

# Acanthocephala, Annelida, Arthropoda, Myxozoa, Nematoda and Platyhelminthes parasites of fishes from the Guandu river, Rio de Janeiro, Brazil

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**ABSTRACT:** Using information from all published reports and data collected during several parasitological surveys between April 2003 and September 2009, a checklist of the parasites of fishes from Guandu River, southeastern of Brazil was generated. A total of 85 parasite species, 54 named species (1 Acanthocephala, 1 Cestoda, 2 Crustacea, 13 Digenea, 11 Nematoda, 23 Monogenea and 3 Myxozoa) and 31 undetermined species (3 Acanthocephala, 2 Cestoda, 1 Crustacea, 8 Digenea, 8 Nematoda, 4 Hirudinea, 3 Monogenea and 2 Myxozoa) in 21 fish host species from Guandu River, were listed in the current study, including 36 new locality records and 36 new host records. Also, a host-parasite list is included herein.

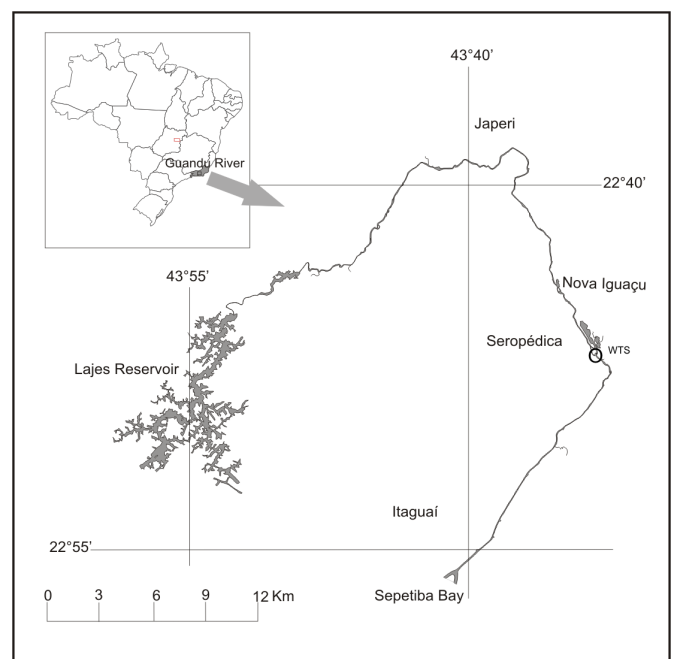
## Introduction

Brazil is the fifth largest country in the world and has the highest species diversity of all of the megadiversity countries, accounting for roughly 14 % of the world's biota (Muniz-Pereira *et al.* 2009). Parasites are recognized as an important component of global biodiversity (Poulin and Morand 2004). Given the integral roles played by parasites in natural ecosystems, identifying hotspots of high parasite diversity, as well as areas of relatively low parasite diversity, is crucial for a complete understanding of the functioning of the biosphere (Luque and Poulin 2007). Currently, the biodiversity of freshwater ecosystems of Latin America is threatened, mainly by environmental problems resulting from the degradation of the ecosystems. In this context, parasite biodiversity can be very important because parasitism plays key roles in ecosystems, regulating the abundance or density of host populations, stabilize food webs and structuring animal communities. Thus, a good knowledge of parasite diversity and whether or not it is declining is crucial for environmental management and conservation (Luque and Poulin 2007). Here we provide a checklist of the parasites species associated with fishes from Guandu River (Figure 1) in function of the strategic importance of this River, which is the main source of potable water in Rio de Janeiro. The information is presented as a list of parasite species and as a host-parasite list.

## Materials and methods

The elaboration of the checklist of the species of parasites reported from fishes from Guandu river, was based on information collected from two sources. Firstly, using published records and papers derived of literature. Secondly, through the sampling between April 2003 to September 2009 where were analyzed 786 specimens of fish, belonging to 21 species from the Guandu River (Table 1), near the dam of water treatment station (WTS) (22°48'2" S, 43°37'35" W), and captured by local fishermen. The checklist follows the classification and systematic

arrangements of the following studies: Amin (1987) for Acanthocephala; Khalil *et al.* (1994) for Cestoda; Boxshall and Halsey (2004) for Crustacea; Kohn *et al.* (2007) for Digenea; Davies (1991) for Hirudinea; Boeger and Vianna (2006) for Monogenea and Moravec (1998) for Nematoda. The parasites are arranged according to the class, order and family, within which the species are presented in alphabetical order. Parasite species names follow those provided in the most recent taxonomic literature. Species of fishes are arranged in alphabetical sequence and valid names are adopted from FishBase (Froese and Pauly 2009). The following conventions in relation to the parasite records were observed: NHR refers to a new host record and NGR refers to Guandu River as new geographical



**FIGURE 1.** Map of the Guandu river and the area of collection (circle) near to the dam of water treatment station (WTS) (22°48'32" S, 43°37'35" W)

