



Checklist of Copepoda associated with fishes from Brazil

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Abstract

One hundred and seventy-six determined species and 39 undetermined species of copepods associated with 179 marine and freshwater fish species from Brazil are listed, including information about the site of infection, host habitat, localities and references. Also, a host-parasite list is included herein.

Key words: Copepoda, Biodiversity, freshwater and marine fishes, Neotropics, Brazil

Introduction

In recent years, parasites have been recognized as an important component of global biodiversity and research efforts directed at documenting parasite species have increased (Poulin & Morand 2004). The copepods are a common component of the ectoparasite assemblages of all kind of fishes, from all environments and ecosystems (Boxshall & Halsey 2004). In the Neotropics, copepods are the second largest parasite group in marine fishes and the third largest group in the freshwater hosts (Luque & Poulin 2007).

Early records of Copepoda parasitic on Brazilian fishes date back to the nineteenth century, and were initially the result of naturalist expeditions into its territories (Burmeister 1835; Dana 1852; Krøyer 1863; Heller 1865). In the last decade, due to the dynamic nature of copepod systematics and the scattered primary taxonomic literature, there have been only a few papers that have attempted to list copepods associated with Brazilian fishes.

Boxshall and Montú (1997) provided keys, records and brief descriptions of 78 species of parasitic copepods on marine and brackish fishes from Brazil. Thatcher (1997) listed the parasite species from Amazonian fishes. Ho (1998a,b) listed the Brazilian species of parasitic copepods, and recently, Thatcher (2006) given keys and an account of the biology and morphology of parasitic copepods from Amazonian river basin.

Here we provide an updated checklist of the Copepoda species associated with marine and freshwater fishes from Brazil. The information is presented as a list of parasite species and as a host-parasite list. We have attempted to include information from all published reports and papers that were based on original records.

Material and methods

Using published records and original data derived from our research, a checklist was generated of the reported Copepoda species associated with fishes from Brazil. The checklist follows the classification and systematic arrangement of Boxshall and Halsey (2004).

The species of Copepoda are presented in alphabetical order, followed by hosts (specific name), site of infection, predominant habitat (marine, freshwater, brackish), localities and references (between parentheses, in chronological sequence). In addition, the checklist included copepod species recorded only to genus level (undetermined species) and a few species (ergasilids mainly) described from free-living specimens. Copepod

species names follow the most recent taxonomic literature.

Mention of the copepods and host species in this list does not imply that the authors agree with their validity or taxonomy. Higher-level classification of fishes follows Nelson (2006). Species of hosts are arranged in alphabetical sequence and valid names are adopted from FishBase (Froese & Pauly 2007).

Results

Order Cyclopoida Burmeister

Family Lernaeidae Cobbold

Amazolernaea sanneræ Thatcher & Williams

Cichla monoculus, *Cichla temensis*, body surface, freshwater, Amazon River basin (Thatcher & Williams 1998).

Bedsylernaea collaris Thatcher & Williams

Hoplias malabaricus, body surface, freshwater, Pará (Thatcher & Williams 1998).

Lamproglena sp.

Astronotus ocellatus, *Oreochromis niloticus niloticus*, body surface, freshwater, Rio de Janeiro (Alves *et al.* 2000; Azevedo *et al.* 2007a).

Lernaea devastatrix Boxshall, Montú & Scharzbold

Astyanax sp., *Cyprinus carpio carpio*, *Hoplias malabaricus*, *Rhamdia* sp., body surface, freshwater, Rio Grande do Sul (Boxshall *et al.* 1997).

Lernaea cyprinacea Linnaeus

Astyanax bimaculatus, *Colossoma macropomum*, *Ctenopharyngodon idella*, *Cyprinus carpio carpio*, *Franciscodoras marmoratus*, *Hoplias malabaricus*, *Leporinus macrocephalus*, *Leporinus* sp., *Oreochromis niloticus niloticus*, *Pachyurus squamipennis*, *Piaractus mesopotamicus*, *Pimelodus blochii*, *Prochilodus brevis*, *Rhamdia sapo*, *Schizodon intermedius*, body surface, freshwater, Paraíba, Rio Grande do Sul, São Francisco River, São Paulo (Fortes *et al.* 1998; Medeiros & Maltchik 1999; Martins *et al.* 2000; Silva-Souza *et al.* 2000; Tavares-Dias *et al.* 2001; Brasil-Sato 2003; Santos & Brasil-Sato 2004, 2006).

Minilernaea floricapitella Thatcher & Huergo

Astyanax sp., *Corydoras ehrhardti*, body surface, freshwater, Santa Catarina, Paraná (Thatcher & Huergo 2005).

Perulernaea gamitanae Thatcher & Paredes

Colossoma macropomum, gills, freshwater, Amazon River basin (Thatcher & Paredes 1985a; Benetton & Malta 1999; Fischer *et al.* 2003).

Family Bomolochidae Stumpf

Acantholochus asperatus (Cressey & Cressey)

Scomberomorus cavalla, nasal sinuses, marine, unspecified locality (Cressey & Cressey 1980).

Acantholochus divaricatus (Cressey & Cressey)

Scomberomorus brasiliensis, nasal sinuses, marine, unspecified locality (Cressey & Cressey 1980).

Acantholochus unisagittatus Tavares & Luque

Centropomus undecimalis, gills, brackish, marine, Rio de Janeiro (Tavares & Luque 2003).

Bomolochus bellones Burmeister

Ablennes hians, gill chambers, marine, Northern coastal zone (Cressey & Collete 1970).

Bomolochus nitidus (Wilson)

Mugil platanus, gills, brackish, marine, Rio de Janeiro (Knoff *et al.* 1994, 1997).

Bomolochus paucus Cressey & Dojiri

Menticirrhus americanus, *Micropogonias furnieri*, gills, marine, Rio de Janeiro (Chaves & Luque 1999; Alves & Luque 2001a,b).

Bomolochus xenomelanirisi Carvalho

Atherinella brasiliensis, branchial cavity, brackish, marine, São Paulo (Carvalho 1955a).

Bomolochus sp.

Trichiurus lepturus, gills, marine, Rio de Janeiro (Silva *et al.* 2002a).

Bomolochus sp.

Aspistor luniscutis, gills, brackish, marine, Rio de Janeiro (new record).

Bomolochus sp.

Merluccius hubbsi, gills, marine, Rio de Janeiro (new record).

Ceratocolax euthynni Vervoort

Sarda sarda, nasal sinuses, marine, unespecified locality (Cressey & Cressey 1980).

Nothobomolochus cresseyi Timi & Sardella

Anchoa marinii, gills, marine, Rio de Janeiro (new record).

Orbitocolax dactylopterusi (Carvalho)

Dactylopterus volitans, eye orbit, marine, São Paulo (Carvalho 1958).

Orbitocolax haplogenyos (Yamaguti & Yamasu)

Prionotus nudigula, eye orbit, marine, Rio Grande do Sul (Cressey & Cressey 1989).

Unicolax collateralis Cressey & Cressey

Euthynnus alletteratus, nasal sinuses, marine, unespecified locality (Cressey & Cressey 1980).

Family Chondracanthidae Milne Edwards

Acanthochondria triangularis Alves, Luque & Paraguassú

Urophycis brasiliensis, *U. mystaceus*, gills, marine, Rio de Janeiro (Alves *et al.* 2003b, 2004).

Blias prionoti Krøyer

Peristedion sp., *Prionotus punctatus*, *Prionotus* sp., gills, marine, Rio de Janeiro, São Paulo (Krøyer 1863; Heller 1865; Wilson 1932; Carvalho 1951; Ho 1970; Bicudo *et al.* 2005).

Brasilochondria riograndensis Thatcher & Pereira Jr.

Paralichthys orbignyana, gills, marine, Rio Grande do Sul (Thatcher & Pereira Jr. 2004).

Chondracanthus merluccii (Holten)

Merluccius hubbsi, oral and branchial cavity, marine, São Paulo (Carvalho 1951).

Chondracanthus sp.

