

Metazoan Parasites of Groupers (*Epinephelinae*, Pisces) from Puerto Rico

By

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Abstract

The subfamily *Epinephelinae* (Groupers) is a major group of commercially important fishes of the world with 19 species reported from Puerto Rico. The goal of the present study was characterize the diversity of parasites that affect groupers in Puerto Rico. A total of 54 species of parasites were found in 116 individual from 16 species of groupers. This study reports 27 new host records. Twenty two species of Digenea from the orders Azygiida, Echinostomida, Opisthorichiida, Plagiorchiida and Strigeata were identified. Six species of Monogenea from the families of *Diplectanidae*, *Capsalidea*, *Dactylogyridae* and *Mycrocotylidae* were collected. The monogenean *Pseudorhabdosynochus kritskyi* showed a high affinity for the genus *Mycteroperca*. Five species of Cestoda from the order Tetraphyllidea, Trypanorhynchida, Trepanorhynchida, and Caryophyllaeidae were collected. *Scolex pleuronectis*, was the most abundant and three different species groups were found. A total of five species of Nematoda from the Families Anisakidae and Cucullanidae were collected. *Anisakis simplex* was the most prevalent with a large infection on *Mycteroperca venenosa*. One leech *Trachelobdella lubrica* was the only species of this group. I identified six species of copepods from two families, *Caligidae* and *Hatschekiidae*. *Lepophtheirus bermudensis* from *Mycteroperca venenosa* is reported as a new host record. I collected nine species of Isopoda from the five families. *Gnathia* sp. was the most abundant isopod found.

Resumen

La subfamilia *Epinephelinae* (meros) es un importante grupo de peces de importancia comercial del mundo con 19 especies reportadas en Puerto Rico. El objetivo del presente estudio fue analizar la diversidad de parásitos que afectan a los meros en Puerto Rico. Un total de 54 especies de parásitos en 116 meros de 16 especies fueron recolectadas. Este estudio informa 27 nuevos registros de hospedero. Veintidós especies de Digenea de las órdenes Azygiida, Echinostomida, Opisthorichiida, Plagiorchiida y Strigeata fueron identificados. Seis especies de Monogenea de las familias de *Diplectanidae*, *Capsalidea*, *Dactylogyridae* y *Mycrocotylidae* fueron recolectados. El monogean *Pseudorhabdosynochus kritskyi* mostro una gran afinidad po el género *Mycteroperca*. Cinco especies de Cestoda de los ordenes Tetraphyllidea, Trypanorhynchae, Trepanorhynchida, y Caryophyllaeidae fueron recolectados. *Scolex pleuronectis*, fue la más abundante y tres grupos de especies fueron recolectados. Un total de cinco especies de Nematodo de las familias *Anisakidae* y *Cucullanidae* fueron recolectadas. *Anisakis simplex* fue el más frecuente con una gran infección en *Mycteroperca venenosa*. Una sanguijuela *Trachelobdella lubrica* fue la única especie de este grupo recolectada. Se identifico seis especies de copépodos de dos familias, *Caligidae* y *Hatschekiidae*. *Lepophtheirus bermudensis* en *Mycteroperca venenosa* se esta reportando como un nuevo registro de hospedero. Se recolectaron nueve especies de Isópodo de cinco familias. *Gnathia* sp. fue el isópodo más abundante encontrado.

DEDICATION

I dedicate this thesis to my family. They are very important in my life. First to my parents, Ana Rios Carrión and Sergio Medina Rivera, who have been my role models and always believe in me. To my brothers Mei-Ling Seian and Sergio Giovanni who always stood by my side. And most of all to my lovely wife, María Teresa Jiménez, and my children: Terrymar, Catherine and Diego. They are a gift from God that always inspires me to complete my goals.

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INTRODUCTION

A large variety of parasites infect marine fishes (Williams and Bunkley-Williams 1996). When great numbers are present in a fish host, they can cause disease or can become a contributing factor to disease development. Data about the parasites associated with fishes from the Caribbean could allow the eventual mitigation or management of these disease problems damaging valuable fisheries.

Grouper Hosts

Serranidae is a major, chiefly marine, family of perciform fishes. It contains five subfamilies and about 508 species, making it one of the largest and most diverse families of vertebrates. Groupers belong to the subfamily Epinephelinae which comprises 15 genera and 165 species worldwide according to Heemstra and Randall (1993) and Eschmeyer and Fong (2008). Groupers are commercially important food fishes concentrated in the warmer oceans of the world (Cribb *et al.* 2002) and, with demand far exceeding supply from the natural environment, they are widely cultured in many countries of Asia and Southern Europe (Vo *et al.* 2007). In Puerto Rico, 19 species in seven genera (Table 1) have been reported (Heemstra and Randall, 1993), with annual commercial landings of 178,083 – 50,199 pounds from 2004 to 2006 (Table 2, Figure 1).

Table 1. Species of Groupers reported from Puerto Rico and their common names.

Species of Groupers ¹	Common English Names ²	Common Spanish Name
<i>Alphestes afer</i> (Bloch, 1793)	Mutton hamlet	Aceituna
<i>Cephalopholis cruentata</i> (Lacepede, 1802)	Graysby	Arigua
<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Coney	Mantequilla
<i>Dermatolepis inermis</i> (Valenciennes, 1833)	Marbled grouper	Boricua
<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Rock hind	Not available
<i>Epinephelus flavolimbatus</i> Poey, 1865	Yellowedge grouper	Cherma blanca
<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Red hind	Cabrilla
<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Goliath grouper	Mero Sapo, Mero Batata
<i>Epinephelus morio</i> (Valenciennes, 1828)	Red grouper	Mero Rojo
<i>Epinephelus mystacinus</i> (Poey, 1852)	Misty grouper, Bigeyed Grouper	Guasa
<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Snowy grouper	Manchado
<i>Epinephelus striatus</i> (Bloch, 1792)	Nassau grouper	Cherna
<i>Gonioplectrus hispanus</i> (Cuvier, 1828)	Spanish flag	Bandera Española
<i>Mycteroperca acutirostris</i> (Valenciennes, 1828)	Comb grouper	Guajil
<i>Mycteroperca bonaci</i> (Poey, 1860)	Black grouper	Mero Pinto, Guajil
<i>Mycteroperca interstitialis</i> (Poey, 1860)	Yellowmouth grouper	Hamlet, Harlequin
<i>Mycteroperca tigris</i> (Valenciennes, 1833)	Tiger Grouper	Cuna Gata
<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Yellowfin grouper	Mero Pinto, Guajil
<i>Paranthias furcifer</i> (Valenciennes, 1828)	Atlantic creole fish	Cuna Lucero

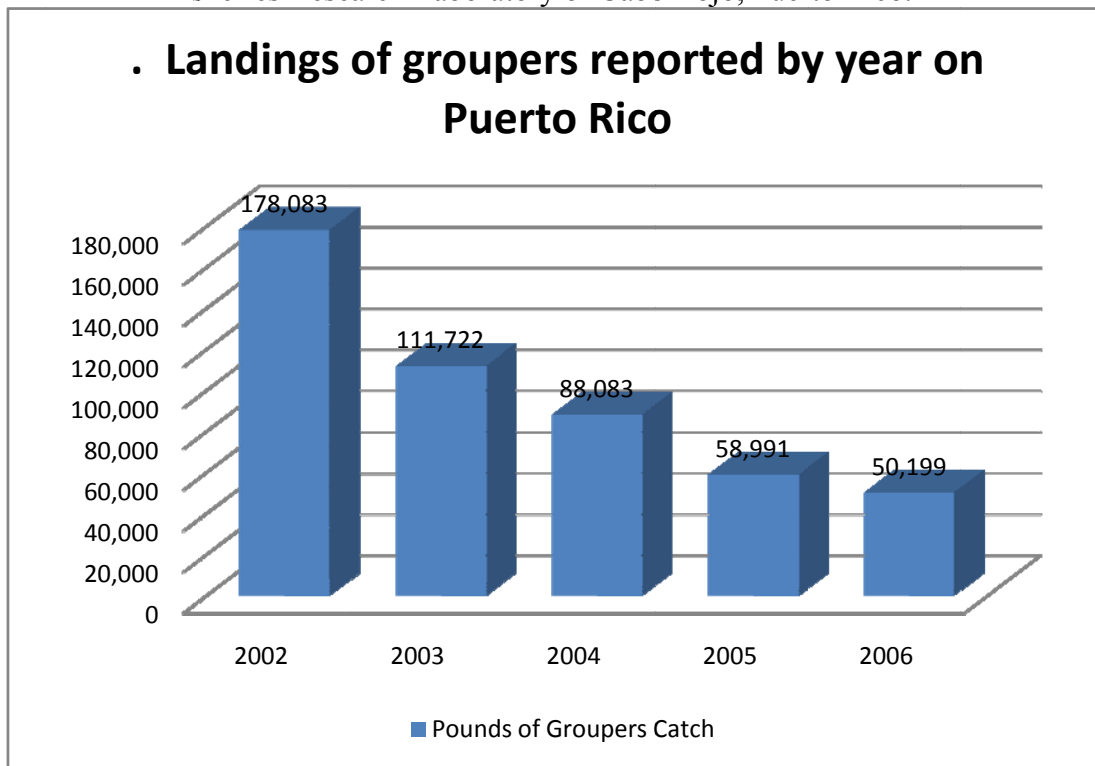
¹ Zaneveld, J.S., 1983. Caribbean Fish Life. Index to the local and scientific names of the marine fishes and fishlike invertebrates of the Caribbean area (Tropical Western Central Atlantic Ocean).