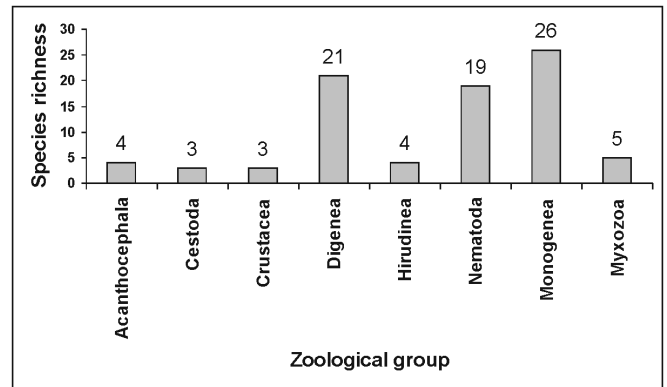
record. Voucher specimens of parasites species were deposited in the Coleção Helmintológica do Instituto de Biociências de Botucatu (CHIBB), Universidade Estadual Paulista, State of São Paulo, Brazil.

### Results and Discussion

A total of 54 named species of parasites (1 Acanthocephala, 1 Cestoda, 2 Crustacea, 13 Digenea, 11 Nematoda, 23 Monogenea and 3 Myxozoa) and 31 undetermined species of parasites (3 Acanthocephala, 2 Cestoda, 1 Crustacea, 8 Digenea, 8 Nematoda, 4 Hirudinea, 3 Monogenea and 2 Myxozoa) (Figure 2) in 21 host species (2 Anostomidae, 2 Auchenipteridae, 1 Callichthyidae, 1 Centropomidae, 4 Characidae, 4 Cichlidae, 1 Curimatidae, 1 Gymnotidae, 1 Heptapteridae, 2 Loricariidae, 1 Mugilidae and 2 Pimelodidae) from Guandu River were listed in the current study, including 36 new locality records and 36 new host records.

**TABLE 1.** Host species studied for parasites from Guandu River, State of Rio de Janeiro, Brazil, between April 2003 and September 2009.

| HOSTS  | COMMON NAME      | N TOTAL    |
|--|------------------|------------|
| <b>ANOSTOMIDAE</b>                                     |                  |            |
| <i>Leporinus conirostris</i> Steindachner, 1875        | piau             | 18         |
| <i>Leporinus copelandii</i> Steindachner, 1875         | piau             | 30         |
| <b>AUCHENIPTERIDAE</b>                                 |                  |            |
| <i>Glanidium melanopterum</i> Miranda Ribeiro, 1918    | bagre            | 10         |
| <i>Trachelyopterus striatulus</i> (Steindachner, 1877) | cumbaca          | 60         |
| <b>CALlichthyidae</b>                                  |                  |            |
| <i>Hoplosternum littorale</i> (Hancock, 1828)          | tamboatá         | 100        |
| <b>CENTROPOMIDAE</b>                                   |                  |            |
| <i>Centropomus undecimalis</i> (Bloch, 1792)           | robalo           | 31         |
| <b>CHARACIDAE</b>                                      |                  |            |
| <i>Astyanax bimaculatus</i> (Linnaeus 1758)            | lambari-amarelo  | 40         |
| <i>Astyanax paraguayensis</i> Eigenmann, 1908          | lambari-vermelho | 40         |
| <i>Mylossoma aureum</i> (Spix and Agassiz, 1829)       | pacu             | 17         |
| <i>Oligosarcus hepsetus</i> (Cuvier, 1829)             | bocarra          | 40         |
| <b>CICHLIDAE</b>                                       |                  |            |
| <i>Astronotus ocellatus</i> (Agassiz, 1831)            | apaiari          | 35         |
| <i>Cichla ocellaris</i> Bloch and Schneider, 1801      | tucunaré         | 26         |
| <i>Geophagus brasiliensis</i> (Quoy and Gaimard, 1824) | acará            | 50         |
| <i>Tilapia rendalii</i> (Boulenger, 1897)              | tilápia          | 30         |
| <b>CURIMATIDAE</b>                                     |                  |            |
| <i>Cyphocharax gilbert</i> (Quoy and Gaimard, 1824)    | sairú            | 60         |
| <b>GYMNOTIDAE</b>                                      |                  |            |
| <i>Gymnotus carapo</i> Linnaeus, 1758                  | peixe-banana     | 30         |
| <b>HEPTAPTERIDAE</b>                                   |                  |            |
| <i>Rhamdia quelen</i> (Quoy and Gaimard, 1824)         | bagre            | 32         |
| <b>LORICARIIDAE</b>                                    |                  |            |
| <i>Hypostomus affinis</i> (Steindachner, 1877)         | casculo          | 31         |
| <i>Loricariichthys castaneus</i> (Castelnau, 1855)     | casculo-viola    | 32         |
| <b>MUGILIDAE</b>                                       |                  |            |
| <i>Mugil liza</i> Valenciennes, 1836                   | tainha           | 34         |
| <b>PIMELODIDAE</b>                                     |                  |            |
| <i>Pimelodus maculatus</i> Lacépède, 1803              | mandi-amarelo    | 40         |
| <b>TOTAL</b>   |                  | <b>786</b> |



**FIGURE 2.** Species richness (number of species) of fish parasites according to zoological groups recorded in the Guandu river, State of Rio de Janeiro, Brazil.