Paralichthys isosceles, gills, marine, Rio de Janeiro (new record).

Pseudolernentoma brasiliensis Luque & Alves

Genypterus brasiliensis, gills, marine, Rio de Janeiro (Alves & Luque 2002; Luque & Alves 2003).

Family Ergasilidae von Nordmann

Acusicola brasiliensis Amado & Rocha

Atherinella brasiliensis, *Lile piquitinga*, *Opisthonema oglinum*, gills, brackish, freshwater, Bahia, Espírito Santo, Pará, Paraná, Sergipe (Amado & Rocha 1996a).

Acusicola cunula Cressey

Pseudotylosurus angusticeps, gills, brackish, marine, unespecified locality (Cressey & Collette 1970)

Acusicola lycengraudilis Thatcher & Boeger

- Lycengraulis grossidens*, gills, freshwater, Amazon River basin (Thatcher & Boeger 1985).
- Acusicola paracunula* Amado & Rocha
Pellona flavipinnis, *Pseudotylosurus microps*, gills, freshwater, Amazon River basin (Amado & Rocha 1996a).
- Acusicola pelloneidis* Thatcher & Boeger
Pellona castelnaeana, gills, freshwater, Amazon River basin (Thatcher & Boeger 1983a).
- Acusicola rotunda* Amado & Rocha
Lycengraulis batesii, *L. grossidens*, gills, freshwater, Amazon River basin (Amado & Rocha 1996a).
- Acusicola spinulosa* Amado & Rocha
Lycengraulis batesii, gills, Amazon River basin (Amado & Rocha 1996a).
- Acusicola tucunarensis* Thatcher
Cichla ocellaris, gills, freshwater, Amazon River basin (Thatcher 1984a).
- Amplexibranchius bryconis* Thatcher & Paredes
Brycon cephalus, gills, freshwater, Amazon River basin (Thatcher & Paredes 1985b).
- Amplexibranchius* sp.
Leporinus obtusidens, *Prochilodus lineatus*, gills, freshwater, intestine, Upper Parana River (Pavanelli *et al.* 2004; Lizama *et al.* 2005; Guidelli 2006).
- Anklobrachius marajoensis* Thatcher
Free in plankton, freshwater, Amazon River basin (Thatcher 1999). *Genus inquerenda* according to Boxshall & Halsey (2004).
- Brasergasilus anodus* Thatcher & Boeger
Anodus elongatus, gills, freshwater, Amazon River basin (Thatcher & Boeger 1983b).
- Brasergasilus guaporensis* Malta
Leporinus fasciatus, gills, freshwater, Rondonia (Malta 1993a).
- Brasergasilus jaraquensis* Thatcher & Boeger
Semaprochilodus insignis, gills, freshwater, Amazon River basin (Thatcher & Boeger 1983b).
- Brasergasilus mamorensis* Varella & Malta
Hydrolycus scomberoides, gills, freshwater, Rondonia (Varella & Malta 2001).
- Brasergasilus oranus* Thatcher & Boeger
Anodus elongatus, gills, freshwater, Amazon River basin (Thatcher & Boeger 1984c).
- Brasergasilus* sp.
Pygocentrus piraya, gills, freshwater, São Francisco River (Brasil-Sato 2003).
- Ergasilus atafonensis* Amado & Rocha
Mugil curema, *M. gaimardianus*, *M. liza*, *M. platanus*, *M. trichodon*, gills, brackish, Rio de Janeiro, Rio Grande do Sul, São Paulo, Bahia, Alagoas, Sergipe, Maranhão, Pará (Amado & Rocha 1995).
- Ergasilus bahiensis* Amado & Rocha
Mugil curema, gills, brackish, Bahia (Amado & Rocha 1995).
- Ergasilus bryconis* Thatcher
Brycon cephalus, *Leporinus elongatus*, *Leporinus lacustris*, *Leporinus obtusidens*, gills, freshwater, Amazon River basin, Upper Parana River (Thatcher 1981a; Guidelli 2006).
- Ergasilus calophysus* Thatcher & Boeger
Calophysus macropterus, gills, freshwater, Amazon River basin (Thatcher & Boeger 1984b).
- Ergasilus caraguatatubensis* Amado & Rocha
Mugil curema, *M. gaimardianus*, *M. liza*, gills, brackish, São Paulo, Rio de Janeiro, Rio Grande do Sul, Alagoas, Maranhão (Amado & Rocha 1995).
- Ergasilus coatiarus* Araujo & Varella
Cichla monoculus, gills, freshwater, Amazon River basin (Araujo & Varella 1998).

Ergasilus colomesus Thatcher & Boeger

Colomesus asellus, gills, freshwater, Amazon River basin (Thatcher & Boeger 1983c).

Ergasilus cyanopictus Carvalho

Mugil cephalus, gills, brackish, São Paulo, Rio Grande do Sul (Carvalho 1962; El Rashidy & Boxshall 2002).

Ergasilus foresti Boxshall, Araújo & Montú

found free in plankton, brackish, marine, Northeastern and South coastal zone (Boxshall *et al.* 2002)

Ergasilus holobryconis Malta & Varella

Brycon pesu, gills, freshwater, Rondonia (Malta & Varella 1986).

Ergasilus hydrolycus Thatcher, Boeger & Robertson

Hydrolycus scomberoides, gills, freshwater, Amazon River basin (Thatcher *et al.* 1984).

Ergasilus hypophthalmi Boeger, Martins & Thatcher

Hypophthalmus edentatus, *H. fimbriatus*, gills, freshwater, Amazon River basin (Boeger *et al.* 1993).

Ergasilus iheringi Tidd

Hoplias malabaricus, gills, freshwater, unspecified locality (Tidd 1942).

Ergasilus jaraquensis Thatcher & Robertson

Semaprochilodus insignis, gills, freshwater, Amazon River basin (Thatcher & Robertson 1982).

Ergasilus leporinidis Thatcher

Leporinus fasciatus, gills, freshwater, Amazon River basin (Thatcher 1981b).

Ergasilus lizae Krøyer

Mugil curema, *M. platanus*, gills, brackish, Rio Grande do Norte, Rio de Janeiro (Knoff *et al.* 1994, 1997; Cavalcanti *et al.* 2004, 2005).

Ergasilus longimanus Krøyer

Mugil sp., gills, brackish, unspecified locality (Krøyer 1863).

Ergasilus orientalis Yamaguti

Potamorhaphis guianensis, gills, Amazon River basin (Cressey & Collette 1970).

Ergasilus thatcheri Engers, Boeger & Brandon

Rhamdia quelen, gills, freshwater, Rio Grande do Sul (Engers *et al.* 2000).

Ergasilus triangularis Malta

Leporinus taeniatus, gills, freshwater, Amazon River basin (Malta 1996).

Ergasilus turucuyus Malta & Varella

Acestrorhynchus falcatus, *A. falcistrostris*, gills, freshwater, Amazon River basin (Malta & Varella 1996).

Ergasilus urupaensis Malta

Prochilodus nigricans, gills, freshwater, Rondonia (Malta 1993b).

Ergasilus versicolor Wilson

Mugil cephalus, *M. curema*, gills, brackish, Rio Grande do Norte, Rio de Janeiro (Knoff *et al.* 1994, 1997; Cavalcanti *et al.* 2004, 2005).

Ergasilus xenomelanirisi Carvalho

Atherinella brasiliensis, gills, marine, São Paulo (Carvalho 1955b).

Ergasilus youngi Tavares & Luque

Aspistor luniscutis, *Genidens barbatus*, gills, brackish, Rio de Janeiro (Tavares & Luque 2004a; Tavares & Luque 2005).

Ergasilus yumaricus Malta & Varella

Pygocentrus nattereri, *Serrasalmus eigenmanni*, *S. rhombeus*, gills, freshwater, Amazon River basin (Malta & Varella 1995).

Ergasilus sp.

Anchoa tricolor, gills, marine, Rio de Janeiro (Tavares *et al.* 2005).

Ergasilus sp.