² FAO Common Names are taken from Food and Agriculture Organization of the United Nations. Species Catalogue Vol.16 Groupers of the World.

Table 2. Pounds of Groupers reported by the Program of Fishery Statistics.
Fisheries Research Laboratory of Cabo Rojo, Puerto Rico.

Species ³	2002	2003	2004	2005	2006
Coney	19,038	11,002	7,858	4,206	4,974
Red hind	81,202	48,045	43,084	29,060	22,288
Misty grouper	5,679	5,861	4,786	7,395	5,593
Nassau groper	18,708	10,212	4,230	1,997	1,750
Yellowfin grouper	6,619	4,893	2,188	752	975
Grouper category	46,837	31,709	25,937	15,581	14,619
Total Catch	178,083	111,722	88,083	58,991	50,199
Boat Trips reported	n-a	n-a	32,677	27,916	25,984

Figure 1. Landings of groupers reported by the Program of Fishery Statistics.
Fisheries Research Laboratory of Cabo Rojo, Puerto Rico.



³ FAO Common Names are taken from Food and Agriculture Organization of the United Nations. Species Catalogue Vol.16 Groupers of the World.

Parasites

Parasites are particularly important in culture situations where crowding may enhance the life cycle of parasites. Parasite infection may limit the profitability of artificial culture of fishes. In addition, the movement of fishes from region to region for fish culture may inadvertently introduce new parasites to local populations with possible disastrous results. In the same way fishes brought to new locations may be susceptible to local parasites. It is therefore, important that native parasite fauna be known so that exotic introductions can be recognized in the future.

In the present work the term parasite refers to the symbiotic relationship between two different organisms where one benefits (the parasite) and other is harmed (the host). Fishes are infected with species of parasites from various phyla including: Platyhelminthes that includes the Digenea, Monogenea, and Cestoidea; Nematoda, Acanthocephala, Annelida including the Hirudinea; Arthropoda including the crustacean orders Copepoda and Isopoda. A brief description of these groups follows.

Phylum Platyhelminthes(flatworms)

Digenea (flukes) is a subclass in the Class Trematoda. They are dorso-ventrally flattening, bilateral symmetry, lack coelom, anus, and circulatory system. The excretory system is composed of flame cells or protonephridia. Digeneans are all hermaphroditic except for the genera *Schistosoma* and *Didymozoa* which have separate sexes. Digeneans have complex life cycles involving one or more intermediate hosts. Adults are parasites of most vertebrate groups, and can inhabit many different sites in these definitive hosts although the majority of species are found in the gastrointestinal tract. Flukes can use fish as both intermediate and final hosts.

Class Cestoidea are the tapeworms. They have a specialized attachment organ called a scolex that may possess specialized attachment structures including suckers or sucker like organs

often with hooks or spiny tentacles. The body is a chain of segments called a strobila with individual segments referred to as proglottids. They are all hermaphrodites and individual proglottids can fertilize other proglottids of the same strobila or can fertilize proglottids from another individual tapeworm of the same if it is nearby. Tapeworms can reduce growth and affect reproductive success of fishes (Williams and Bunkley-Williams, 1996).

Class Monogenea (monogeneans) are ectoparasites of aquatic vertebrates mostly fishes. They can be found on any external surface, and even internally but they are found most often on the gills of fishes. The life cycle is direct with no intermediate host required. These parasites can be a serious problem when there is a high population density of the host (e.g., in an aquarium, pond, cage or hatchery). The most notable structure of Monogenea is the major attachment organ called the opisthaptor. This organ is also important in the taxonomy of this group. In heavy infections, they can kill fish in captivity and occasionally wild ones (Williams and Bunkley-Williams, 1996). Many host species have not yet been examined for these helminthes, therefore much remains to be done to expand knowledge on both geographic ranges and hosts for Monogenea (Hendrix, 1994).

Phylum Nematoda

Also known as roundworms, nematodes are one of the most abundant groups of animals (Roberts and Janovy, 2000) with many species of free living as well as parasitic roundworms. As parasites they infect animals and plants. Despite their diversity of habitat, the nematodes have a remarkable consistency of shape, normally being vermiform, long and slender with tapering ends. They are bilaterally symmetrical, non-segmented pseudocoelomates with a complete digestive system and excretory system composed of renette cells. They are dioecious

with females generally larger than males. Male genitalia are used in the identification of species.

Phylum Acanthocephala

This completely parasitic phylum is commonly called thorny-headed or spiny-headed worms because the anterior attachment organ, called a proboscis (which is evertable by an internal hydrolic system), is armed with spines. The relative size and shape of the proboscis and the size, shape and number of spines thereon are used to identify the species. Acanthocephalans typically have complex life cycles, involving a number of hosts, including invertebrates, fishes, amphibians, birds, and mammals. Fishes can be final hosts and are sometimes infected by larval stages which are adults in marine mammals (Williams and Bunkley-Williams, 1996).

Phylum Annelida (segmented worms)

The Class Hirudinea, known as leeches, is the most highly specialized of the major annelid groups. Leeches are typically dorsoventrally flattened with suckers at both ends. Hirudinea can be predators, parasites of animals, vectors of parasites, and food for semiaquatic and aquatic animals. Leeches are hermaphroditic but do not self-fertilize (Peckarsky *et al.* 1999).

Phylum Arthropoda, Subphylum, Crustacea

The Copepoda are a subclass of the Class Maxillopoda and are the largest and most diversified group of crustaceans. They inhabit sea and continental waters, semi terrestrial habitats, with many living in symbiotic relationships (including parasitism) with other organisms (Rouch, 1994). Parasitic copepods in fishes can be found mostly on the gills, head sinuses, skin

or in the orbits of the eyes (Williams and Bunkley-Williams, 1996). Parasitic forms can be highly modified for attachment in specific locations on the body of the fish. Sexes are separate and several nauplear and copepodid stages are found in parasitic forms. In fish parasitic forms the major attachments include antennae and mouthparts or combinations of these and sometimes specialty organs not found in any freeliving form.

Class Malacostraca includes the Order Isopoda commonly known as pill bugs, are dorsoventrally depressed and can roll into balls when they feel threatened. Most are free-living, but some parasitize fish, crabs, shrimp and other isopods. Fish parasitic isopods attach themselves with hooked terminal segments on the legs to a variety of locations including the skin, gills, inside the mouth, on the fins and some even burrow under the skin to form a cyst in the flanks of fish (Williams and Bunkley-Williams, 1996). Some species can heavily damage the host. Many fish parasitic species are protandrous hermaphrodites.

No studies specifically targeting the total parasite fauna of groupers have been undertaken in Puerto Rico. This study attempts to increase our knowledge of the parasites of these important fishes.

OBJECTIVES

The present study attempts to address the following questions: What is the total parasite fauna of groupers of Puerto Rico? Which of these are new host or locality records? Can we identify new species among these parasites? How does this fauna relate to the parasite fauna reported in the literature for Puerto Rico, the Western Atlantic and the World?

Therefore, the objectives for this research are to:

- Determine the diversity of parasite species associated with groupers in Puerto Rico.
- Compile a checklist of the parasite fauna of groupers worldwide.
- Determine host or family specificity
- Determine new host and locality records
- Identify new species of parasites associated with groupers.

REVIEW OF LITERATURE

The history of fish parasitology involves primarily the description and cataloging of species found on these hosts, very little life history or biology of fish parasites has been done. This review will describe the work of researchers who studied fish parasites and included groupers in their studies. A host-parasite list of the known parasites of groupers of the world is compiled and presented at Table 3 and Table 4.

The study of fish parasites in the United States began with Edwin Linton who first started publishing at the end of the 19th century. He was based at the Woodshole Oceanographic Institute and made extensive surveys of fish parasites from that region (Linton 1889, 1891, 1898, 1905, 1907, 1910, 1911, 1912, 1940). He also worked in the Bahamas and in Bermuda (1907). His work formed the foundation of all subsequent fish parasite studies, particularly on the east coast of the United States.

Linton's student, Harold Manter, who began working in the late 1940's, performed a survey of the parasites of fishes from the Florida Keys among many other significant works on fish parasites. In the article, "The digenetic trematodes of marine fishes of Tortugas, Florida", Manter (1947) reported many parasites from groupers, including: *Stephanostomum dentatum* (Linton, 1901) from *Epinephelus adscensionis*, *Epinephelus morio* and *Mycteroperca venenosa*; *Brachyphallus parvus*, *Helicometra torta* and *Poslporus epinepheli* on *Epinephelus striatus*, now an endangered species; and *Helicometra torta* and *Lepidapedon levenseni* from *Epinephelus morio*.