### ACANTHOCEPHALA Rudolphi, 1808

#### EOACANTHOCEPHALA Van Cleave, 1936

#### NEOECHINORHYNCHIDA Southwell and MacFie, 1925

#### Neoechinorhynchidae Ward, 1917

##### *Neoechinorhynchus paraguayensis* Machado Filho, 1959

**Host:** *Geophagus brasiliensis* (Quoy and Gaimard, 1824)

**References:** Nickol and Padilha (1979), Azevedo *et al.* (2006), Carvalho *et al.* (2010)

##### *Neoechinorhynchus* sp.

**Host:** *Gymnotus carapo* Linnaeus, 1758 (NHR)

**Specimen deposited:** CHIBB 012L

**Reference:** Present paper

#### PALAEACANTHOCEPHALA Meyer, 1931

#### POLYMORPHIDA Petrochenko 1956

#### Polymorphidae Meyer, 1931

##### *Andracantha* sp. — cystacanth

**Hosts:** *Centropomus undecimalis* (Bloch, 1792) (NHR, NGR)

**Specimen deposited:** CHIBB 014L

**Reference:** Present paper

##### *Polymorphus* sp.— cystacanth

**Hosts:** *Astronotus ocellatus* (Agassiz, 1831), *Geophagus brasiliensis*, *Gymnotus carapo* (NHR), *Oligosarcus hepsetus* (Cuvier, 1829), *Rhamdia quelen* (Quoy and Gaimard, 1824)

**Specimens deposited:** CHIBB 013L, 023L

**References:** Abdallah *et al.* (2004), Azevedo *et al.* (2006 ; 2007), present paper

#### ANNELIDA Lamarck, 1809

#### HIRUDINEA Lamarck, 1818

#### RHYNCHOBDELLIDA Blanchard, 1894

#### Glossiphoniidae Vaillant, 1890

Glossiphoniidae gen. sp.

**Host:** *Geophagus brasiliensis*, *Gymnotus carapo*, *Hoplosternum littorale* (Hankoc, 1828)

**References:** Abdallah et al. (2006), Azevedo et al. (2006), Carvalho et al. (2010), present paper

*Helobdella* sp.

**Host:** *Pimelodus maculatus* Lacépède, 1803, *Loricariichthys castaneus* (Castelnau, 1855) (NHR), *Trachelyopterus striatulus* (Steindachner, 1877)

**Specimens deposited:** CHIBB 015L, 021L, 022L

**References:** Santos et al. (2007), Mesquita et al. (2010), present paper

*Placobdella* sp.

**Hosts:** *Astronotus ocellatus*, *Cyphocharax gilbert* (Quoy and Gaimard, 1824), *Geophagus brasiliensis*, *Hoplosternum littorale*, *Hypostomus affinis* (Steindachner, 1877)

**Specimen deposited:** CHIBB 016L

**References:** Abdallah et al. (2005; 2006), Azevedo et al. (2006, 2007), present paper

### Piscicolidae

Piscicolidae gen. sp.

**Host:** *Centropomus undecimalis*, *Geophagus brasiliensis*, *Rhamdia quelen*

**References:** Carvalho et al. (2010), present paper

### ARTHROPODA Latreille, 1829

#### MAXILLOPODA Dahl, 1956

CYCLOPOIDA Burmeister, 1834

#### Ergasilidae Von Nordmann, 1832

*Ergasilus* sp.

**Host:** *Mugil liza* Valenciennes, 1836 (NGR)

**Specimen deposited:** CHIBB 5014

**Reference:** Present paper

#### Lernaeidae Cobbold, 1879

*Lamproglana monodi* Capart, 1944

**Hosts:** *Astronotus ocellatus* (NHR, NGR), *Cichla ocellaris* Bloch and Schneider, 1801 (NHR), *Tilapia rendalii* (Boulenger, 1897)

**Specimens deposited:** CHIBB 5016, 5017

**Reference:** Present paper

SIPHONOSTOMATOIDA Thorell, 1859

#### Lernaeopodidae Milne Edwards, 1840

*Naobranchia lizae* (Kroyer, 1863)

**Host:** *Mugil liza* (NHR, NGR)

**Specimen deposited:** CHIBB 5015

**Reference:** Present paper

### MYXOZOA Grasse, 1960

### MYXOSPOREA Bütschli, 1881

BIVALVULIDA Schulman, 1959

#### Myxobolidae Thélohan, 1892

*Henneguya cyphocharax* Abdallah, Azevedo and Luque, 2007

**Host:** *Cyphocharax gilbert*

**References:** Abdallah et al. (2007)

*Henneguya guanduensis* Abdallah, Azevedo and Luque, 2007

**Host:** *Hoplosternum littorale*

**References:** Abdallah et al. (2007)

*Henneguya* sp.

**Host:** *Astyanax bimaculatus* (Linnaeus, 1758), *A. paraguayae* Eigenmann, 1908 (NHR), *Leporinus conirostris* Steindachner, 1875 (NHR), *L. copelandii* Steindachner, 1875, *Oligosarcus hepsetus* (NHR)

**Specimens deposited:** CHIBB 009L

**References:** Santos et al. (2007), present paper

*Myxobolus absonus* Cellere, Cordeiro and Adriano, 2002

**Host:** *Pimelodus maculatus*

**Reference:** Santos et al. (2007)

*Myxobolus* sp.