Astyanax fasciatus, *Hoplias malabaricus*, *Hypostomus affinis*, *Loricariichthys castaneus*, gills, freshwater, Rio de Janeiro (Paraguassú & Luque 2007).

Ergasilus sp.

Centropomus undecimalis, gills, brackish, Rio de Janeiro (Tavares & Luque 2004b)

Ergasilus sp.

Iheringichthys labrosus, gills, freshwater, Upper Parana River (Moreira *et al.* 2005).

Ergasilus sp.

Leporinus piau, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Ergasilus sp.

Oreochromis niloticus niloticus, gills, freshwater, Rio de Janeiro (Alves *et al.* 2000)

Ergasilus sp.

Pagrus pagrus, gills, marine, Rio de Janeiro (Paraguassú *et al.* 2002).

Ergasilus sp.

Pimelodus maculatus, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Ergasilus sp.

Prochilodus lineatus, intestine, freshwater, Upper Parana River (Pavanelli *et al.* 2004; Lizama *et al.* 2005).

Ergasilus sp.

Trachelyopterus galeatus, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Gamidactylus bryconis Varella

Brycon amazonicus, *B. melanopterus*, gills, freshwater, Rondonia (Varella 1994).

Gamidactylus hoplius Varella & Malta

Hoplias malabaricus, nose, freshwater, Rondonia (Varella & Malta 1995).

Gamidactylus jaraquensis Thatcher & Boeger

Colossoma macropomum, *Prochilodus lineatus*, *Semaprochilodus insignis*, gills, freshwater, Amazon River basin, Upper Parana River (Thatcher & Boeger 1984d; Guidelli, 2006).

Gamispatulus schizodontis Thatcher & Boeger

Schizodon fasciatus, *Leporinus elongatus*, *L. friderici*, *L. lacustris*, *L. obtudisens*, gills, freshwater, Amazon River basin, Upper Parana River (Thatcher & Boeger 1984e; Guidelli 2006).

Gamispatulus sp.

Pachyurus squamipennis, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Gamispatulus sp.

Prochilodus lineatus, gills, freshwater, Upper Parana River (Pavanelli *et al.* 2004; Lizama *et al.* 2005).

Gamispinus diabolicus Thatcher & Boeger

Ageneiosus inermis, *Pimelodus maculatus*, gills, freshwater, Amazon River basin, São Francisco River, Upper Parana River (Thatcher & Boeger 1984f; Brasil-Sato *et al.* 2000; Brasil-Sato 2003).

Gauchergasilus euripedesi (Montú)

Brevoortia pectinata, *Lycengraulis grossidens*, *Micropogonias furnieri*, gills, brackish, marine, Rio de Janeiro, Rio Grande do Sul (Montú 1980; Alves & Luque 1999, 2000, 2001a,b; Montú & Boxshall 2002).

Miracetyma etimaruya Malta

Curimata cyprinoides, *Potamorhina latior*, *Psectrogaster essequibensis*, gills, freshwater, Rondonia (Malta 1993c).

Miracetyma kawa Malta

Rhaphiodon vulpinus, gills, freshwater, Rondonia (Malta 1993d).

Miracetyma piraya Malta

Pygocentrus nattereri, gills, freshwater, Rondonia (Malta 1993e).

Pindapixara tarira Malta

Hoplias malabaricus, gills, freshwater, Rondonia (Malta 1994).

Prehendorastrus bidentatus Boeger & Thatcher

Hypophthalmus edentatus, *H. fimbriatus*, gills, freshwater, Amazon River basin (Boeger & Thatcher 1990)

Prehendorastrus monodontus Boeger & Thatcher

Hypophthalmus edentatus, *H. fimbriatus*, gills, freshwater, Amazon River basin (Boeger & Thatcher 1990)

Rhinergasilus piranhus Boeger & Thatcher

Pygocentrus nattereri, gills, freshwater, Amazon River basin (Boeger & Thatcher 1988).

Rhinergasilus sp.

Pygocentrus piraya, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Therodamas elongatus (Thatcher)

Plagioscion squamosissimus, gills, freshwater, Amazon River basin (Thatcher 1986).

Therodamas fluviatilis Velloso, Pereira Jr. & Cousin

Paralichthys orbignyanus, gills, brackish, marine, Rio Grande do Sul (Velloso *et al.* 2005).

Therodamas serrani Krøyer

Genidens barbatus, *Mugil* sp., gills, brackish, marine, São Paulo (Carvalho 1955c; Araújo & Boxshall 2001).

Therodamas tamarae Amado & Rocha

Plagioscion squamosissimus, gills, freshwater, Amazon River basin (Amado & Rocha 1996b).

Therodamas sp.

Mugil platanus, gills, brackish, marine, Rio de Janeiro (Knoff *et al.* 1997).

Therodamas sp.

Pimelodus maculatus, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Vaigamus retrobarbatus Thatcher & Robertson

free from plankton, freshwater, Amazon River basin (Thatcher & Robertson 1984).

Vaigamus spinicephalus Thatcher & Robertson

free from plankton, freshwater, Amazon River basin (Thatcher & Robertson 1984).

Vaigamus sp.

Pimelodus maculatus, gills, freshwater, São Francisco River (Brasil-Sato 2003).

Family Philichthyidae Vogt

Colobomatus belizensis Cressey & Schotte

Haemulon steindachneri, *Orthopristis ruber*, mandibular canals, marine, Rio de Janeiro (Cressey & Schotte 1983; Luque & Takemoto 1996; Luque *et al.* 1996).

Colobomatus sp.

Micropogonias furnieri, gills, marine, Rio de Janeiro (Alves & Luque 1999, 2000, 2001a,b).

Family Shiinoidae Cressey

Shiinoa inauris Cressey

Scomberomorus brasiliensis, *S. maculatus*, *S. regalis*, nasal lamellae, marine, unspecified locality (Cressey & Cressey 1980).

Family Taeniacanthidae Wilson*Taeniacanthus balistae* (Claus)

Balistes capriscus, gills, marine, Rio de Janeiro (Alves *et al.* 2005).

Taeniacanthus lagocephali Pearse

Lagocephalus laevigatus, gills, marine, unspecified locality (Dojiri & Cressey 1987).

Taeniastrotos braziliensis Montú & Boxshall

Cathorops spixii, *Genidens barbatus*, gills, brackish, Rio Grande do Sul, Rio de Janeiro (Montú & Boxshall 1997; Tavares & Luque 2004a).

Family Tuccidae Vervoort*Tucca impressus* Krøyer

Chilomycterus schoepfii, body surface, marine, São Paulo (Carvalho 1951).

Order Siphonostomatoida Thorell**Family Caligidae Burmeister***Alebion carchariae* Krøyer

Unspecified host and site of infection, marine, São Paulo (Carvalho 1940, 1951)

Anuretes anurus (Bere)

Chaetodipterus faber, body surface, gills, marine, Rio de Janeiro (Cezar & Luque 1998, 1999).

Anuretes heckelli (Krøyer)

Chaetodipterus faber, branchial cavity, marine, Rio de Janeiro (Wilson 1905).

Caligodes laciniatus (Krøyer)

Tylosurus acus acus, *Ablennes hians*, oral valve, marine, Northern coastal zone, Rio de Janeiro (Cressey & Collette 1970; Tavares *et al.* 2004).

Caligus balistae Steenstrup & Lütken

Aluterus scriptus, *Archosargus rhomboidalis*, *Balistes capriscus*, *B. vetula*, *Canthidermis maculata*, *C. sufflamen*, *Coryphaena hippurus*, *Stephanolepis hispidus*, body surface, branchial cavity, gills, marine, Rio de Janeiro (Cressey 1991; Alves *et al.* 2005; Cordeiro & Luque 2005).

Caligus bonito Wilson

Euthynnus alletteratus, *Katsuwonus pelamis*, *Mugil curema*, *M. platanus*, *Oligoplites palometa*, *Sarda sarda*, branchial and oral cavity, gills, marine, Rio Grande do Norte, Rio de Janeiro, São Paulo (Carvalho 1951; Cressey & Cressey 1980; Knoff *et al.* 1994, 1997; Takemoto *et al.* 1996; Takemoto & Luque 2002; Cavalcanti *et al.* 2004, 2006a; Alves & Luque 2006).