Satyu Yamaguti made a great contribution to the knowledge of parasites of vertebrates and particularly from fishes from Japan and worldwide, publishing five volumes that essentially cataloged all the species of the parasites of vertebrates known worldwide to that date (1958-

1971). In these volumes, he provided generic diagnoses and listed and illustrated most of the species known. *Systema Helminthum* includes parasites from groupers. In his work *Parasitic Copepoda and Branchiura of Fishes* Yamaguti, (1963a), reported parasitic copepods from species of groupers found in Puerto Rico (Table 3); *Caligus spinosurculus*, *Hatschekia incata*, *Hatschekia insolita* and *Sagum flagellatum* from *Epinephelus adscensionis*; *Lepeophtheirus dissimulates* from *Epinephelus morio*, *E. striatus* and *Mycteroperca venenosa* and *Lepeophtheirus edwardsi* from *Epinephelus morio*.

Of the Digenea from groupers, Yamaguti (1958) reported (Table 3) *Helicometra torta*, *Postporus epinepheli* from *Epinephelus morio*; *Lepidapedon nicolli*, *Prosorhynchus ozakii* and *Stephanostomum microstephanum* from *Epinephelus niveatus*; *Atalosrophion epinepheli*, *Brachyphallus parvus*, *Helicometra torta*, *Opechona levinseni* and *Stephanostomum casum* from *Epinephelus striatus*; *Prosorhynchus atlanticum* from *Mycteroperca bonaci*; *Hamacreadium mutabile*, *Postporus mycteropercae*, *Prosorhynchus atlanticum* and *Stephanostomum dentatum* from *Mycteroperca venenosa* and *Elytrophallus mexicanus*, *Lecithochirium microstomum*, *Opechona orientalis* and *Opecoelus mexicanus* from *Paranthias furcifer*.

Interestingly, Yamaguti (1963c) reported only two species of acanthocephalans on groupers worldwide: *Gorgorhynchus medium* and *Corynosomao btuscens*, and the only species on groupers in the Caribbean is *G. medium* from *Mycteroperca venenosa* from Bermuda. Yamaguti (1963c) also reported only one species of cestoda, *Otobothrium curtum* (Linton, 1909), from *Epinephelus striatus* and *Mycteroperca bonaci*.

The digenetic trematodes of marine fishes constitute a large group of parasites. Siddiqi and Cable (1960) published an important research extending the knowledge on Digenea affecting marine fishes from Puerto Rico, "Digenetic trematodes of Marines Fishes of Puerto Rico". They

reported *Neolepidapedon equilatum* as new species from *Cephalopholis fulva*. They reported *Cainocradium lintoni* (as *Hamacreadium lintoni*), *Helicometra torta*, *Neolepidapedon epinepheli*, *Postporus epinepheli* and *Stephanostomum dentatum* from *Epinephelus striatus*. They also reported *Neolepidapedon epinepheli* and *Cianocreaadium longisaccum* (as *Hamacreadium longisaccum*) from *Epinephelus adscensionis*. From the genus *Mycteroperca* they described *Neopidapedon mycteropercae* as new species and reported *Prosorhynchus atlanticus*.

In 1964, Nahhas and Cable published, “Digenetic and aspidogastrid trematodes from marine fishes of Curaçao and Jamaica”. They reported *Lepidapedon trachinoti* from *Epinephelus morio* and *Epinephelus striatus*; *Neolepidapedon mycteropercae* Siddiqi and Cable, 1960 from *Mycteroperca venenosa* and *Mycteroperca bonaci*.

Overstreet (1969) also contributed to the knowledge of grouper parasites with his work in the Gulf of Mexico and Florida Keys on fish parasites. He reported *Helicometra torta* from *Epinephelus adscensionis*; *Postporus epinepheli*, *Prosorhynchus pacificus* from *Epinephelus itajara*; *Lecithochirium musculus*, *Lecithochirum microstomum* from *Epinephelus striatus* from Biscayne Bay, Florida. From studies of the fish parasites of the Gulf of Mexico, Bullard *et al.* (2000) reported *Neobenedenia melleni* from *Epinephelus guttatus*, *E. morio*, *E. striatus* and *Mycteroperca rosacea*.

Victor Vidal-Martínez also contributed to our knowledge of fish parasites from the Caribbean and Gulf of Mexico. Among his studies are data from species of groupers also present in Puerto Rico. Vidal-Martínez *et al.* (1997) reported a nematode *Hysterothylacium* sp. from *Epinephelus morio* from the Gulf of Mexico. Vidal-Martínez and Poulin (2003) reported

copepod species *Hatschekia insolita* (as *Hatschekia serrana*) and two nematode species *Philometra salgadoi* and *P. margolisi* (Moravec, 1995) from *Epinephelus morio*.

Ernest Williams, Jr. and Lucy Bunkley-Williams contributed to the knowledge of parasites from fresh and salt water fishes in Puerto Rico and the Caribbean, including groupers. Bunkley-Williams *et al.* (1996) reported *Cainocreadium longisaccum* from *Epinephelus guttatus* and *Gonapodasmius* sp. from *Cephalopholis fulva* from Puerto Rico. Williams (1982) reported *Trachelobdella lubrica* from *Epinephelus guttatus* and *Epinephelus striatus*. Dyer *et al.* (1992) reported eight species of digenea from the gastrointestinal tract of six species of groupers (Table 3). Dyer *et al.* (1995) described a monogenean, *Pseudorhabdosynochus kritskyi*, from *Mycteroperca microlepis*. Also, Dyer *et al.* (1998) collected one species of digenea (Table 3) from the intestine of *Epinephelus guttatus*.

Bunkley-Williams *et al.* (1999) reported on isopods from marine fishes in Colombia and the southern Caribbean. They reported *Anilocra haemuli* (Williams and Williams, 1981), *Excorallana costata* (Lemos de Castro, 1960) and *Tridentella virginiana* (Richardson, 1905) from *Mycteroperca bonaci*. *Anilocra haemuli* (Williams and Williams, 1981) commonly infects three species of the genus *Epinephelus* (Williams and Bunkley-Williams, 1981) but this parasite has not been previously reported on *Mycteroperca bonaci*.

Around the world we can find more reports of parasites that affect groupers especially since the onset of mariculture of this group of fishes. Si Si (1999) studied Digenea from fishes of the genus *Epinephelus* in Myanmar and found *Proisorhynchus* sp. and *Pearsonellum* sp. in the intestine of different species of groupers (Table 3).

Reports from different sources only describe larval stages of cestodes infecting groupers, indicating that groupers act as intermediate hosts. Leong and Wong (1988) studied the parasites

of cultured groupers in Malaysia and reported a larva of the Order Tretraphyllidea. Chambers *et al.* (2000) reported *Anthobothrium* sp. in *Cephalopholis boenak* and *Caulobothrium* sp. in *Cephalopholis cyanostigma* from the Great Barrier Reef Australia.

Hamid (2001) studied the parasites of groupers cultured in cages off Brunei and found one species of Monogenea, *Pseudorhabdosynochus epinepheli*, from *Epinephelus albaricus*, *E. bleekeri* and *E. suillus*. Rückert (2006) studied the fish parasites of Indonesian mariculture and reported *Pseudorhabdosynochus epinepheli* and *P. lantauensis* on *Epinephelus coioides* and *E. fuscoguttatus*. From Brazil, Vinicius (2004) reported *Pseudorhabdosynochus bacquitae* from *Epinephelus adscensionis*, and *Pseudorhabdosynochus americanum* from *Epinephelus itajara*, *Pseudorhabdosynochus yucatanensis* from *Epinephelus morio*, *Pseudorhabdosynochus sulamericanus* from *Epinephelus niveatus*, *Pseudorhabdosynochus capurroi* from *Mycteroperca bonaci* and *Diplectanum mycteropercae* from *Mycteroperca tigris*.

Different species of groupers have different levels of susceptibility to capsalid monogeneans, with the estuarine groupers, *Epinephelus coioides* and *E. lanceolatus*, being the most susceptible (Leong 2001). Koesharyani *et al.* (1999b) determined that *Benedenia* spp. or *Neobenedenias* spp. were the most frequently observed monogenean parasites in this genus of groupers.

Nematodes, also known as roundworms, are one of the most abundant groups of animals (Roberts and Janovy 2000). None of the roundworms found in Puerto Rican fishes are known to normally infect humans (Williams and Bunkley-Williams 1996). Laffon-Leal *et al.* (2000) found larva of *Pseudoterranova*, a nematode that causes human anisakiasis, in the mesentery of *Epinephelus morio* in Mexico. Any of the anisakids could potentially harm humans (Williams and Bunkley-Williams 1996). In this case, an anisakid nematode larva was found only in the

mesentery of the fish, and was interpreted as harmless to humans except by post mortem larval migration from the mesentery to fish muscle (Laffon-Leal *et al.* 1998). Olsen (1952) reported *Hysterothylacium* sp. and *Heterotyphlum eurycheilum* (Olsen, 1952) from *Epinephelus itajara*.

Few species of Hirudinea (leeches) have been reported, but one species, *Trachelobdella* sp. (Diesing, 1850), was found (Pearse, 1934) in *Epinephelus itajara*, an endangered grouper in the Caribbean. Other Hirudinea, from the order Rhynchobdellida have been reported by Leong and Wong (1988) from *Epinephelus malabaricus* from Malaysia and Cruz-Lacierda *et al.* (1999) who found it in *Epinephelus coioides* from the Indopacific, but the genus of the parasites was not identified.