**Host:** *Centropomus undecimalis*, *Mugil liza*

**Specimens deposited:** CHIBB 008L, 010L

**Reference:** Present paper

### NEMATODA Rudolphi, 1808

#### ADENOPHOREA Linstow, 1905

ENOPLIDA Schuurmans, Stekhoven and Deconing, 1933

#### Capillariidae Railliet, 1915

Capillariidae gen. sp.

**Hosts:** *Gymnotus carapo*, *Hoplosternum littorale*, *Rhamdia quelen*

**Reference:** Abdallah et al. (2006), present paper

*Paracapillaria piscicola* (Travassos, Artigas and Pereira 1928)

**Hosts:** *Hypostomus affinis* (NHR, NGR), *Trachelyopterus striatulus*

**Specimens deposited:** CHIBB 4996, 4998

**Reference:** Mesquita et al. (2010), present paper

#### SECERNENTEA Linstow, 1905

ASCARIDIDA Skrjabin and Shulz, 1940

#### Anisakidae Skrjabin and Karoklin, 1945

*Contraecaecum* sp.-larval

**Hosts:** *Astronotus ocellatus*, *Centropomus undecimalis*, *Geophagus brasiliensis*, *Gymnotus carapo*, *Loricariichthys castaneus* (NHR), *Rhamdia quelen*, *Trachelyopterus striatulus*

**Specimens deposited:** CHIBB 5010, 5011

**Reference:** Azevedo *et al.* (2006; 2007), Carvalho *et al.* (2010), Mesquita *et al.* (2010), present paper

*Goezia* sp.

**Host:** *Hoplosternum littorale*

**Reference:** Abdallah *et al.* (2006)

*Hysterothylacium* sp. -larval

**Hosts:** *Mugil liza* (NHR, NGR), *Trachelyopterus striatulus*

**Specimens deposited:** CHIBB 5012, 5013

**Reference:** Mesquita *et al.* (2010), present paper

*Raphidascaris* sp. -larval

**Host:** *Cyphocharax gilbert*

**References:** Abdallah *et al.* (2005)

#### **Cucullanidae Cobbod, 1864**

*Cucullanus* (*Cucullanus*) *brevispiculus* Moravec, Kohn and Fernandes, 1993

**Host:** *Leporinus copelandii* (NHR, NGR)

**Specimen deposited:** CHIBB 5007

**Reference:** Present paper

*Cucullanus* (*Cucullanus*) *grandistomis* (Ferraz and Thatcher 1988) Moravec, Kohn and Fernandes, 1993

**Host:** *Mugil liza* (NHR, NGR)

**Specimen deposited:** CHIBB 5003

**Reference:** Present paper

*Cucullanus* (*Cucullanus*) *pinnai pinnai* Travassos, Artigas and Pereira, 1928

**Host:** *Pimelodus maculatus*

**Specimen deposited:** CHIBB 5004

**References:** Santos *et al.* (2007), Albuquerque *et al.* (2008), present paper

*Cucullanus* sp.

**Host:** *Geophagus brasiliensis*, *Rhamdia quelen* (NHR), *Trachelyopterus striatulus*

**Specimen deposited:** CHIBB 4997

**Reference:** Carvalho *et al.* (2010), Mesquita *et al.* (2010), present paper

OXYURIDA Railliet, 1916

#### **Pharyngodonidae Travassos, 1919**

*Cosmoxynemoides aguirrei* Travassos, 1949

**Hosts:** *Cyphocharax gilbert*

**References:** Abdallah *et al.* (2005)

*Spinoxyuris annulata* Moravec and Thatcher, 2001

**Host:** *Mylossoma aureum* (Spix and Agassiz, 1829) (NHR, NGR)

**Specimens deposited:** CHIBB 5002

**Reference:** Present paper

*Travnema araujo* Fernandes, Campos and Artigas, 1983

**Host:** *Cyphocharax gilbert*

**References:** Abdallah *et al.* (2005)

SPIRURIDA Chitwood, 1933

#### **Camallanidae Railliet and Henry, 1915**

*Procamallanus* (*Procamallanus*) *peraccuratus* Pinto, Fábio, Noronha and Rolas, 1976

**Hosts:** *Cichla ocellaris* (NHR, NGR), *Geophagus brasiliensis*, *Gymnotus carapo* (NHR), *Trachelyopterus striatulus*

**Specimens deposited:** CHIBB 4999, 5000, 5006

**Reference:** Carvalho *et al.* (2010), Mesquita *et al.* (2010), present paper

*Procamallanus* sp.