Caligus chorinemi Krøyer

Carangoides bartholomaei, *Caranx crysos*, *C. hippos*, body surface, branchial cavity, marine, unspecified locality (Cressey 1991).

Caligus coryphaenae Steenstrup & Lütken

Katsuwonus pelamis, *Thunnus albacares*, *T. obesus*, body surface, gills, marine, unspecified locality (Cressey & Cressey 1980).

Caligus flexispina Lewis

Chaetodipterus faber, *Mugil* sp., gills, marine, Rio de Janeiro (Luque *et al.* 1998a).

Caligus haemulonis Krøyer

Anchoa marinii, *Archosargus rhomboidalis*, *Aspistor luniscutis*, *Chaetodipterus faber*, *Genidens barbatus*,

Haemulon steindachneri, *Menticirrhus americanus*, *Micropogonias furnieri*, *Orthopristis ruber*, *Pagrus pagrus*, *Paralichthys brasiliensis*, *Prionotus punctatus*, body surface, gills, brackish, marine, Rio de Janeiro (Luque & Takemoto 1996, Luque *et al.* 1996; Cezar & Luque 1999; Alves & Luque 1999, 2000, 2001a,b; Paraguassú *et al.* 2002; Ribeiro *et al.* 2002; Luque *et al.* 2003; Tavares & Luque 2004a; Cordeiro & Luque 2005; Bicudo *et al.* 2005).

Caligus irritans Heller

Serranus sp., gills, marine, Rio de Janeiro (Heller 1865).

Caligus itacurussensis Luque & Cezar

Anchoa marinii (new record), *Atherinella brasiliensis*, gills, marine, Rio de Janeiro (Luque & Cezar 2000a).

Caligus littoralis Luque & Cezar

Atherinella brasiliensis, gills, marine, Rio de Janeiro (Luque & Cezar 2000a).

Caligus longipedis Bassett-Smith

Selene setapinnis, *S. vomer*, gills, marine, Rio de Janeiro (Cezar *et al.* 2000; Cordeiro & Luque 2004).

Caligus malabaricus Pillai

Tylosurus acus acus, gills, marine, Rio de Janeiro (Tavares *et al.* 2004).

Caligus mutabilis Wilson

Archosargus rhomboidalis, *Chaetodipterus faber*, *Scomberomorus brasiliensis*, *S. maculatus*, *Trachinotus goodei*, branchial cavity, gills, marine, Rio de Janeiro (Cressey & Cressey 1980; Luque *et al.* 1998a; Cezar & Luque 1999; Luque & Cezar 2004; Cordeiro & Luque 2005; Alves & Luque 2006).

Caligus oligoplitisi Carvalho

Oligoplites saliens, body surface, branchial cavity, marine, São Paulo (Carvalho 1956).

Caligus pelamydis Krøyer

Euthynnus alletteratus, *Pomatomus saltatrix*, *Sarda sarda*, *Scomber japonicus*, *Scomberomorus* sp., gills, marine, Rio de Janeiro (Rohde *et al.* 1995; Luque *et al.* 1998a; Abdallah *et al.* 2002; Alves *et al.* 2003a; Alves & Luque 2006).

Caligus praetextus Bere

Aspistor luniscutis (new record), *Centropomus undecimalis*, *Chaetodipterus faber*, *Cynoscion* sp., *Genidens barbatus*, *Orthopristis ruber*, *Scomberomorus* sp., *Umbrina* sp., body surface, gills, brackish, marine, Rio de Janeiro (Luque *et al.* 1998a; Tavares & Luque 2001; 2004a,b).

Caligus productus Dana

Katsuwonus pelamis, *Thunnus albacares*, body surface, branchial cavity, marine, Rio de Janeiro (Cressey & Cressey 1980; Alves & Luque 2006).

Caligus quadratus Shiino

Coryphaena hippurus, gills, marine, Rio de Janeiro (Luque *et al.* 1998a).

Caligus robustus Bassett-Smith

Caranx hippos, *C. latus*, *Oligoplites palometa*, *O. saliens*, *O. saurus*, *Selene setapinnis*, *S. vomer*, body surface, gills, marine, Rio de Janeiro (Takemoto *et al.* 1996; Cezar *et al.* 2000; Luque *et al.* 2000; Luque & Alves 2001; Takemoto & Luque 2002; Cordeiro & Luque 2004).

Caligus rufimaculatus Wilson

Oligoplites palometa, *O. saliens*, *Pomatomus saltatrix*, body surface, gills, marine, Rio de Janeiro (Takemoto *et al.* 1996; Luque *et al.* 1998a; Luque & Chaves 1999; Takemoto & Luque 2002).

Caligus sepetibensis Luque & Takemoto

Haemulon steindachneri, *Orthopristis ruber*, *Pagrus pagrus*, body surface, body surface, marine, Rio de Janeiro (Luque & Takemoto 1996; Luque *et al.* 1996; Paraguassú *et al.* 2002).

Caligus tenax Heller

Caranx hippos, gills, marine, Rio de Janeiro (Heller 1865).

Caligus trachynoti Heller

Trachinotus sp., body surface, marine, Rio de Janeiro (Heller 1865).

Caligus tetrodontis Barnard

found free in plankton, marine, Rio Grande do Sul (Montú 1982).

Caligus undulatus Shen & Li

found free in plankton, marine, Rio Grande do Sul (Montú 1982).

Caligus sp. D Cressey & Collette

Tylosurus acus acus, gills, marine, Rio de Janeiro (Tavares *et al.* 2004).

Caligus sp.

Aluterus monoceros, gills, marine, Rio de Janeiro (new record).

Caligus sp.

Aspistor luniscutis, gills, brackish, Rio de Janeiro (new record).

Caligus sp.

Cynoscion guatucupa, gills, marine, Rio de Janeiro (Sabas & Luque 2003; Timi *et al.* 2005).

Caligus sp.

Mugil curema, gills, marine, Rio Grande do Norte (Cavalcanti *et al.* 2004, 2006a).

Caligus sp.

Paralichthys orbignyanus, gills, marine, Rio Grande do Sul (Robaldo *et al.* 2002).

Caligus sp.

Peprilus paru, gills, marine, Rio de Janeiro (Azevedo *et al.* 2007b).

Euryphorus brachypterus (Gerstaecker)

Thunnus alalunga, *T. albacares*, *T. obesus*, branchial cavity, marine, Northern coastal zone (Cressey & Cressey 1980).

Euryphorus nordmanni Milne Edwards

Coryphaena hippurus, gills, marine, Rio de Janeiro (Luque *et al.* 1998a).

Gloiopotes hygomanus Steenstrup & Lütken

Acanthocybium solandri, body surface, marine, Northern coastal zone (Cressey & Cressey 1980).

Gloiopotes ornatus Wilson

Tetrapturus audax, gills, marine (Shiino 1959).

Lepeophtheirus bagri Dana

Aspistor luniscutis (new record), *Genidens barbatus*, *Paralichthys* sp., body surface, gills, brackish, marine, Rio de Janeiro (Luque & Cezar 2000b)

Lepeophtheirus curtus (Wilson)

Mycteroperca bonaci, body surface, marine, Bahia, Espirito Santo (Luque *et al.* 1998a).

Lepeophtheirus monacanthus Heller

Ariopsis felis, *Arius heudelotii*, *Aspistor luniscutis*, *Bagre marinus*, *Genidens barbatus*, body surface, gills, brackish, marine, Bahia, Espirito Santo, Rio de Janeiro (Heller 1865; Luque & Cezar 2000b; Tavares & Luque 2004a).

Lepeophtheirus rhinobati Luque, Chaves & Cezar

Rhinobatos sp., body surface, marine, Rio Grande do Sul (Luque *et al.* 1998b).