Lo *et al.* (1998) working in French Polynesia, reported parasitic copepods from the genera *Hatschekia* and *Caligus* in the grouper *Cephalopholis argus* (Bloch and Schneider, 1801) (Table 2). *Caligus* is the most commonly reported copepod in marine fishes (Ho *et al.* 2000). Koesaryani *et al.* (1999a) reported *Caligus* sp. and *Lepeophtheirus* sp. from *Epinephelus fuscoguttatus* (Forsskal, 1775) in Malaysia.

Lepeophtheirus dissimulatus (Wilson, 1905) and *Dentigyrps curtus* (as *Lepeophtheirus curtus*) were reported from *Mycteroperca bonaci* by Bunkley-Williams *et al.* (1999). Steele-Llinas (1982), working in Puerto Rico, also reported *Lepeophtheirus dissimulatus* (Wilson, 1905) from *Epinephelus striatus* and *Mycteroperca tigris*. In the same study she reported, *Dentigyrps curtus* (Wilson, 1913) from *Epinephelus adscensionis*, *Mycteroperca interstitialis* and *M. tigris*, *Pseudolernanthropus angulatus* (Kroyer, 1863) from *Epinephelus guttatus* and *Sagum flagellatum* (Wilson, 1913) from *Cephalopolis fulvus*, *E. guttatus* and *E. striatus*.

Pearse (1952) reported *Excorallana tricornis* (Hansen, 1890) and *Rocinela signata* (Schioedte and Meinert, 1879) from *Epinephelus itajara*. These isopods are found in other fishes and have no host specificity. They also report *Nerocilla acuminata* (Schioedte and Meinert, 1881) from *Epinephelus itajara*. *Nerocila* spp. on big game fishes may be a result of prey to predator transfer and can cause considerable tissue damage (Williams and Bunkley-Williams 1996).

The genus *Gnathia*, called “sea gnats”, is found around the world. These isopods are assumed to have no host specificity (Williams and Bunkley-Williams 1996). In Colombia, Bunkley-Williams *et al.* (1999) found the genus *Gnathia* in *Epinephelus niveatus*, representing a new host record. Lo *et al.* (1998) reported Gnathiidae larvae from *Cephalopholis argus* (Bloch and Schneider, 1801) and Chinabut (1996) reported the genus *Gnathia* from *Epinephelus malabaricus* (Bloch and Schneider, 1801).

Cribb *et al.* (2002) published the only paper presenting an analysis of the total knowledge to that date of grouper trematodes. Their work was based on over 2000 published papers. They state that trematodes have been reported from only 62 of the 159 species of groupers world wide, that 90% of the parasite-host combinations are reported only once or twice, and that there seems to be little or no cosmopolitan species.

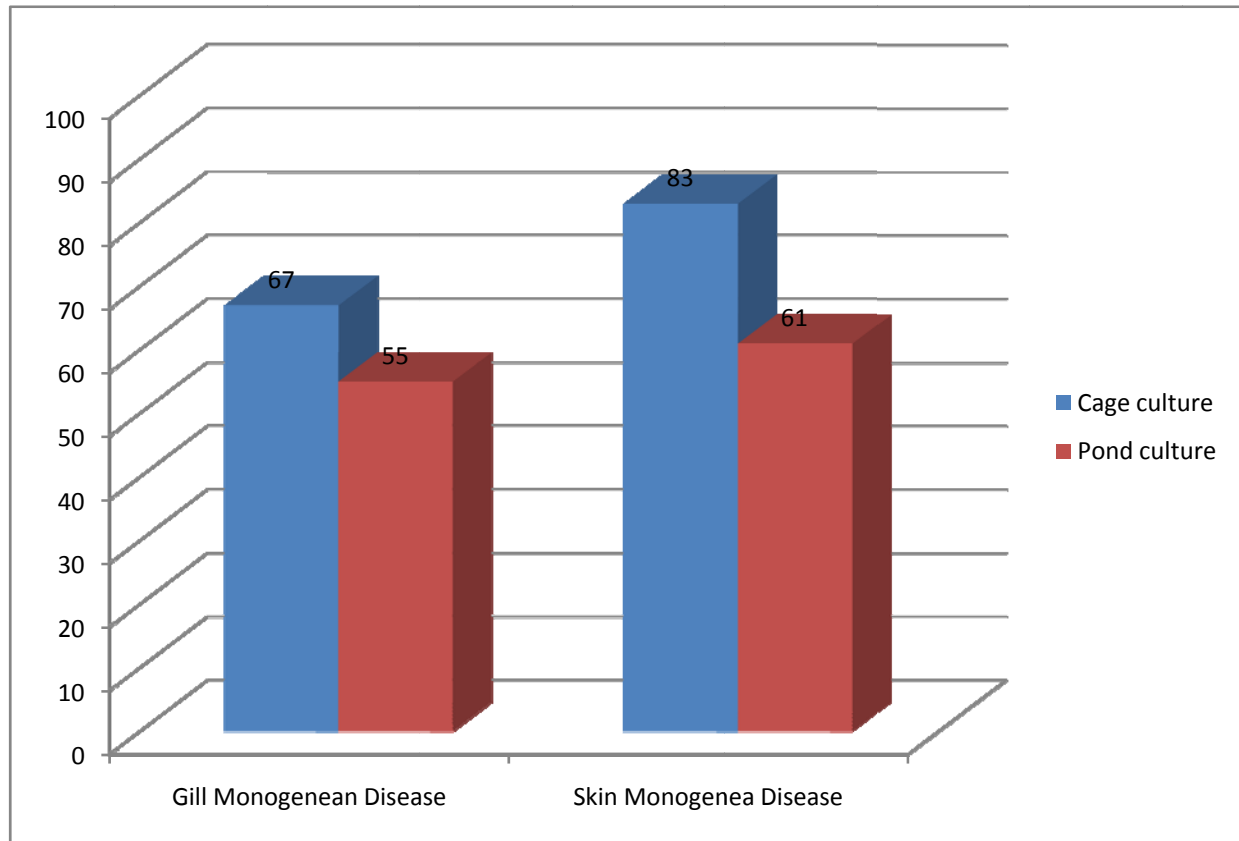
The study of grouper parasites is very important around the world particularly in countries where they are cultured and the economy is focused on marine fisheries. Most of the recent information on the parasites of cultured groupers comes from studies in Asia. One of them is Leong and Wong (1988) reported only one species of *Acanthocephalus* (Koelreuther, 1771) from the intestine of the *Epinephelus malabaricus* and six species of trematodes (Table 3); *Allopodocotyle serrani*, *Ectenurus* sp., *Proisorhynchus pacificus*, *Proisorhynchus* sp.,

Pseudometadena celebesensis and *Stephanostomum* sp. in *Epinephelus malabaricus*, from Malaysia. They found the nematodes *Echinocephalus* sp. and *Contracaecum* sp. from *Epinephelus malabaricus* (Bloch and Schneider, 1801). Leong (2001) reported *Neobenedenia girellae* (Hargis, 1955) from *Epinephelus amblycephalus*, *E. bleekeri*, *E. chlorostigma*, *E. coioides*, *E. fuscoguttatus*, *E. lanceolatus* and *E. malabaricus* and suggested that this species was family specific. Later, Leong (2001) reported *Benedenia* sp. from *Epinephelus bleekeri* and *E. coioides* (Hamilton, 1822).

It is obvious from the above studies of parasites of groupers in mariculture, that knowledge of parasites is necessary for successful culture of these fishes. Healthy fish usually have low numbers of parasites which generally cause little or no harm; however, when the number of parasites per fish increases significantly, disease can occur and other pathogens (interrelated) can infect weakened hosts. As a result of parasitic diseases, Indonesian mariculture suffers from serious economical loss (Rückert and Palm, 2006). In an aquatic ecosystem, where the health conditions of cultured fish are not easily observed, proper care of the fish and their environment are of the utmost importance. For example, Monogenea disease often displayed lethargic swimming; loss of appetite, and secretion of mucous fluid from damaged gills and skin can cause mortalities in cultured groupers, especially in small size fish (<20cm) (Thi Hoa and Van Ut, 2007). If monogenean intensity in skin was high, diseased fish showed ulcerative lesions in skin in final stage of the disease. In marine fish cultured ponds and cages in Khanh Hoa, the frequency of the disease is very high, 71.4% the disease in skin and 60.3% of disease in the gills of fish (Thi Hoa and Van Ut, 2007). If monogenean intensity in skin was high, diseased fish showed ulcerative lesions in skin in final stage of the disease, no good if the main purpose is

sell the fish. It is only a matter of time before species of Groupers will be cultured in Puerto Rico and the Caribbean. Hopefully this work will aid future workers.

Monogenean disease in skin and gill of cultured groupers and snappers in cages and ponds in Khanh Hoa province (n = 63)⁴.



⁴ Thi Hoa, Do, and Van Ut, Phan (2007). Monogenean disease in cultured grouper (*Epinephelus* spp.) and snapper (*Lutjanus argentimaculatus*) in Khanh Hoa province, Vietnam. Faculty of Aquaculture, Nha Trang University, Vietnam. October-December

MATERIALS AND METHODS

Parasite specimens used in this study came from many sources including the personal parasite collections of Dr. Lucy Bunkley Williams and Dr. Ernest H. Williams that were collected and preserved by them and their students who were associated with their work. Additionally, fresh fish specimens were obtained from professional fishers and examined by me. The methods of parasite collection, fixation, staining and mounting described below apply to the total collection as they are standard parasitological methods as described by Dailey (1996).