**Hosts:** *Pimelodus maculatus*

**Reference:** Santos *et al.* (2007)

*Procamallanus* (*Spirocamallanus*) *hilarii* Vaz and Pereira, 1934

**Hosts:** *Astyanax bimaculatus*, *A. paraguayae*

**References:** Abdallah *et al.* (2004)

*Procamallanus* (*Spirocamallanus*) *inopinatus* Travassos, Artigas and Pereira, 1928

**Host:** *Leporinus copelandii* (NGR)

**Specimen deposited:** CHIBB 5008

**Reference:** Present paper

#### **Rhabdochonidae Travassos, Artigas and Pereira, 1928**

*Rhabdochona* sp.

**Host:** *Centropomus undecimalis* (NHR, NGR)

**Specimens deposited:** CHIBB 5009

**Reference:** Present paper

*Rhabdochona uruyeni* Diaz-Ungria 1968

**Host:** *Pimelodus maculatus* (NHR, NGR)

**Specimen deposited:** CHIBB 5001

**Reference:** Present paper

#### **PLATYHELMINTHES Gegenbaur, 1859**

##### **CESTODA Van Beneden, 1849**

PROTEOCEPHALIDEA Mola, 1928

##### **Proteocephalidae La Rue, 1914**

*Nomimoscolex* sp.

**Host:** *Pimelodus maculatus*

**Specimen deposited:** CHIBB 024L

**References:** Santos *et al.* (2007), Albuquerque *et al.* (2008), present paper

*Proteocephalus macrophallus* (Diesing 1850)

**Host:** *Cichla ocellaris* (NGR)

**Specimen deposited:** CHIBB 025L

**Reference:** Present paper

*Proteocephalus* sp.

**Host:** *Gymnotus carapo* (NGR)

- Specimen deposited:** CHIBB 026L  
**Reference:** Present paper
- MONOGENEA van Beneden, 1858**
- DACTYLOGYRIDEA Bychowsky, 1937
- Dactylogyridae Bychowsky, 1933**
- Anacanthorus paraspathulatus* Kritsky, Boeger and van Every, 1992  
**Host:** *Mylossoma aureum* (NHR, NGR)  
**Specimen deposited:** CHIBB 027L  
**References:** Present paper
- Aphanoblastella mastigatus* Suriano 1986  
**Host:** *Rhamdia quelen* (NGR)  
**Specimen deposited:** CHIBB 028L  
**References:** Present paper
- Demidospermus armostus* Kritsky and Gutiérrez, 1998  
**Host:** *Pimelodus maculatus* (NGR)  
**Specimen deposited:** CHIBB 017L  
**References:** Present paper
- Demidospermus leptosynophallus* Kritsky and Gutierrez, 1998  
**Host:** *Pimelodus maculatus* (NHR, NGR)  
**Specimen deposited:** CHIBB 019L  
**References:** Present paper
- Demidospermus majusculus* Kritsky and Gutierrez, 1998  
**Host:** *Pimelodus maculatus*  
**Reference:** Santos et al. (2007)
- Demidospermus paravalenciennesi* Gutiérrez and Suriano, 1992  
**Host:** *Pimelodus maculatus*  
**Specimen deposited:** CHIBB 018L  
**References:** Santos et al. (2007), present paper
- Demidospermus* sp.  
**Host:** *Loricariichthys castaneus* (NHR)  
**Specimen deposited:** CHIBB 029L  
**References:** Present paper
- Demidospermus uncusvalidus* Gutiérrez and Suriano, 1992  
**Host:** *Pimelodus maculatus*  
**Reference:** Santos et al. (2007)
- Gussevia asota* Kritsky, Thatcher and Boeger, 1989  
**Host:** *Astronotus ocellatus*  
**References:** Azevedo et al. (2007), Abdallah et al. (2008)
- Gussevia astronoti* Kritsky, Thatcher and Boeger, 1989  
**Host:** *Astronotus ocellatus*  
**References:** Azevedo et al. (2007), Abdallah et al. (2008)
- Gussevia tucunarensis* Kritsky, Thatcher and Boeger, 1986
- Host:** *Cichla ocellaris* (NGR)  
**Specimen deposited:** CHIBB 030L  
**References:** Present paper
- Gussevia undulata* Kritsky, Thatcher and Boeger, 1986  
**Host:** *Cichla ocellaris* (NGR)  
**Specimen deposited:** CHIBB 020L  
**References:** Present paper
- Ligophorus brasiliensis* Abdallah, Azevedo and Luque, 2009  
**Host:** *Mugil liza*  
**References:** Abdallah et al. (2009)
- Ligophorus guanduensis* Abdallah, Azevedo and Luque, 2009  
**Host:** *Mugil liza*  
**References:** Abdallah et al. (2009)
- Ligophorus lizae* Abdallah, Azevedo and Luque, 2009  
**Host:** *Mugil liza*  
**References:** Abdallah et al. (2009)
- Ligophorus tainhae* Abdallah, Azevedo and Luque, 2009  
**Host:** *Mugil liza*  
**References:** Abdallah et al. (2009)
- Sciadicleithrum ergensi* Kritsky, Thatcher and Boeger, 1989  
**Host:** *Cichla ocellaris* (NGR)  
**Specimen deposited:** CHIBB 031L  
**References:** Present paper
- Sciadicleithrum guanduensis* Carvalho, Tavares and Luque, 2008  
**Host:** *Geophagus brasiliensis*  
**Reference:** Carvalho et al. (2008), (2010a)
- Trinigyryus hypostomatis* Hanek, Molnar and Fernando, 1974  
**Host:** *Hypostomus affinis* (NHR, NGR)  
**Specimen deposited:** CHIBB 032L  
**References:** Present paper
- Diplectanidae Monticelli, 1903**
- Rhabdosynochus hargisi* Kritsky, Boeger and Robaldo, 2001  
**Host:** *Centropomus undecimalis* (NGR)  
**Specimen deposited:** CHIBB 033L  
**References:** Present paper
- GYRODACTYLIDEA Bychowsky, 1937
- Gyrodactylidae van Beneden and Hesse, 1863**
- Gyrodactylus* sp.  
**Hosts:** *Astyanax bimaculatus*, *A. parahybae* (NGR)  
**Specimen deposited:** CHIBB 011L  
**References:** Present paper
- Hyperopteles malmbergi* Boeger, Kritsky and Belmont-