Metacaligus rufus (Wilson)

Merluccius sp., *Oligoplites palometa*, *O. saliens*, *Scomberomorus* sp., *Selene vomer*, *Trichiurus lepturus*, *Umbrina* sp., gills, marine, Rio de Janeiro (Rohde *et al.* 1995; Takemoto *et al.* 1996; Luque *et al.* 1998a; Cezar *et al.* 2000; Takemoto & Luque 2002).

Metacaligus uruguayensis Thomsen

Trichiurus lepturus, gills, marine, Rio Grande do Sul, Rio de Janeiro (Rohde *et al.* 1995; Boxshall & Montú 1997; Luque *et al.* 1998a; Silva *et al.* 2000b,c).

Metacaligus sp.

Tylosurus acus acus, gills, marine, Rio de Janeiro (Tavares *et al.* 2004).

Tuxophorus caligodes Wilson

Mugil platanus, *Oligoplites palometa*, *O. saliens*, *O. saurus*, *Scomberomorus* sp., *Selene vomer*, *Trachinotus goodei*, gills, marine, Rio de Janeiro (Knoff *et al.* 1994, 1997; Takemoto *et al.* 1996; Luque *et al.* 1998a; Cezar *et al.* 2000; Takemoto & Luque 2002; Luque & Cezar 2004).

Family Dichelesthiidae Milne Edwards

Anthosoma crassum (Abildgaard)

Isurus oxyrinchus, body surface, marine, Rio Grande do Sul (Montú, 1996).

Kabatarina pattersoni Cressey & Boxshall

Cladocyclus gardneri, gills, fossil, Lower Cretaceous, Ceará (Cressey & Boxshall 1989).

Family Hatschekiidae Kabata

Hatschekia quadrabdominalis Yu

Priacanthus arenatus, gills, marine, Rio de Janeiro (Tavares *et al.* 2001a,b).

Hatschekia sp.

Cephalopholis fulva, gills, marine, Rio de Janeiro (new record)

Hatschekia sp.

Prionotus punctatus, gills, marine, Rio de Janeiro (Bicudo *et al.* 2005).

Family Kroyeriidae Kabata

Kroyeria brasiliense Thatcher & Pereira Jr.

Galeorhinus galeus, gills, marine, Rio Grande do Sul (Thatcher & Pereira Jr. 2006).

Family Lernaeopodidae Milne Edwards

Brachiella thynni Cuvier

Acanthocybium solandri, fins, marine, Northern coastal zone, Santa Catarina, (Cressey & Cressey 1980; Boxshall & Montú 1997).

Brachiella coryphaenae Pearse

Coryphaena hippurus, branchial cavity, marine, Rio de Janeiro (new record)

Charopinopsis quaternia (Wilson)

Unspecified host and locality, marine (Boxshall & Montú 1997).

Clavellisa scombri Kurz

Scomber japonicus, gills, marine, Rio de Janeiro (Rohde *et al.* 1995; Abdallah *et al.* 2002; Alves *et al.* 2003a).

Clavellistes lampri (Scott & Scott)

Lampris guttatus, gills, marine, São Paulo (new record).

Clavellopsis sp.

Archosargus rhomboidalis, gills, marine, Rio de Janeiro (Cordeiro & Luque 2005).

Clavellotis dilatata (Krøyer)

Haemulon steindachneri, *Micropogonias furnieri*, *Pagrus pagrus*, gills, marine, Rio de Janeiro (Luque & Takemoto 1996; Luque *et al.* 1996; Alves & Luque 1999; 2000; 2001a,b; Paraguassú *et al.* 2002).

Lernaeopoda galei Krøyer

Unspecified host and locality (Boxshall & Montú 1997).

Naobranchia lizae (Krøyer)

Chilomycterus spinosus spinosus, *Mugil platanus*, gills, brackish, marine, Rio de Janeiro (Leigh-Sharpe 1926; Knoff *et al.* 1994, 1997).

Naobranchia stibara Leigh-Sharpe

Chilomycterus spinosus spinosus, gills, marine, unspecified locality (Leigh-Sharpe 1926).

Neobrachiella chevreurii (Van Beneden)

Micropogonias furnieri, *Paralonchurus brasiliensis*, gills, marine, Rio de Janeiro (Rohde *et al.* 1995; Alves & Luque 1999; 2000; 2001a, b; Ribeiro *et al.* 2002; Luque *et al.* 2003).

Neobrachiella exilis (Shiino)

Mugil platanus, fins, brackish, marine, Rio de Janeiro (Knoff *et al.* 1994, 1997).

Neobrachiella gulosa (Wilson)

Unspecified host and locality, marine (Boxshall & Montú).

Neobrachiella insidiosa f. lageniformis Kabata

Merluccius hubbsi, gills, marine, Rio de Janeiro (new record).

Thysanote lobiventris (Heller)

Rypticus saponaceus, branchial cavity, marine, Southwestern coastal zone (Heller 1865).

Family Lernanthropidae Kabata

Lernanthropus belones Krøyer

Strongylura marina, *S. timucu*, gills, marine, Rio de Janeiro (Cressey & Collette 1970).

Lernanthropus caudatus Wilson

Pagrus pagrus, gills, marine, Rio de Janeiro (Paraguassú *et al.* 2002; Luque & Paraguassú 2003).

Lernanthropus cornutus Kirtisinghe

Strongylura timucu, gills, marine, Rio de Janeiro (Cressey & Collette 1970).

Lernanthropus cynoscicola Timi & Etchegoin

Cynoscion guatucupa, gills, marine, Rio de Janeiro (Sabas & Luque 2003; Timi *et al.* 2005).

Lernanthropus giganteus Krøyer

Caranx hippos, *C. latus*, gills, marine, Rio de Janeiro (Luque *et al.* 2000; Luque & Alves 2001).

Lernanthropus gisleri Van Beneden

Centropomus undecimalis, gills, brackish, marine, Rio de Janeiro (Tavares & Luque 2004b).

Lernanthropus leydii Wilson

Umbrina canosai, gills, marine, Rio de Janeiro (Luque & Paraguassú 2003).

Lernanthropus nobilis Heller

Pomatomus saltatrix, gills, marine, Southwestern coastal zone (Heller 1865).

Lernanthropus pagodus Krøyer

Equetus lanceolatus, gills, marine, Southwestern coastal zone (Krøyer 1863).

Lernanthropus pomatomi Rathbun

Pomatomus saltatrix, gills, marine, Rio de Janeiro (Luque & Chaves 1999).

Lernanthropus pupa (Burmeister)

Chaetodipterus faber, *Lobotes surinamensis*, *Platax* sp., gills, marine, Rio de Janeiro, (Burmeister 1835; Cezar & Luque 1999).

Lernanthropus rathbuni Wilson

Haemulon steindachneri, *Orthopristis ruber*, *Pomadasys corvinaeformis*, gills, marine, Rio de Janeiro, Rio Grande do Norte (Luque & Takemoto 1996; Luque *et al.* 1996; Cavalcanti *et al.* 2004; 2006b).

Lernanthropus tylosuri Richiardi

Ablennes hians, *Tylosurus acus acus*, gills, marine, Rio de Janeiro (Cressey & Collette 1970; Tavares *et al.* 2004).

Lernanthropus sp.

Sarda sarda, gills, marine, Rio de Janeiro (Alves & Luque 2006).

Family Pandaridae Milne Edwards, 1840

Dinemoura latifolia (Steenstrup & Lütken)

Carcharhinus sp., *Isurus oxyrinchus*, body surface, marine, Rio Grande do Sul (Montú 1982, 1996).

Echthrogaleus coleoptratus (Guerin-Meneville)

Prionace glauca, body surface, marine, Rio Grande do Sul, Rio de Janeiro (Montú 1996; Luque *et al.* 1998a).

Nessipus orientalis Heller

Prionace glauca, body surface, marine, Rio de Janeiro (Luque *et al.* 1998a).

Pandarus bicolor Leach

Carcharhinus signatus, body surface, marine, Rio Grande do Sul (Montú 1996).

Pandarus cranchii Leach

Sphyrna lewini, body surface, marine, Rio de Janeiro (Luque *et al.* 1998a).