Fresh Fish Collections

Groupers were collected by fishermen from: Pescadería el Maní, Mayagüez; Villa Pesquera La Pargüera, Lajas; Pescadería Paola, Mayagüez; Pescadería Guajil, Humacao; and by Fred Lenz (diver and fisherman), Rincón. Collection methods included hook and line and spearfishing. The localities where they were landed are shown in Table 5. The fish were identified using the taxonomic keys of Richards (1999) and Heenstra and Randall (1993). All fish were measured to the nearest millimeter using a fishboard (Figure 4c) recording the Standard and Total length (as described by Williams and Bunkley-Williams, 1996). Fishes were weighed in kilograms to the nearest gram using a Certificate scaled. They were then placed in individual plastic bags within a container with ice and transported to the laboratory at the Department of Biology, University of Puerto Rico Mayagüez Campus. Some were examined immediately and the remaining were frozen at -5° C for later examination.

Fish Examinations

Fishes were examined externally (skin, fins and gills) and internally (gastrointestinal tract) for parasites. Initial examination included a visual scan of the outer surfaces of the specimen for large external parasites and signs of disease. Mouth and operculum (gills cover)

were opened and similarly scanned for macroscopic parasites. Additionally, the inside of the nares and the orbits around the eyes were closely examined. Sometimes a cotton swab was used to collect small parasites from these areas. After gross examination, fins and gills were removed from the fish, placed individually (each gill arch separated) in petri dishes, clean salt water added, and carefully examined under a dissecting microscope. While observing with the dissection microscope, each gill filament was gently separated and individually examined for small parasites. The gastrointestinal tract was removed whole, cutting at the esophagus and anus. For small fishes (< 12 cm) the whole tract was placed in a clean Petri dish, split open and observed with the dissection microscope. For large fishes (>12 cm), the stomach was removed and placed in a separate Petri dish, the pyloric caecae were separated next and placed in a Petri dish, and the remaining intestine cut into six centimeter (approximately) sections and each placed in a separate Petri dish. Each section was then split open and a small amount of physiological saline solution added to just barely cover the tissues and prevent drying. Each section (both inside and out) was then examined under a dissecting microscope. Examination began with a low magnification and then switched to a higher magnification when a possible parasite was found. After observing each Petri dish the contents were removed with forceps and the remaining fluid carefully observed for small parasites. In addition, the bag that had held the fish initially was carefully washed and the fluid collected and examined for parasites that may have dropped off during transport and storage. After the guts and gill were removed and examined the body cavity was examined for encysted parasites adhering to the peritoneal wall.

All parasites found were placed in a small stender dish or Syracuse watch glass in tap water and any extra tissues or mucus, was carefully cleaned from the parasite. Prior to fixation, a label was prepared. All data for each parasite was recorded on the following data sheet kept in

GROUPERS PARASITE EXAMINATION FORM

(PLEASE USE ONE FORM FOR EACH FISH)

COLLECTION #: _____

EXAMINATED BY: _____

GROUPERS SPECIES	MARK ONE	
<i>Alphestes afer</i> (Bloch, 1793)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	<i>Mycteroperca bonaci</i> (Poey, 1860)
<i>Cephalopholis cruentata</i> (Lacepède, 1802)	<i>Epinephelus morio</i> (Valenciennes, 1828)	<i>Mycteroperca interstitialis</i> (Poey, 1860)
<i>Cephalopholis fulva</i> (Linnaeus, 1758)	<i>Epinephelus mystacinus</i> (Poey, 1852)	<i>Mycteroperca venenosa</i> (Linnaeus, 1758)
<i>Dermatolepis inermis</i> (Valenciennes, 1833)	<i>Epinephelus niveatus</i> Valenciennes, 1828	<i>Mycteroperca tigris</i> (Valenciennes, 1833)
<i>Epinephelus adscensionis</i> (Osbeck, 1765)	<i>Epinephelus striatus</i> (Bloch, 1792)	<i>Paranthias furcifer</i> (Valenciennes, 1828)
<i>Epinephelus flavolimbatus</i> Poey, 1865	<i>Gonioplectrus hispanus</i> (Cuvier, 1828)	PICTURE # _____
<i>Epinephelus guttatus</i> (Linnaeus, 1758)	<i>Mycteroperca acutirostris</i> (Valenciennes, 1828)	

DATE COLLECTED: _____ **DATE EXAMINED:** _____

PURPOSE: _____ **SEX:** M F **UNDETERMINED**

STANDAR LENGH (mm): _____ **TOTAL LENGH (mm):** _____ **WEIGHT (kg):** _____

COLLECTION LOCALITY _____

COND. WHEN RECEIVED _____ **COND. WHEN EXAMINED** _____

PARASITES FOUND

LOCATION	GENERAL GROUPS	SPECIES	NUMBER FOUND

STOMACH CONTENTS: _____

COMMENTS: _____

a notebook and included; collection number, host species, date collected, date examined, and number of each species of parasite found, and attachment location on the host.

Fixation

The procedures for fixing parasites follow techniques described in *Essentials of Parasitology* (Dailey, 1996). The fixative agent used is different depending whether the parasite has cuticle or tegument. Trematodes, cestodes and monogenes (with tegument) were transferred to a small dish, excess water removed and fixed and stored in 10% Phosphate buffered formalin. Adult and larval nematodes, copepods and isopods (cuticle) were fixed and stored in 70% ethanol.

Staining and Mounting

Techniques follow *Essentials of Parasitology* (Dailey, 1996). Digenea and cestode larvae were dehydrated with ascending proportions of ethanol: 35%, 50%, 70% for 15 minutes in each proportion of alcohol. Digenea were stained in the 70% step with Semichon's Acetic–carmine stain (10–15 minutes). The excess stain was washed off in two changes of 70% ethanol (5–10 minutes for each change), then de-stained with 70% acid-alcohol until parenchyma and muscles were nearly free from stain (light pink) while internal organs were well stained (red). After de-staining, dehydration continued to 95% then 100% ethyl alcohol. Xylene was then used as a clearing agent for at least 10 minutes. After clearing was complete, the specimens were transferred and oriented correctly on the slide, a drop of Kleermount® or Permount® added to the slide and a cover slip placed carefully on top of the specimen.

Monogeneans, nematodes, copepods and some isopods were mounted in glycerin jelly directly after fixing. The glycerin jelly mounting medium was heated in a water bath until

liquefied, a small drop added to the center of the cover slip, the specimen was transferred to the drop of jelly, and a cover slip carefully placed over the specimen. The amount of glycerin jelly should have been sufficient to almost reach the edge of the cover glass when it is in place.

Photographs and Measurements

Measurements for small specimen descriptions are reported in micrometers and were measured using an ocular calibrated micrometer in a compound microscope. These measurements are using to compare with previous reports to ensure the identification of the species. Photographs were taken with a Cannon® Power shot A95 digital camera attached to a Scopetronix phototube.

Identification

Parasites were identified using primarily Systema Helminthum collection (Yamaguti, 1958-1971) and Parasitic Copepoda and Branchiura of fishes (Yamaguti, 1963). Other primary sources included, Digenetic trematodes of marine fishes of Puerto Rico (Siddiqi and Cable, 1960), Parasites of offshore big game fishes of Puerto Rico and the Western Atlantic (Williams and Bunkley-Williams, 1996) and Metzoan parasites of snappers, Lutjanidae (Pisces) from Puerto Rico (Bosques-Rodriguez, 2004).

RESULTS AND DISCUSSION

Parasites Found In This Study

In the present study 54 species of parasites were found in 116 fishes of 16 species (Table 5) including: 22 digeneans (Table 6), 6 monogeneans (Table 7), 5 cestodean larvae (Table 8), 5 nematodes (Table 9), 1 leech (Table 10), 6 copepods (Table 11) and 9 isopods (Table 12). Also 27 new host records and one new regional record was found. The percent infection by species of groupers is shown on Table 13.

Phylum Platyhelminthes

Class **Trematoda** Rudolphi, 1808

Subclass **Digenea** Van Beneden, 1858

Siddiqi and Cable (1960) studied the Digenea found on marine fishes from Puerto Rico and reported eight species, four of which were described as new (Table 4). In the present study, there were 22 species of digeneans found from eight species of groupers (Table 6). The percent of infection with digenea on infected groupers is shown on Table 13.

Order **Azygiida**

Family **Hemiuridae**

Genus **Brachyphallus** Odhner, 1905

Brachyphallus parvus (Manter, 1947) Skrjabin and Gushanskaja, 1955 (Fig. 21)

These digeneans were originally described by Manter (1947) in the genus *Lecithochirium*. This species of parasite has been allocated to different genera several times;

Brachyphallus, *Lecithochirium* and *Stherhurus*, because it does not appear to fit well in any described genus (Williams and Bunkley-Williams 1996). The genus *Brachyphallus* is characterized by having deep striations on the sides of the body; which the present specimen lacks. It was for this reason that Overstreet (1969) put it back in the genus *Lecithochirium* after Skryabin and Guschanskaja (1955) placed it in the genus *Brachyphallus*. *Lecithochirium* is characterized by a prostatic vesicle that this parasite also lacks. Williams and Bunkley-Williams (1996) placed it in the genus *Brachyphallus*. Manter (1947) found it from *Epinephelus striatus* but reported as *Lecithochirum parvum*.