Jégu, 1994

**Host:** *Hypostomus affinis* (NHR, NGR)

**Specimen deposited:** CHIBB 034L

**References:** Present paper

*Phanerothecioides agostinhoi* Kritsky, Vianna and Boeger, 2007

**Host:** *Hypostomus affinis* (NGR)

**Specimen deposited:** CHIBB 035L

**References:** Present paper

*Scleroductus* sp.

**Host:** *Glanidium melanopterum* Miranda Ribeiro, 1918, *Trachelyopterus striatulus*, *Pimelodus maculatus*, *Pimelodella* sp., *Rhamdia quelen*

**References:** Kritsky et al. (1995), Santos et al. (2007)

*Scleroductus yuncensi* Jará and Con,e 1989

**Host:** *Leporinus copelandii* (NHR, NGR)

**Specimen deposited:** CHIBB 036L

**References:** Present paper

MAZOCRAEIDEA Bychowsky 1937

### Microcotylidae Taschenberg, 1879

*Anakohnia brasiliiana* Bravo–Hollis, 1986

**Host:** *Centropomus undecimalis* (NHR, NGR)

**Specimen deposited:** CHIBB 001L

**Reference:** Present paper

### TREMATODA Rudolphi, 1808

DIGENEA Carus, 1863

### Acanthocollari trematidae Travassos, Freitas and Bührnheim, 1965

*Acanthocollari trema umbilicatum* Travassos, Freitas and Bührnheim, 1965

**Host:** *Centropomus undecimalis* (NGR)

**Specimen deposited:** CHIBB 037L

**Reference:** Present paper

### Allocreadiidae (Looss, 1902) Stossich, 1903

*Creptotrema creptotrema* Travassos, Artigas and Pereira, 1928

**Host:** *Leporinus conirostris* (NHR, NGR)

**Specimen deposited:** CHIBB 038L

**Reference:** Present paper

### Apocreadidae Skrjabin, 1942

*Crassicutis* sp.

**Host:** *Geophagus brasiliensis*

**Reference:** Carvalho et al. (2010)

### Bucephalidae Poche, 1907

*Bucephalus* sp.

**Host:** *Centropomus undecimalis* (NGR)

**Specimen deposited:** CHIBB 039L, 049L

**Reference:** Present paper

### Clinostomidae Lühe, 1901

*Clinostomum complanatum* (Rudolphi, 1814) -metacercariae

**Hosts:** *Astyanax bimaculatus*, *A. paraguayae*, *Gymnotus carapo*, *Hoplosternum littorale*, *Oligosarcus hepsetus*

**References:** Abdallah et al. (2004), Abdallah et al. (2006), present paper

*Clinostomum detruncatum* Braum, 1899 -metacercariae

**Hosts:** *Rhamdia quelen* (NGR), *Trachelyopterus striatulus*

**Specimens deposited:** CHIBB 046L, 047L, 048L

**Reference:** Mesquita et al. (2010), present paper

### Diplostomidae Poirier, 1886

*Austrodiplostomum compactum* (Lutz, 1928) -metacercariae

**Hosts:** *Centropomus undecimalis* (NHR), *Cichla ocellaris*, *Cyphocharax gilbert*, *Geophagus brasiliensis*, *Gymnotus carapo* (NHR), *Hypostomus affinis* (NHR), *Loricariichthys castaneus*, *Pimelodus maculatus* (NHR), *Trachelyopterus striatulus*

**Specimens deposited:** CHIBB 007L, 040L, 041L, 042L, 043L, 044L, 045L

**References:** Abdallah et al. (2005), Azevedo et al. (2006), Santos et al. (2007), Carvalho et al. (2010a, b), Mesquita et al. (2010), present paper

