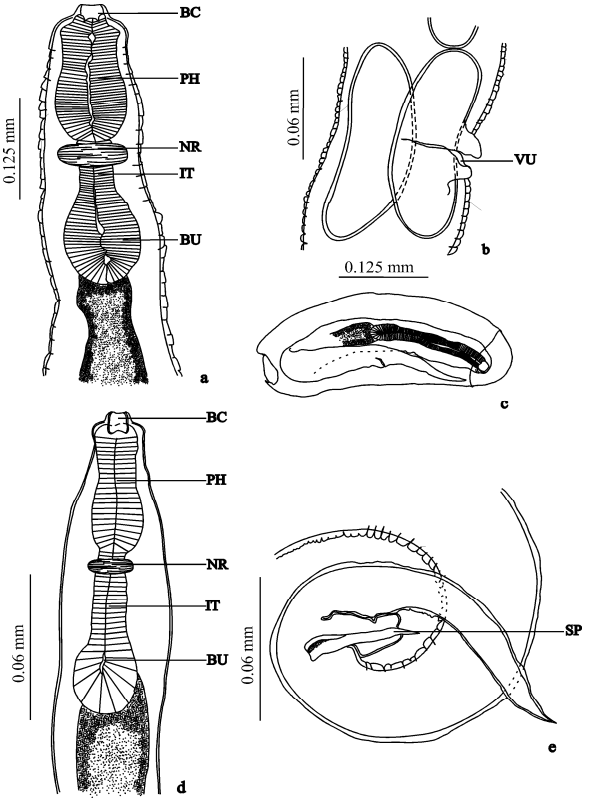

Figure 4. a-c) Female of *T. travnema* Pereira, 1938. a) (anterior region): BC – buccal capsule; PH – pharynx; NR – nerve ring; IT – isthmus; BU – bulb; b) (vulva region): VU – Vulva. c) egg development, initial fase. d-e) Male of *T. travnema* Pereira, 1938. d) (anterior region): BC – buccal capsule; PH – pharynx; NR – nerve ring; IT – isthmus; BU – bulb. e) (posterior region): SP – Spicule.

Measures based on 15 female and one male specimens.

Female: small compared to other nematodes, 1.600 – 2.425 (1.989) long and 0.084 – 0.264 (0.163) wide; Buccal capsule lack teeth and well developed; oesophagus, 0.144 – 0.187 (0.167) long and 0.031 – 0.069 (0.048) wide, divided in: anterior region of oesophagus (developed and muscular) 0.072 – 0.086 (0.079) long and 0.031 – 0.048 (0.041) wide; Isthmus, 0.024 – 0.040 (0.032) long and 0.016 – 0.024 (0.019) wide; and bulb, 0.036 – 0.079 (0.056) long and 0.031 – 0.069 (0.049) wide; vulva situated at the posterior region of second third of body, with a distance of 0.700 – 1.250 (0.947) anterior region to reproductive organ; egg asymmetric, elongated with at small operculum, 0.122 – 0.179 (0,227) long and 0.040 – 0.072 (0.050) wide.

Male: body size two times smaller than the female, 1.130 long and 0.055 wide. Oesophagus, 0.125 long and 0.025 wide; divided in: anterior region of oesophagus, 0.055 long and 0,020 wide; Isthmus, 0.037 long and 0,013 wide; and Bulb, 0.009 long and 0.014 wide; Conical tail with sharp curvature, 0.118 long and 0.080 wide in anterior region and 0.010 near to end; One spicule, 0.047 long and wide base 0.007, gubernaculum absent.

Taxonomic Summary

Host: *Steindachnerina brevipinna* (Eigenmann and Eigenmann, 1889).

Site: Intestine.

Locality: Tributaries Guairacá and Corvo of the low Paranapanema river, Paraná State, Brazil.

Material: CHIOC: no. 37258, no. 37259.

Mean Intensity of infection: 1.26, maximum of two parasites found in a single host.

Prevalence: 30.15%.

Others hosts: *Pseudocurimata elegans*, *P. gilbert* (= *Cyphocarax gilbert*), *P. plumbea* and *Astyanax bimaculatus lacustris* (MORAVEC, 1998).

Distribution

Described by Pereira (1938), *Travnema travnema* was found in northeastern Brazil, in Porangaba, Soure and Tauape lakes, Fortaleza, Ceará State, Brazil. Later found in Mogi Guaçu, Pirassununga and Paraná rivers, Brazil by Kohn et al. (1985), Kohn and Fernandes (1987) and Moravec et al. (1992).