This worm appears to have little host preference. Vélez (1987) reported it in a snapper, *Lutjanus synagris* from Colombia. Williams and Bunkley-Williams (1996) report it from *Elops saurus* and *Megalops atlanticus* species of non-grouper hosts. Bosques-Rodriguez (2004) also reported it from *Lutjanus analis*, *L. vivanus*, *L. mahogoni*, *Pristipomoides aquilonari* and *Ocyurus chrysurus*.

In the present study three specimens were collected; one from *Mycteroperca bonaci* and two from one *Epinephelus guttatus* (Table 6). *Mycteroperca bonaci* and *Epinephelus guttatus* represent new host records. Intensity data (Table 6) reflects a low preference for this group of fishes.

Genus ***Lecithochirium*** Luhe, 1901

Lecithochirium microstomum Chandler, 1935

This fluke occurs worldwide and has generalized host preferences (Williams and Bunkley-Williams, 1996). Yamaguti (1958) reported this worm from *Paranthias furcifer* from Galapagos Island. Overstreet (1969) collected this worm from the stomach of *Mycteroperca bonaci*, *Epinephelus striatus* and also from a snapper (*Lutjanus synagris*) from Biscayne Bay,

Florida. Bullock *et al.* (1992) also found, this worm in *Epinephelus itajara* from the eastern Gulf of Mexico.

In the present study (Table 6), two *Lecithochirium microstomum* were collected from one *Cephalopholis fulva* and three from one *Mycteroperca bonaci*. *Cephalopholis fulva* represents a new host record for this worm. It is also the first report of *Lecithochirium microstomum* on the genus *Cephalopholis*.

***Lecithochirium* sp.** (sensu Williams and Bunkley-Williams 1996) (Fig. 23)

Williams and Bunkley-Williams (1996) distinguished this worm as a new species and reported it from King Mackerel and Black Jack from La Parguera and Mona Island respectively. It is similar to *L. microcercus* but differs by having a genital pore that opens posterior to the oral sucker instead of on top of it, and widely separated testes instead of close (Williams and Bunkley-Williams, 1996). According to Williams and Bunkley-Williams (1996), this fluke has low host preference. In this study (Table 6), one *Lecithochirium* sp. from *Mycteroperca bonaci* was collected.

Genus ***Leurodera*** Linton, 1910

Leurodera decora Linton, 1910 (Fig. 24)

Linton (1910) described this flatworm from *Lutjanus griseus* from Florida. In the Caribbean, Dyer *et al.* (1992b) reported *L. decora* from *Lutjanus apodus* caught in Puerto Rico. Also Bunkley-Williams *et al.* (1996) reported it from *Haemulon flavolinaetum* and *Haemulon sciurus*. In the present study (Table 6), two *L. decora* from *Epinephelus guttatus* were collected, which is a new host record for these flatworms.

Order *Echinostomida*

Family **Haploporidae** Nicoll, 1914

Vitellibaculum allenuata (Siddiqi and Cable, 1960) (Fig. 25)

The genus *Allomegasolena* was erected by Siddiqi and Cable (1960) for two new species: *Allomegasolena spinosa* and *A. allenuata*. This genus has similar characters to genus *Megasolena* but differs in the sucker-like structure that occupies the terminal end of the hermaphroditic sac near the genital pore, and the metraterm and ejaculatory duct remain separate until they approach the genital pore, which then unite well back in the sac in *Megasolena estrix* (Siddiqi and Cable, 1960). Durio and Manter (1968) and Jones *et al.* (2005) found that *Allomegasolena* was a synonym of *Vitellibaculum* Montgomery, 1957. Siddiqi and Cable (1960) described *Allomegasolena allenuata* from *Lutjanus apodus* from Punta Arenas, Puerto Rico. Both species (*Allomegasolena spinosa* and *A. allenuata*) have differences in body shape, sucker ratio, and size of pharynx (Siddiqi and Cable, 1960). Bosques-Rodriguez (2004) collected *Allomegasolena allenuata* from one *Lutjanus apodus* and two *Ocyurus chrysurus*.

In the present study, two *Allomegasolena allenuata* (Table 6), were collected from one *Mycteroperca venenosa*. This is a new host record for this parasite.

Family **Haplospilichnidae** (Ponche, 1925)

Genus ***Schikhobalotrema*** Skrjabin and Gushanskaja (1955)

***Schikhobalotrema* sp.** (Fig. 26)

Skrjabin and Gushanskaja (1955) created the genus *Schikhobalotrema* for species of the genus *Haplospilichnus* that have extensive vitellaria. Dyer *et al.* (1998) reported this genus on *Sparisoma aurofrenatum*, *S. rubripinne*, and *S. viridi* from Parguera, Puerto Rico. In this study

one specimen from *Cephalopholis cruentata* was collected (Table 6). The condition of this specimen did not allow identification to species level. *Cephalopholis cruentata* is a new host and host family record for this genus. Also, it is possible that this is an incidental parasite from a parrot fish prey of the groupers.

Order ***Plagiorchiida***

Suborder ***Allocreadiata*** Skrjabin, Petrow, Koval, 1958

Family ***Lepocreadiidae*** (Odhner, 1905)

Lepidapedon trachinoti Siddiqi and Cable, 1960 (Fig. 27)

Siddiqi and Cable (1960) described this species from *Trachinotus* sp. from Punta Arenas, Puerto Rico. This worm differs from all other species of its genus in the extent of vitellaria, larger prostatic gland, smaller excretory vesicle and smaller eggs (Siddiqi and Cable, 1960). Nahhas and Cable (1964) reported it from *Epinephelus morio* and *Epinephelus striatus* from Curaçao and Jamaica. Bunkley-Williams *et al.* (1996) reported this parasite from *Umbrina coroides* from Humacao, Puerto Rico.

In the present study, one *Lepidapedon trachinoti* was collected from *Epinephelus morio* (Table 6). The present data are consistent with the reports of Nahhas and Cable (1964) (Table 3).

Lepocreadium trulla (Linton, 1907) (Fig. 28)

Linton (1907) described this parasite as *Distomun trulla*, but changed it in 1910 to the genus *Lepocreadium*. Siddiqi and Cable (1960) collected this worm from *Rhomboplites aurorubens* and *Ocyurus chrysurus*. *Lepocreadium trulla* was also reported from *Lutjanus synagris*, *L. jocu* and *L. purpureus* by Vélez (1987) from Colombia. In the present study (Table 6), three *Lepocreadium trulla* were collected from one *Epinephelus guttatus* which is a new host record for this parasite.

***Neolepidapedon mycteropercae* Siddiqi and Cable, 1960 (Fig. 29)**

Siddiqi and Cable (1960) described this digenean from fishes of the genus *Mycteroperca* from Mona Island, Puerto Rico. *Neolepidapedon mycteropercae* differs from other species of the genus in the position of genital pores. Nahhas and Cable (1964) reported this worm from *Mycteroperca bonaci* and *M. venenosa* from Jamaica. In the present study (Table 6), two were collected from one *Cephalopholis cruentata* from Desecheo Island, Puerto Rico. *Cephalopholis cruentata* is a new host record for this worm. It is interesting that this worm was not found in *Mycteroperca* spp examined in the present study.

Suborder ***Opercoelata*** Odening, 1960

Family ***Opecoelidae*** Ozaki, 1925

Genus ***Cainocreadium*** Nicoll, 1909

***Cainocreadium lintoni* (Siddiqi and Cable, 1960) (Fig. 30)**

Siddiqi and Cable (1960) described this parasite and placed it in the genus *Hamacreadium*, but Sogandares-Bernal and Sogandares (1961) considered this parasite a synonym of *Hamacreadium mutabile* Linton, 1910. However, the distribution of vitellaria and the sucker ratio is different (Siddiqi and Cable 1960) between the species (Manter 1963). Durian and Manter (1968) transferred some species of genus *Hamacreadium* Linton 1910 to genus *Cainocreadium* Nicoll, 1909 based on the median position of the genital pore. These species are: *Hamacreadium epinepheli* Yamaguti, 1934; *H. gulella* Linton, 1910; *H. lintoni* Siddiqi and Cable, 1960; *H. longisaccum* Siddiqi and Cable, 1960; *H. pterois* Nagaty and Abdel Aal, 1962; *H. consuetum* Linton 1910, and *H. serrani* Nagaty and Abdel Aal, 1962 (Caballero, 1990).

Siddiqi and Cable (1960) reported this worm from *Cephalopholis fulva* and *Epinephelus striatus* from Mona Island, Puerto Rico. Dyer *et al.* (1992b) reported this worm from *Cephalopholis cruentata* from Guánica, *Haemulon sciurus* and *Epinephelus striatus* from Mona Island, Puerto Rico. Bosques-Rodriguez (2004) also reported this digenetic from *Lutjanus griseus*, *L. vivanus*, *L. synagris* and *L. jocu*.

In the present study (Table 6), 29 *Cainocreadium lintoni* were collected; two from *Cephalopholis fulva*, one from *Epinephelus striatus*, 18 from three *Mycteroperca tigris*, and eight from *Mycteroperca venenosa* (Table 6). *Mycteroperca tigris* and *M. venenosa* are new host records for this parasite. Also the higher number of the infection (Table 6) on *Mycteroperca tigris* may indicate a preference of this parasite for this species of host.