*Diplostomum* sp. -metacercariae

**Host:** *Geophagus brasiliensis*, *Pimelodus maculatus*

**Specimen deposited:** CHIBB 006L

**Reference:** Carvalho et al. (2010a, b), present paper

*Neascus* tipo 1

**Host:** *Geophagus brasiliensis*

**Reference:** Carvalho et al. (2010a, b)

*Neascus* tipo 2

**Host:** *Geophagus brasiliensis*

**Reference:** Carvalho et al. (2010a, b)

*Posthodiplostomum macrocotyle* Dubois, 1937 -metacercariae

**Hosts:** *Geophagus brasiliensis*, *Trachelyopterus striatulus*

**Specimen deposited:** CHIBB 005L

**References:** Azevedo et al. (2006), Mesquita et al. (2010), present paper

*Posthodiplostomum* sp. -metacercariae

**Host:** *Geophagus brasiliensis*

**Reference:** Carvalho et al. (2010a, b)

*Sphincterodiplostomum musculosum* Dubois, 1936 -metacercariae

**Host:** *Cyphocharax gilbert*

**References:** Abdallah *et al.* (2005)

### Gorgoderidae, Looss 1901

*Phyllodistomum rhamdiae* Amato and Amato 1993

**Host:** *Rhamdia quelen*

**Reference:** Amato and Amato (1993)

### Haplospilachnidae Poche, 1926

Haplospilachnidae gen. sp.

**Host:** *Mugil liza*

**Reference:** Present paper

### Haploporidae Nicoll, 1914

*Saccocoelioides elongatus* Szidat, 1954

**Host:** *Mugil liza* (NHR, NGR)

**Specimen deposited:** CHIBB 004L

**Reference:** Present paper

### Heterophyidae Odhner, 1914

*Ascocotyle* sp.–metacercariae

**Host:** *Mugil liza* (NHR, NGR)

**Reference:** Present paper

### Lecithasteridae Odhner, 1905

*Hysterolecitha brasiliensis* Oliveira, Amato and Knoff, 1988

**Host:** *Mugil liza* (NGR)

**Specimen deposited:** CHIBB 003L

**Reference:** Present paper

### Macroderoididae McMullen, 1937

*Magnivitellinum corvitellinum* Lacerda, Takemoto and Pavanelli, 2009

**Host:** *Hoplosternum littorale* (NGR)

**Specimen deposited:** CHIBB 002L

**Reference:** Present paper

### Proterodiplostomidae (Dubois, 1936)

*Herpetodiplostomum caimanicola* (Dollfus, 1935) Dubois, 1936 -metacercariae

**Host:** *Hoplosternum littorale*

**References:** Abdallah *et al.* (2006)

### Zonocotylidae Yamaguti, 1963

*Zonocotylodes haroltravassosi* (Padilha 1978) Kohn, Fernandes, Macedo and Abramson, 1985

**Host:** *Cyphocharax gilbert*

**References:** Padilha (1978), Abdallah *et al.* (2005)

## HOST-PARASITE LIST

### ACTINOPTERYGII

#### CHARACIFORMES

### Anostomidae

*Leporinus conirostris*

*Creptotrema creptotrema*

*Henneguya* sp.

*Leporinus copelandii*

*Cucullanus (Cucullanus) brevispiculus*

*Henneguya* sp.

*Procamallanus (Spirocamallanus) inopinatus*

*Scleroductus yuncensi*

### Characidae

*Astyanax bimaculatus*

*Clinostomum complanatum*

*Gyrodactylus* sp.

*Henneguya* sp.

*Procamallanus (Spirocamallanus) hilarii*

*Astyanax parahybae*

*Clinostomum complanatum*

*Gyrodactylus* sp.

*Henneguya* sp.

*Procamallanus (Spirocamallanus) hilarii*

*Mylossoma aureum*

*Anacanthorus paraspathulatus*

*Spinoxyuris annulata*

*Oligosarcus hepsetus*

*Clinostomum complanatum*

*Henneguya* sp.

*Polymorphus* sp.

### Curimatidae

*Cyphocharax gilbert*

*Austrodiplostomum compactum*

*Cosmoxyнемoides aguirrei*

*Henneguya cyphocharax*

*Placobdella* sp.

*Raphidascaaris* sp.

*Sphincterodiplostomum musculosum*

*Travnema araujo*

*Zonocotylodes haroltravassosi*

#### GYMNOTIFORMES

### Gymnotidae

*Gymnotus carapo*

*Austrodiplostomum compactum*

Capillariidae gen. sp.

*Clinostomum complanatum*

*Contraecum* sp.

Glossiphoniidae gen. sp.

*Neoechinorhynchus* sp.

*Polymorphus* sp.

*Procamallanus (Procamallanus) peraccuratus*

*Proteocephalus* sp.

#### MUGILIFORMES

### Mugilidae

*Mugil liza*

*Ascocotyle* sp.

*Cucullanus (Cucullanus) grandistomis*

*Ergasilus* sp.

Haplospilachnidae gen. sp.

*Hysterolecitha brasiliensis*

*Hysterothylacium* sp.