Pandarus floridanus Cressey

Prionace glauca, body surface, marine, Santa Catarina, (new record).

Pandarus satyrus Dana

Prionace glauca, body surface, marine, Santa Catarina (new record).

Pandarus sinuatus Say

Carcharhinus limbatus, body surface, marine, São Paulo (Carvalho 1940, 1951).

Pandarus smithii Rathbun

Carcharhinus limbatus, *Sphyrna zygaena*, body surface, marine, São Paulo (Carvalho 1940).

Perissopus armatus (Dana)

Mustelus mustelus, body surface, marine, Rio de Janeiro (Dana 1852).

Perissopus dentatus Steenstrup & Lütken

Carcharhinus limbatus, body surface, marine, São Paulo, Rio de Janeiro, (Carvalho 1940; Luque *et al.* 1998a).

Perissopus oblongus (Wilson)

Unspecified host, body surface, marine, Rio Grande do Sul (Luque *et al.* 1998a).

Family Pennellidae Burmeister

Lernaeenicus longiventris Wilson

Atherinella brasiliensis, *Mugil platanus*, *Scomberomorus brasiliensis*, *S. maculatus*, body surface, gills, brackish, marine, Rio de Janeiro, São Paulo (Carvalho 1951, 1953, 1957; Knoff & Boeger 1994; Knoff *et al.* 1997).

Lernaeenicus sp.

Selene setapinnis, gills, marine, Rio de Janeiro (Cordeiro & Luque 2004).

Lernaeocera sp.

Pagrus pagrus, gills, marine, Rio de Janeiro (Paraguassú *et al.* 2002).

Lernaeocera sp.

Priacanthus arenatus, gills, marine, Rio de Janeiro (Tavares *et al.* 2001b).

Metapeniculus haemuloni (Alexander)

Haemulon steindachneri, fins, marine, São Paulo (Alexander, 1983).

Pennella filosa (Linnaeus)

Mola mola, body surface, marine, São Paulo (Carvalho 1951).

Trifur tortuosus Krøyer

Unspecified host, body surface, marine, Rio Grande do Sul (Boxshall & Montú 1997).

Family Pseudocycnidae Wilson

Cybicola buccata (Wilson)

Scomberomorus brasiliensis, *S. cavalla*, *S. concolor*, *S. regalis*, gills, marine, Rio de Janeiro (Cressey & Cressey 1980; Alves & Luque 2006).

Pseudocycnus appendiculatus Heller

Euthynnus alletteratus, *Katsuwonus pelamis*, gills, marine, Rio de Janeiro, São Paulo (Carvalho 1950; Alves & Luque 2006).

Host parasite list

Class Actinopterygii (ray-finned fishes)

Order Atheriniformes

Family Atherinopsidae

Atherinella brasiliensis (Quoy & Gaimard)

Acusicola brasiliensis

Caligus itacurussensis

Caligus littoralis

Ergasilus xenomelanirisi

Lernaeenicus longiventris

Parabomolochus xenomelanirisi

Order Beloniformes

Family Belonidae

Ablennes hians (Valenciennes)

Bomolochus bellones

Caligodes laciniatus

Lernanthropus tylosuri

Potamorrhaphis guianensis (Jardine)

Ergasilus orientalis

Pseudotylosurus angusticeps (Günther)

Acusicola cunula

Pseudotylosurus microps (Günther)

Acusicola paracunula

Strongylura marina (Walbaum)

Lernanthropus belones

Strongylura timucu (Walbaum)

Lernanthropus belones

Lernanthropus cornutus

Tylosurus acus acus (Lacépède)

Caligus malabaricus

Caligodes laciniatus

Caligus sp. D

Lernanthropus tylosuri

Metacaligus sp.

Order Clupeiformes

Family Clupeidae

Brevoortia pectinata (Jenyns)

Gauchergasilus euripedesi

Lile piquitinga (Schreiner & Miranda-Ribeiro)

Acusicola brasiliensis

Opisthonema oglinum (Lesueur)

Acusicola brasiliensis

Family Engraulidae

Anchoa marinii Hildebrand

Caligus itacurussensis

Caligus haemulonis

Nothobomolochus cresseyi

Anchoa tricolor (Spix & Agassiz)

Ergasilus sp.

Lycengraulis batesii (Günther)

Acusicola rotunda

Acusicola spinulosa

Lycengraulis grossidens (Agassiz)

Acusicola rotunda

Acusicola lycengraudilis

Gauchergasilus euripedesi

Family Pristigasteridae

Pellona castelnaeana Valenciennes

Acusicola pellonidis

Pellona flavipinnis (Valenciennes)

Acusicola paracunula

Order Characiformes

Family Acestrorhynchidae

Acestrorhynchus falcatus (Bloch)

Ergasilus turucuyus

Acestrorhynchus falcirostris (Cuvier)

Ergasilus turucuyus

Family Anostomidae

Leporinus elongatus Valenciennes

Ergasilus bryconis

Gamispatulus schizodontis

Leporinus fasciatus (Bloch)

Brasergasilus guaporensis

Ergasilus leporinidis

Leporinus friderici (Bloch)

Gamispatulus schizodontis

Leporinus lacustris Amaral Campos

Ergasilus bryconis

Gamispatulus schizodontis

Leporinus macrocephalus Garavello & Britski

Lernaea cyprinacea

Leporinus obtusidens (Valenciennes)

Amplexibranchius sp.

Ergasilus bryconis

Gamispatulus schizodontis

Leporinus piau Fowler

Ergasilus sp.

Leporinus taeniatus Lütken

Ergasilus triangularis

Leporinus sp.

Lernaea cyprinacea

Schizodon intermedius Garavello & Britski

Lernaea cyprinacea

Gamispatulus schizodontis

Family Characidae

Astyanax bimaculatus (Linnaeus)

Lernaea cyprinacea

Astyanax fasciatus (Cuvier)

Ergasilus sp.

Astyanax sp.

Lernaea devastatrix

Gamidactylus bryconis

Minilernaea floricapitella

Brycon amazonicus (Spix & Agassiz)

Gamidactylus bryconis

Brycon cephalus (Günther)

Amplexibranchius bryconis

Ergasilus bryconis

Brycon melanopterus (Cope)

Gamidactylus bryconis

Brycon pesu Müller & Troschel

Ergasilus holobryconis

Colossoma macropomum (Cuvier)

Gamidactylus jaraquensis

Lernaea cyprinacea

Perulernaea gamitanae

Piaractus mesopotamicus (Holmberg)

Lernaea cyprinacea

Pygocentrus nattereri Kner

Ergasilus yumaricus

Miracetyma piraya

Rhinergasilus piranhus

Pygocentrus piraya (Cuvier)

Brasergasilus sp.

Rhinergasilus sp.

Serrasalmus eigenmanni Norman

Ergasilus yumaricus

Serrasalmus rhombeus (Linnaeus)

Ergasilus yumaricus

Family Curimatidae

Curimata cyprinoides (Linnaeus)

Miracetyma etimaruya

Potamorhina latior (Spix & Agassiz)

Miracetyma etimaruya

Psectrogaster essequibensis (Günther)

Miracetyma etimaruya

Family Cynodontidae

Hydrolycus scomberoides (Günther)

Brasergasilus mamorensis

Ergasilus hydrolycus

Rhaphiodon vulpinus Agassiz

Miracetyma kawa

Family Erythrinidae

Hoplias malabaricus (Bloch)

Bedsylernaea collaris

Ergasilus iheringi

Ergasilus sp.

Gamidactylus hoplius

Lernaea cyprinacea

Lernaea devastatrix

Pindapixara tarira

Family Hemiodontidae

Anodus elongatus Agassiz

Brasergasilus anodus

Brasergasilus oranus

Family Prochilodontidae

Prochilodus brevis Steindachner

Lernaea cyprinacea

Prochilodus lineatus (Valenciennes)

Amplexibranchius sp.

Ergasilus sp.

Gamidactylus jaraquensis

Gamispatulus sp.