***Cainocreadium longisaccum* (Siddiqi and Cable, 1960) (Fig. 31)**

Siddiqi and Cable (1960) described this worm as *Hamacreadium longisaccum* from *Epinephelus adscensionis* from Puerto Real, Puerto Rico. *Cainocreadium longisaccum* is the only species in its genus that has a cirrus sac extending well posterior to the ventral sucker (Siddiqi and Cable 1960). Williams and Bunkley-Williams (1996) reported this worm from *Epinephelus guttatus*.

In the present study, three *Cainocreadium longisaccum* (Table 6) were collected one from *Epinephelus adscensionis*, and two from *Epinephelus guttatus*. This confirms the data previously reported (Table 3).

***Cainocreadium* sp. (Fig. 32)**

In the present study, two *Cainocreadium* sp. (Table 6) were collected from *Mycteroperca tigris*. This worm shares similar body morphology with *Cainocreadium longisaccum* such as the

vitellaria distribution and the sucker ratio and oral sucker subspherical, but differs by the position of the ventral sucker at 1/3 of the body length, instead of slightly anterior to midlevel.

Genus ***Helicometra*** Odhner, 1902

Helicometra torta Linton 1910 (Fig. 33)

Linton (1910) reported this worm from *Epinephelus morio*. Manter (1947) reported this worm from *Epinephelus morio* from Dry Tortugas, Florida. Yamaguti (1958) and Siddiqi and Cable (1960) report this worm from *Epinephelus striatus* from Dry Tortugas, Florida, and Cabo Rojo, Puerto Rico, respectively. Overstreet (1969) also reported this worm from *Epinephelus adscensionis* from Biscayne Bay, Florida. Starck and Schroeder (1971) reported this species from *Lutjanus griseus* from Florida. Dyer *et al.* (1992b) reported it from *L. apodus* and *L. griseus* from Puerto Rico.

In the present study, six *Helicometra torta* were collected only from two *Epinephelus adscensionis* (Table 6) even though seven *Epinephelus striatus* and two *Epinephelus morio* were collected. Bosques-Rodriguez (2004) did not report this worm from snappers from Puerto Rico.

Helicometra nimia Linton, 1910 (Fig. 34)

This worm has the basic characteristic of the genus, body lanceolate, unarmed, small oral sucker, small pharynx, short esophagus and an acetabulum that is not very large (Yamaguti 1958). This specimen is very similar to *Helicometra nimia* Linton, 1910 but it differs in that it has ten testes in comparison with *H. nimia* which only has nine. Another characteristic is that the distribution of vitellaria begins posterior of the esophagus, where in *H. nimia* the distribution of vitellaria begins close to the pharynx. These differences, based on only two specimens, do not justify the description of a new species unless more specimens can be obtained and the

differences found to be consistent. Vélez (1987) reported *H. nimia* from *Lutjanus apodus* and *L. synagris* from Colombia.

In the present study, two *Helicometra nimia* from the pyloric caeca of *Cephalopholis cruentata* were collected.

Genus ***Pachycreadium***

Pachycreadium crassigulum (Linton, 1910) Manter, 1954 (Fig. 35)

Synonym: ***Lebouria crassigulum*** Linton, 1910

Manter (1954) described the genus *Pachycreadium* and placed *Lebouria crassigulum* there. Siddiqi and Cable (1960) reported this worm from *Calamus calamus* from Cabo Rojo, Puerto Rico. In the present study, one *Pachycreadium crassigulum* was found on *Mycteroperca tigris* (Table 6). *Mycteroperca tigris* is a new host record for this worm or is possibly an incidental parasite from prey item.

Order Opisthorichiida

Family ***Acanthocolpidae*** (Lühe, 1909)

Genus ***Stephanostomum*** Looss, 1899

Stephanostomum dentalum (Linton, 1901) (Fig. 36)

Manter (1947) reported this worm from *Epinephelus adscensionis*, *E. morio* and *Mycteroperca venenosa* from Dry Tortugas, Florida; Siddiqi and Cable (1960) reported it from *Epinephelus striatus* from Cabo Rojo, Puerto Rico; Nahhas and Cable (1964) from *Mycteroperca bonaci* from Jamaica, and Dyer *et al.* (1998) from *Epinephelus guttatus* from Parguera, Puerto Rico.

In this study, nine *Stephanostomum dentalum* from three *Epinephelus guttatus* were collected (Table 6). Even though both Manter (1947) and Siddiqi and Cable (1960) examined *Epinephelus guttatus*, they did not report this worm (Table 3). In this study all the previously reported grouper hosts for this parasite were examined and none of these worms were found. It is possible that a switch in host is occurring due to the decrease in population of the other groupers.

***Stephanostomum imparispine* (Linton, 1905) (Fig. 37)**

Synonym: ***Distomun valdeinflatum* (Stossich)**

This worm occurs in cobia from the Atlantic coasts of the USA (Williams and Bunkley-Williams, 1996). Arthur and Te (2006) reported it from *Albalistes stellaris*, *Aluterus monoceros*, *Echeneis naucrates*, *Psettodes erumei*, *Rachycentron canadum*, *Seriolina nigrofasciata* and *Triacanthus biaculeatus* from the Gulf of Thailand and South China Sea. In this study, four specimens of this worm were found in one *Mycteroperca bonaci* (Table 6) which is a new host record for this parasite.

***Stephanostomum* sp. (Fig. 38)**

This worm shows the basic characteristics of the genus ***Stephanostomum*** in the form of the oral sucker and elongated body length. It differs from all others specimens because the ventral sucker is slightly anterior of the middle of the body. The sucker ratio is 1:1.2. The vitellaria began posterior of the ventral sucker. The most remarkable characteristic are two testicles between the oral sucker and the ventral sucker. In this study, two specimens of this worm were found in one *Epinephelus guttatus* from Mayagüez, Puerto Rico (Table 6).

Order **Strigeata**

Family **Bucephalidae** Larue, 1926

Genus **Rhipidocotyle** Diesing, 1858

Rhipidocotyle adbaculum Manter, 1940 (Fig. 39)

This worm has a length of 3 mm and a width of 0.4 mm. It has a very small sucker. The uterus can be seen full of eggs and other structures in a length of almost 2 mm. Siddiqi and Cable (1960) described this worm as *Proisorhynchus stunkardi* from *Scomberomorus* sp. from Puerto Real, Cabo Rojo, Puerto Rico, but Nahhas and Cable, (1964) and Bunkley-Williams *et al.* (1996) found this worm to be a synonym of *Rhipidocotyle adbaculum*. In the present study, 20 worms were collected four from one *Mycteroperca bonaci*, eight from two *Mycteroperca venenosa* and 12 from one *Mycteroperca tigris* (Table 6). All are new host records and this also represents a new host generic specificity for these worms.

Order **Azygiida** Schell, 1982

Suborder **Hemiurata**

Superfamily **Didymozoidae**

Family **Didymozoidae** Poche, 1907

Didymozoa as adults are tissue dwelling parasites of fishes. Usually they are found inside of the branchial area but they can also be found in other parts of the body such as muscles. Usually this worm is not harmful to humans but Nikolaeva (1985) suggests that the metacercaria of Didymozoa in raw fish could adapt to humans and become dangerous. Vidal-Martinez *et al.* (2002) reported one on the eyes of *Cichlasoma urophthalmus*, a fresh water fish. Williams and Bunkley-Williams (1996) reported 18 host species including wahoo, Spanish mackerels, tunas,

scombrids and billfishes. Gu and Shen (1983a, 1983b) reported *Gonapodasmius pacificus* and *Gonapodasmius hainanensis* from *Epinephelus tauvina* and *Triso dermopterus* respectively from China. Bunkley-Williams *et al.* (1996) reported *Gonapodasmius* from *Cephalopholis fulva*. In the present study, three species of this worm were found.

***Gonapodamsius cf. tomex* (Linton, 1907):**

Seven were collected from the pectoral fin of two *Cephalopholis fulva* from Crashboat, Puerto Rico (Table 6). None of the other 15 *C. fulva* examined had this parasite (Table 4). Linton (1907) described this parasite from *Epinephelus striatus* from Bermuda in the genus *Atalostrophion*, but Yamaguti changed it to the species above (Yamaguti 1971).

***Didymocystis* sp. (Fig. 40)**

These tissue worms have the shape of a human brain and are around 10 mm in length. In this study, 18 were collected from the gills filaments of three *Mycteroperca venenosa*. It most closely resembles *Colocynotrema* sp. reported from billfishes by Williams and Bunkley Williams (1996).

Unidentified *Didymozoa*. (Fig. 41)

The Didymozoa, looks like a yellow flower. In the present study one of these parasites was collected from the left operculum of *Mycteroperca bonaci*.

Class *Monogenea* Carus, 1863

These flatworms are known as gillworms. Most parasitize the gills of their host but they can also be found in the mouth, eyes, nares, body surface and even internally. In the present study, nine species of Monogenea were collected from eight of the species of groupers examined.