*Ligophorus brasiliensis*

*Ligophorus guanduenis*

*Ligophorus lizae*  
*Ligophorus tainhae*  
*Myxobolus* sp.  
*Naobranchia lizae*  
*Saccocoelioides elongatus*

#### PERCIFORMES

##### Centropomidae

*Centropomus undecimalis*  
*Acanthocollaritrema umbilicatum*  
*Anakohnia brasiliiana*  
*Andracantha* sp.  
*Austrodiplostomum compactum*  
*Bucephalus* sp.  
*Contraecaecum* sp.  
*Myxobolus* sp.  
Piscicolidae gen. sp.  
*Rhabdochona* sp.  
*Rhabdosynochus hargisi*  
Trypanorhyncha

##### Cichlidae

*Astronotus ocellatus*  
*Contraecaecum* sp.  
*Gussevia asota*  
*Gussevia astronoti*  
*Lamproglena monodi*  
*Placobdella* sp.  
*Polymorphus* sp.  
*Cichla ocellaris*  
*Austrodiplostomum compactum*  
*Gussevia tucunarensis*  
*Gussevia undulata*  
*Lamproglena monodi*  
*Procamallanus (Procamallanus) peraccuratus*  
*Proteocephalus macrophallus*  
*Sciadicleithrum ergensi*  
*Geophagus brasiliensis*  
*Austrodiplostomum compactum*  
*Contraecaecum* sp.  
*Crassicutis* sp.  
*Diplostomum* sp.  
Glossiphoniidae gen. sp.  
*Neascus tipo 1*  
*Neascus tipo 2*  
*Neoechinorhynchus paraguayensis*  
*Placobdella* sp.  
*Polymorphus* sp.  
*Posthodiplostomum macrocotyle*  
*Posthodiplostomum* sp.  
*Sciadicleithrum guanduensis*  
*Tilapia rendalii*  
*Lamproglena monodi*

#### SILURIFORMES

##### Auchenipteridae

*Glanidium melanopterum*  
*Scleroductus* sp.  
*Trachelyopterus striatulus*  
*Austrodiplostomum compactum*  
*Clinostomum detruncatum*  
*Contraecaecum* sp.  
*Cucullanus* sp.

*Helobdella* sp.  
*Hysterothylacium* sp.  
*Paracapillaria piscicola*  
*Posthodiplostomum macrocotyle*  
*Procamallanus (Procamallanus) peraccuratus*  
*Scleroductus* sp.

##### Callichthyidae

*Hoplosternum littorale*  
Capillaridae gen. sp.  
*Clinostomum complanatum*  
Glossiphoniidae gen. sp.  
*Goezia* sp.  
*Henneguya guanduensis*  
*Herpetodiplostomum caimancola*  
*Magnivitellinum corvitellinum*  
*Placobdella* sp.

##### Heptapteridae

*Rhamdia quelen*  
*Aphanoblastella mastigatus*  
Capillariidae gen. sp.  
*Clinostomum detruncatum*  
*Contraecaecum* sp.  
*Cucullanus* sp.  
*Phyllodistomum rhamdiae*  
Piscicolidae gen. sp.  
*Polymorphus* sp.  
*Scleroductus* sp.

##### Loricariidae

*Hypostomus affinis*  
*Austrodiplostomum compactum*  
*Hyperopteles malmbergi*  
*Paracapillaria piscicola*  
*Phanerothecioides agostinhoi*  
*Placobdella* sp.  
*Trinigyryus hypostomatis*  
*Loricariichthys castaneus*  
*Austrodiplostomum compactum*  
*Contraecaecum* sp.  
*Demidospermus* sp.  
*Helobdella* sp.

##### Pimelodidae

*Pimelodus maculatus*  
*Austrodiplostomum compactum*  
*Cucullanus (Cucullanus) pinnai pinnai*  
*Demidospermus armostus*  
*Demidospermus leptosynophallus*  
*Demidospermus majusculus*  
*Demidospermus paravalenciennesi*  
*Demidospermus uncusvalidus*  
*Diplostomum* sp.  
*Helobdella* sp.  
*Myxobolus absonus*  
*Nomimoscolex* sp.  
*Procamallanus* sp.  
*Rhabdochona uruyeni*  
*Scleroductus* sp.  
*Pimelodella* sp.  
*Scleroductus* sp.

One of the main steps toward conservation of biodiversity requires systematic inventories and parasites have only recently been included in this evaluation of



biodiversity. In Brazil, only 17.3 % of fish species has its parasite fauna recorded, indicating that the total parasite biodiversity of fishes in the region is grossly underestimated (Luque and Poulin 2007).

The composition of the parasite fauna of fishes from Guandu River is represented mainly by species belonging to the families Dactylogyridae (Monogenea), Diplostomidae (Digenea), Anisakidae, Camallanidae and Cucullanidae (Nematoda). Among the groups of parasites found in this work, monogenea is the group that presented the greatest number of species. *Pimelodus maculatus* was the most parasitized fish species, with 14 species of metazoan parasites and the helminth recorded from the greatest number of hosts was the digenean *A. compactum*. Some genera are clearly specific to South American fishes, whereas others are cosmopolitan and may have been introduced into this River with the translocation of their hosts, since in the last decades the Brazil has shown how the country with largest number of non-native fish introduced into continental waters. The translocation of fish was common in the 60s and 70s, mostly from the Amazonian Basin to the Southeast and Northeast, stimulated by economic reasons, aquaculture, ornamental, sport fishing, biological control or accidental (Buckup and Menezes 2003). This work expanded the geographic distribution and recorded new host for some parasite species, with new records for Brazil.

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