Prochilodus nigricans Spix & Agassiz

Ergasilus urupaensis

Semaprochilodus insignis (Jardine & Schomburgk)

Brasergasilus jaraquensis

Ergasilus jaraquensis

Gamidactylus jaraquensis

Order Cypriniformes

Family Cyprinidae

Ctenopharyngodon idella (Valenciennes)

Lernaea cyprinacea

Cyprinus carpio carpio Linnaeus

Lernaea devastratix

Lernaea cyprinacea

Order Gadiformes

Family Merlucciidae

Merluccius hubbsi Marini

Bomolochus sp.

Chondracanthus merluccii

Neobrachiella insidiosa f. *lageniformis*

Merluccius sp.

Metacaligus rufus

Family Phycidae

Urophycis brasiliensis (Kaup)

Acanthochondria triangularis

Urophycis mystacea Miranda-Ribeiro

Acanthochondria triangularis

Order Ichthyodectiformes (Fossil)

Family Ichthyodectidae

Cladocycclus gardneri Agassiz (fossil)

Kabatarina pattersoni (fossil)

Order Lampriformes

Family Lampridae

Lampris guttatus (Brünnich)

Clavellistes lampri

Order Ophidiiformes

Family Ophidiidae

Genypterus brasiliensis Regan

Pseudolernentoma brasiliensis

Order Perciformes

Family Carangidae

Carangoides bartholomaei (Cuvier)

Caligus chorinemi

Caranx crysos (Mitchill)

Caligus chorinemi

Caranx hippos (Linnaeus)

Caligus chorinemi

Caligus robustus

Caligus tenax

Lernanthropus giganteus

Caranx latus Agassiz

Caligus robustus

Lernanthropus giganteus

Oligoplites palometa (Cuvier)

Caligus bonito

Caligus robustus

Caligus rufimaculatus

Metacaligus rufus

Tuxophorus caligodes

Oligoplites saliens (Bloch)

Caligus oligoplitisi

Caligus robustus

Caligus rufimaculatus

Metacaligus rufus

Tuxophorus caligodes

Oligoplites saurus (Bloch & Schneider)

Caligus robustus

Tuxophorus caligodes

Selene setapinnis (Mitchill)

Caligus longipedis

Caligus robustus

Lernaeenicus sp.

Selene vomer (Linnaeus)

Caligus longipedis

Caligus robustus

Metacaligus rufus

Tuxophorus caligodes

Trachinotus goodei Jordan & Evermann

Caligus mutabilis

Tuxophorus caligodes

Trachinotus sp.

Caligus trachynoti

Family Centropomidae

Centropomus undecimalis (Bloch)

Acantholochus unisagittatus

Caligus praetextus

Ergasilus sp.

Lernanthropus gisleri

Family Cichlidae

Astronotus ocellatus (Agassiz)

Lamproglena sp.

Cichla monoculus Spix & Agassiz

Amazolernaea sanneriae

Ergasilus coatiarus

Cichla ocellaris Bloch & Schneider

Acusicola tucunarensis

Cichla temensis Humboldt

Amazolernaea sanneriae

Oreochromis niloticus niloticus (Linnaeus)

Ergasilus sp.

Lamproglena sp.

Lernaea cyprinacea

Family Coryphaenidae

Coryphaena hippurus Linnaeus

Brachiella coryphaenae

Caligus balistae

Caligus quadratus

Euryphorus nordmanni

Family Ehippidae

Chaetodipterus faber (Broussonet)

Anuretes anurus

Anuretes heckelli

Caligus flexispina

Caligus haemulonis

Caligus mutabilis

Caligus praetextus

Lernanthropus pupa

Platax sp.

Lernanthropus pupa

Family Haemulidae

Haemulon steindachneri (Jordan & Gilbert)

Caligus haemulonis

Caligus sepetibensis

Clavellotis dilatata

Colobomatus belizensis

Lernanthropus rathbuni

Metapeniculus haemuloni

Orthopristis ruber (Cuvier)

Caligus haemulonis

Caligus praetextus

Caligus sepetibensis

Colobomatus belizensis

Lernanthropus rathbuni

Pomadasys corvinaeformis (Steindachner)

Lernanthropus rathbuni

Family Istiophoridae

Tetrapturus audax (Philippi)

Gloiopotes ornatus

Family Lobotidae

Lobotes surinamensis (Bloch)

Lernanthropus pupa

Family Mugilidae

Mugil cephalus Linnaeus

Ergasilus cyanopictus

Ergasilus versicolor

Mugil curema Valenciennes

Caligus bonito

Caligus sp.

Ergasilus atafonensis

Ergasilus bahiensis

Ergasilus caraguatatubensis

Ergasilus lizae

Ergasilus versicolor

Mugil gaimardianus Desmarest

Ergasilus atafonensis

Ergasilus caraguatatubensis

Mugil liza Valenciennes

Ergasilus atafonensis

Ergasilus caraguatatubensis

Mugil platanus Günther

Bomolochus nitidus

Caligus bonito

Ergasilus atafonensis

Ergasilus lizae

Ergasilus versicolor

Lernaeenicus longiventris

Naobranchia lizae

Neobranchiella exilis

Therodamas sp.

Tuxophorus caligodes

Mugil trichodon Poey

Ergasilus atafonensis

Mugil sp.

Caligus flexispina
Ergasilus longimanus
Therodamas serrani

Family Pomatomidae

Pomatomus saltatrix (Linnaeus)
Caligus pelamydis
Caligus rufimaculatus
Lernanthropus nobilis
Lernanthropus pomatomi

Family Priacanthidae

Priacanthus arenatus Cuvier
Hatschekia quadrabdominalis
Lernaeocera sp.

Family Sciaenidae

Cynoscion guatucupa (Cuvier)
Caligus sp.
Lernanthropus cynoscicola
Cynoscion sp.
Caligus praetextus
Equetus lanceolatus (Linnaeus)
Lernanthropus pagodus
Menticirrhus americanus (Linnaeus)
Bomolochus paucus
Menticirrhus littoralis (Holbrook)
Caligus haemulonis
Micropogonias furnieri (Desmarest)
Bomolochus paucus
Caligus haemulonis
Clavellotis dilatata
Colobomatus sp.
Gauchergasilus euripedesi
Neobrachiella chevreuxii
Pachyurus squamipennis Agassiz
Gamispatulus sp.
Lernaea cyprinacea
Paralonchurus brasiliensis (Steindachner)
Caligus haemulonis
Neobrachiella chevreuxii
Plagioscion squamosissimus (Heckel)
Therodamas elongatus
Therodamas tamarae

Umbrina canosai Berg
Lernanthropus leydii
Umbrina sp.
Caligus praetextus
Metacaligus rufus

Family Scombridae

Acanthocybium solandri (Cuvier)
Brachiella thynni
Gloiopotes hygomianus
Euthynnus alletteratus (Rafinesque)
Caligus bonito
Caligus pelamydis
Pseudocycnus appendiculatus
Unicolax collateralis
Katsuwonus pelamis (Linnaeus)
Caligus bonito
Caligus coryphaenae
Caligus productus
Pseudocycnus appendiculatus
Sarda sarda (Bloch)
Caligus bonito
Caligus pelamydis
Ceratocolax euthynni
Lernanthropus sp.
Scomber japonicus Houttuyn
Caligus pelamydis
Clavellisa scombri
Scomberomorus brasiliensis Collette, Russo & Zavala-Camin
Acantholochus divaricatus
Caligus mutabilis
Lernaeenicus longiventris
Pseudocycnoides buccata
Shiinoa inauris
Scomberomorus cavalla (Cuvier)
Acantholochus asperatus
Pseudocycnoides buccata
Scomberomorus maculatus (Mitchill)
Caligus mutabilis
Lernaeenicus longiventris
Shiinoa inauris
Scomberomorus regalis (Bloch)
Pseudocycnoides buccata
Shiinoa inauris
Scomberomorus sp.
Caligus pelamydis

Caligus praetextus

Metacaligus rufus

Tuxophorus caligodes

Thunnus alalunga (Bonnaterre)

Euryphorus brachypterus

Thunnus albacares (Bonnaterre)

Caligus coryphaenae

Caligus productus

Euryphorus brachypterus

Thunnus obesus (Lowe)

Caligus coryphaenae

Euryphorus brachypterus

Family Serranidae

Cephalopholis fulva (Linnaeus)

Hatschekia sp.