Comments

The genus *Travnema* was described by Pereira (1938) and has two species, *T. araujoi* and *T. travnema*. The main difference between them is the presence of denticles in the buccal capsule of the first species. Besides being one of the oldest genera of Superfamily Oxyuridea, with *Laurotravassoxyuris* described in same year by Vigueiras (MORAVEC, 1998), *T. travnema* had the highest distribution and prevalence of all parasites found in *S. brevipinna*.

This parasite is small and therefore difficult to visualize on stereoscopic microscope, being best viewed after viscera washing with sieve (154 μm).

The illustration shows in the anterior region of the parasite, transverse striations, buccal capsule, oesophagus and nerve ring, vulva located in posterior region of the second third of body, in posterior region of parasite can be observed, the final part of intestine and anus; egg in initial and final stage.

Spinoxyuris sp. (Figure 5)

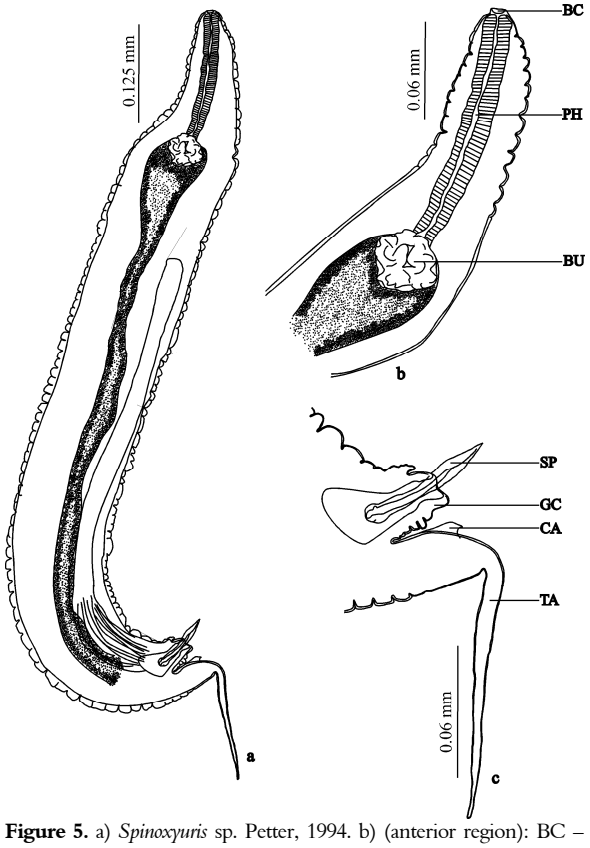

Figure 5. a) *Spinoxyuris* sp. Petter, 1994. b) (anterior region): BC – buccal capsule; PH – pharynx; BU – bulb. c) (posterior region): SP – spicule; GC – genital cone; CA – caudal alae; TA – tail.

Measures based on one male.

Male: small body, 1.130 long by 0.055 wide. Pharynx without isthmus, 0.192 long and 0.045 wide; bulb with irregular surface, 0.012 long and 0.045 wide. Terminal tail presence, 0.118 long, 0.080 anterior and 0.010 posterior wide; caudal alae presence. Genital cone well developed with only one simple and grooved spicule, 0.066 long and 0.009 wide base, gubernaculum absent.

Female: Unknown.

Taxonomic Summary

Host: *Steindachnerina brevipinna* (Eigenmann and Eigenmann, 1889).

Site: Intestine.

Locality: Tributaries Guairacá and Corvo of the low Paranapanema river, Paraná State, Brazil.

Material: CHIOC: no. 37262.

Mean Intensity of infection: 1, only one parasite found in a single host.

Prevalence: 1.58%.

Others hosts: *Oxydoras kneri* to *Spinoxyuris oxydoras* (MORAVEC, 1998).

Distribution

Genus described by Petter (1994), in Paraná river, Alto Paraná Province, Paraguay.

Comments

The Spinoxyuris genus was described by Petter (1994) with records of both sexes for a single species, *Spinoxyuris oxydoras* in host *Oxydoras kneri*, collected in Paraná river, Alto Paraná Province, Paraguay (MORAVEC, 1998). This parasite species possibly belongs to a new species, but this single specimen limits the identification only to genus level.

The illustration shows in the anterior region of the parasite, one irregular bulb which probably obtained such features due to methods of fixation. In posterior region can be observed a developed genital cone, caudal alae and only a single spicule with grooves.

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