Mycteroperca bonaci (Poey)

Lepeophtheirus curtus

Rypticus saponaceus (Bloch & Schneider)

Thysanote lobiventris

Serranus sp.

Caligus irritans

Family Sparidae

Archosargus rhomboidalis (Linnaeus)

Caligus balistae

Caligus haemulonis

Caligus mutabilis

Clavellopsis sp.

Pagrus pagrus (Linnaeus)

Caligus haemulonis

Caligus sepetibensis

Clavellotis dilatata

Ergasilus sp.

Lernaeocera sp.

Lernanthropus caudatus

Family Stromateidae

Peprilus paru (Linnaeus)

Caligus sp.

Family Trichiuridae

Trichiurus lepturus Linnaeus

Bomolochus sp.

Metacaligus rufus

Metacaligus uruguayensis

Order Pleuronectiformes

Family Paralichthyidae

Paralichthys isosceles Jordan

Chondracanthus sp.

Paralichthys orbignyanus (Valenciennes)

Brasilochondria riograndensis

Caligus sp.

Therodamas fluviatilis

Paralichthys sp.

Lepeophtheirus bagri

Order Scorpaeniformes

Family Dactylopteridae

Dactylopterus volitans (Linnaeus)

Orbitocolax dactylopterusi

Family Peristediidae

Peristedion sp.

Blias prionoti

Family Triglidae

Prionotus nudigula Ginsburg

Orbitocolax haplogenyos

Prionotus punctatus (Bloch)

Blias prionoti

Caligus haemulonis

Hatschekia sp.

Prionotus sp.

Blias prionoti

Order Siluriformes

Family Ariidae

Ariopsis felis (Linnaeus)

Lepeophtheirus monacanthus

Arius heudelotii Valenciennes

Lepeophtheirus monacanthus

Aspistor luniscutis (Valenciennes)

Ergasilus youngi

Bomolochus sp.

Caligus haemulonis

Caligus praetextus

Caligus sp.

Lepeophtheirus bagri

Lepeophtheirus monacanthus

Bagre marinus (Mitchill)

Lepeophtheirus monacanthus

Cathorops spixii (Agassiz)

Taeniastrotois braziliensis

Genidens barbatus (Lacépède)

Caligus haemulonis

Caligus praetextus

Ergasilus youngi

Lepeophtheirus bagri

Lepeophtheirus monacanthus

Taeniastrotois braziliensis

Therodamas serrani

Family Auchenipteridae

Ageneiosus inermis (Linnaeus)

Gamispinus diabolicus

Trachelyopterus galeatus (Linnaeus)

Ergasilus sp.

Family Callichthyidae

Corydoras ehrhardti Steindachner

Minilernaea floricapitella

Family Doradidae

Franciscodoras marmoratus (Reinhardt)

Ergasilus sp.

Lernaea cyprinacea

Family Heptapteridae

Rhamdia quelen (Quoy & Gaimard)

Ergasilus thatcheri

Rhamdia sapo (Valenciennes)

Lernaea cyprinacea

Rhamdia sp.

Lernaea devastatrix

Family Loricariidae

Hypostomus affinis (Steindachner)

Ergasilus sp.

Loricariichthys castaneus (Castelnau)

Ergasilus sp.

Family Pimelodidae

Calophysus macropterus (Lichtenstein)

Ergasilus calophysus

Hypophthalmus edentatus Spix & Agassiz

Ergasilus hypophthalmi

Prehendorastrus bidentatus

Prehendorastrus monodontus

Hypophthalmus fimbriatus Kner

Ergasilus hypophthalmi

Prehendorastrus bidentatus

Prehendorastrus monodontus

Iheringichthys labrosus (Lütken)

Ergasilus sp.

Pimelodus blochii Valenciennes

Lernaea cyprinacea

Pimelodus maculatus Lacépède

Ergasilus sp.

Gamispinus diabolicus

Therodamas sp.

Vaigamus sp.

Order Tetraodontiformes

Family Balistidae

Balistes capriscus Gmelin

Caligus balistae

Taeniacanthus balistae

Balistes vetula Linnaeus

Caligus balistae

Canthidermis maculata (Bloch)

Caligus balistae

Canthidermis sufflamen (Mitchill)

Caligus balistae

Family Diodontidae

Chilomycterus schoepfii (Walbaum)

Tucca impressus

Chilomycterus spinosus spinosus (Linnaeus)

Naobranchia lizae

Naobranchia stibara

Family Molidae

Mola mola (Linnaeus)

Pennella filosa

Family Monacanthidae

Aluterus monoceros (Linnaeus)

Caligus sp.

Aluterus scriptus (Osbeck)

Caligus balistae

Stephanolepis hispidus (Linnaeus)

Caligus balistae

Family Tetraodontidae

Colomesus asellus (Müller & Troschel)

Ergasilus colomesus

Lagocephalus laevigatus (Linnaeus)

Taeniacanthus lagocephali

Class Chondrichthyes (cartilaginous fishes)

Order Carcharhiniformes

Family Carcharhinidae

Carcharhinus limbatus (Müller & Henle)

Pandarus sinuatus

Pandarus smithii

Perissopus dentatus

Carcharhinus signatus (Poey)

Pandarus bicolor

Carcharhinus sp.

Dinemoura latifolia

Prionace glauca (Linnaeus)

Echthrogaleus coleoptratus

Nessipus orientalis

Pandarus floridanus

Pandarus satyrus

Family Sphyrnidae

Sphyrna lewini (Griffith & Smith)

Pandarus cranchii

Sphyrna zygaena (Linnaeus)

Pandarus smithii

Family Triakidae

Galeorhinus galeus (Linnaeus)

Kroyeria brasiliense

Mustelus mustelus (Linnaeus)

Perissopus armatus

Order Lamniformes

Family Lamnidae

Isurus oxyrinchus Rafinesque

Anthosoma crassum

Dinemoura latifolia

Order Rajiformes

Family Rhinobatidae

Rhinobatos sp.

Lepeophtheirus rhinobati

Discussion

In the present paper, 176 copepod species associated with fishes from Brazil were listed; in addition, one fossil species and 39 undetermined species were included. These copepod species were parasitic on 179 fish species. This is the highest number of parasitic copepods recorded in the Neotropics, but is also a clear indication of the lack of knowledge of this parasitic group in the region, especially when the number of fish species known from Brazil (approximately 3443, 17.3% with parasite records) is considered. The same lack of knowledge is true for other groups of metazoan parasites on fishes (Luque & Poulin 2007).

Although the knowledge of parasitic copepods in Brazil is still in its infancy, it is possible to observe some characteristics in the composition of the known copepod fauna. Ergasilidae is the largest family of parasitic copepods from Brazil, comprising 77 species, parasitic on freshwater, brackish water and marine fish species. In the marine fishes the most diverse copepod group is Caligidae with 47 species. *Mugil platanus* was the

most parasitized fish species, with 10 species of parasitic copepods. The majority of copepod species (68.4%) were associated with marine and brackish water fish species. Only 14 copepod species were recorded as parasitic on the ten species chondrichthyans.

In the case of freshwater species, almost all the copepods were described from host species that were native or indigenous to Brazil or South America. A different picture emerges in relation to marine species, which could be divided into three groups based on geographical distribution of the host fish: 1) the native or indigenous species (the smallest group); 2) the species originally described from the Caribbean and North American coastal zone and; 3) the cosmopolitan or widely distributed species.

As only a small portion of the potential hosts have been examined for parasitic copepods, its possible that these differences may only reflected regional discrepancies in study effort and local priorities for fish parasitology research, thus, further studies are necessary to evaluate the possible biogeographical implications of the composition of these groups.

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