Subclass **Plyonchoinea**

Order ***Dactylogyridea***

Suborder ***Dactylogyridea***

Family ***Diplectanidae*** Bychowsky, 1957

Many species of diplectanids have been reported from groupers from numerous geographic locations (Dyer *et al.* 1995)

Diplectanum epinepheli Yamaguti, 1938 (Fig. 42)

Yamaguti (1938b) describes this parasite from *Epinephelus akaara* from Japan. In the present study, four *D. epinepheli* were collected from *Epinephelus adscensionis* and six from *Cephalopholis cruentata* (Table 7). This is the first report of this worm in the Caribbean. *Epinephelus adscensionis* and *Cephalopholis cruentata* are new host records for this parasite.

Pseudorhabdosynochus kritskyi Dyer, Williams and Bunkley-Williams, 1995

(Fig. 43)

A total of 24 species of the genus *Pseudorhabdosynochus* have been described, mostly from *Epinephelus* spp. (Balasuriya and Leong 1995, Santos *et al.* 2000). Dyer *et al.* (1995) described this species from *Mycteroperca microlepis* taken in the Gulf of Mexico. *Pseudorhabdosynochus kritskyi* is different from other species of *Pseudorhabdosynochus* in having 11-15 rows of scales in each squamodisk and having a sclerotized tubular vagina leading to an oval-shape sclerotized reservoir possibly serving as a seminal receptacle (Dyer *et al.* 1995)

In the present study, 161 *Pseudorhabdosynochus kritskyi* were found: 2 on one *Cephalopholis fulva*, 82 on seven *Epinephelus guttatus*, 14 on one *Mycteroperca bonaci*, seven on one *Mycteroperca tigris* and 146 on two *Mycteroperca venenosa*, all of which are new host

records for this parasite (Table 7). The high intensity of this monogenean in *Mycteroperca venenosa* (Table 7) suggests a high affinity for this species of grouper.

***Pseudorhabdosynochus monaensis* Dyer, Williams and Bunkley-Williams, 1994**

(Fig. 44)

Dyer *et al.* (1994) described this monogenea from the gill from *Epinephelus adscensionis* from Mona Island, Puerto Rico. This worm differs from other species of *Pseudorhabdosynochus* by the shape of the vagina and the number of scale rows on the squamodisc.

In the present study, four *Pseudorhabdosynochus monaensis* were collected from two *Epinephelus guttatus* and two from *Epinephelus adscensionis*, both from Desecheo Island, Puerto Rico. *Epinephelus guttatus* is a new host record for this parasite (Table 10).

Family ***Dactylogyridae*** Bychowsky, 1933

Subfamily ***Acyrocephalinae*** Bychowsky, 1937

***Haliotrema longihamus* Zhukov, 1976 (Fig. 46)**

Zhukov (1976) described this monogenean from *Lutjanus synagris*, *L. analis* and *L. mahogoni*. Bosques-Rodriguez (2004) reported this gillworm from *Lutjanus synagris* and *L. griseus*. *Haliotrema epinepheli* has been reported from *Epinephelus chlorostigma*, *E. fasciatus* and *E. merra* from the Red Sea (Paperna, 1972). In the present study, two *Haliotrema longihamus* were collected from one *Epinephelus guttatus*, which represents a new host record for this parasite (Table 7)

Order ***Capsalidea***

Family ***Capsalidae***

Genus ***Neobenedenia*** Yamaguti, 1963

Neobenedenia pargueraensis Dyer, Williams and Bunkley-Williams, 1994 (Fig. 45)

Dyer *et al.* (1992a) described this monogenean from *Epinephelus guttatus* from La Parguera, Puerto Rico. In the present study, one *Neobenedenia pargueraensis* was collected from *Mycteroperca interstitialis*, which is a new host record for this gillworm (Table 7). It is also the first report for the genus *Mycteroperca*.

Subclass ***Oligonchoinea***

Order **Mazocreidea**

Suborder **Microcotylinea**

Family **Heteraxinidae** Price, 1962

Genus ***Cemocotylella*** Price 1962

***Cemocotylella* sp.** (Fig. 47)

The genus *Cemocotylella* has been reported from *Caranx* spp. from Fiji Island by Yamaguti (1963). Bravo-Hollis and Salgado-Maldonado (1982) reported *Cemocotylella elongata* (Meserve, 1938) from *Caranx latus*.

In the Caribbean, Williams and Bunkley-Williams (1996) reported *Cemocotylella elongata* from *Caranx hippos* from Venezuela. The genus *Cemocotylella* is characterized by having an asymmetrical opisthaptor, with three pairs of terminal anchors, muzzle type clamps with a trident and several large clamps of the *Myrcocotyle* type. In addition, the genital atrium in the anterior part of the worm is unarmed.

The *Cemocotylella* sp. morphology does not relate to any known species so we agree that this monogenea is a new species. In the present study, three *Cemocotylella* sp. were collected from *Epinephelus guttatus* (Table 7) which represents a new host record for this genus of worm.

Class **Cestoda** (Rudolphi, 1808)

Commonly called Tapeworms, the adults of this group are mostly found in the digestive track of vertebrates. This class is separated into groups based on variations in the life cycle. Adult tapeworms are not commonly found in bony fishes which usually serve as intermediate hosts with adults in fish-eaters such as sharks, marine birds and mammals including humans. In the present study, six species of groupers were parasitized by cestodes with the highest intensity in the genus *Mycteroperca* (Table 8) particularly in two specimens of *Mycteroperca venenosa*.

Subclass **Eucestoda**

Scolex pleuronectis (O.F. Müller, 1788)

The name *Scolex pleuronectis* is used to describe the small and white cestoda larva with five suckers on the scolex. The genus *Scolex* is used as a collective group name for plerocercoids of unknown generic affinity (McDonald and Margolis 1995). We can find larva belonging to the *Scolex pleuronectis* in different parts of the world parasitizing bivalve mollusks (Carvajal and Mellado 2007), polychaetes, isopods, copepods, crustaceans, mollusks and fishes (Dollfus 1974, Cake 1976). The identification of these larvae to species level is very difficult. In the present study, we identified three types of plerocercoids that may represent three separate species of tapeworms.

***Scolex pleuronectis* sp. 1** (Fig. 48)

This worm differs from the other species found in this study in the size of the scolex and the body shape and length. The body size is about 0.9 mm, around 3.5 times the length of the scolex. It has five suckers, four around the scolex and one large terminal sucker. The four lateral suckers have an inclination of 45° from the longitudinal center line of the body in the direction of the terminal sucker. The terminal sucker is two times the diameter of the smaller

around 0.4 mm. In the present study, 64 *Scolex pleuronectis* sp. 1 were collected; three in one *Cephalopholis fulva*, 32 from two *Epinephelus guttatus*, 20 in one *Mycteroperca bonaci* and nine from one *Mycteroperca tigris* (Table 8).

***Scolex pleuronectis* sp. 2 (Fig. 49)**

This specimen differs from the *Scolex pleuronectis* sp. 1, in the shape and length of the scolex, size of suckers and body length. There are five suckers on the scolex but they are smaller than those of *Scolex pleuronectis* sp. 1 and do not angle forward in the same manners. In addition the terminal sucker is the same size as the lateral suckers. The four lateral suckers differ from *Scolex pleuronectis* sp 1 in their inclination angle, which is almost perpendicular to the body.

This body is longer, around 2 mm; six times the size of its scolex and has a short neck. In the present study, 250 larvae were collected on one *Mycteroperca venenosa* and 15 on one *Mycteroperca tigris* (Table 8).

***Scolex pleuronectis* sp. 3 (Fig. 50)**

This specimen differs from the previous two species in shape and length of the scolex. The scolex has the same arrangement of the *Scolex pleuronectis* sp 1. The terminal sucker has a diameter of 0.17 mm and the lateral suckers diameter of 0.10 mm. This also differs from sp 1 in its body length which is shorter, around 0.96 mm. These worms also have many visible small testes. In the present study, twelve of these worms; were collected five from one *Epinephelus guttatus* and seven from one *Mycteroperca venenosa* (Table 8).

Order *Trypanorhyncha*

Family *Lacistorhynchidae* Guiart, 1927

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (Fig. 51)

Synonym *Tentacularia lepida* (Chandler)

This species was originally named from a plerocercoid larva in an *Auxis rochei rochei* (Risso, 1810) Bullet Tuna and *Auxis thazard thazard* (Lacepède, 1800) Frigate Tuna (Williams and Bunkley-Williams 1996), encapsulated in the wall of the stomach and intestines. Dollfus (1942) reported this worm from Maraja Island, Brazil in *Centropomus undecimalis* (Bloch, 1792), Common Snook. Palm (1997) indicates that *C. gracilis* is the most common parasite species with the lowest host specificity in the coastal waters of north eastern Brazil. Akmirza (2006) reported *Callitetrarhynchus gracilis* in *Euthynnus alletteratus* (Rafinesque, 1810) from the Aegean Sea. This worm was found in groupers in *Epinephelus aeneus* (Geoffroy Saint-Hilaire, 1817) from the Gulf of Guinea (Palm *et al.* 1994). In the present study, one *Callitetrarhynchus gracilis* from *Alphestes afer* was collected (Table 8), and is a new host record for this parasite.

Order *Trepanorhynchida*

Family *Tentaculariidae*

Genus *Nybelina* Ponche 1926

Nybelina sp. (Fig. 52)

Williams and Bunkley-Williams (1996) reported *Nybelina bisulcata*, *N. lamontaeae* and *N. lingualis* from Atlantic Blue Marlin, King Mackerel and Skipjack tuna respectively. They also describe a *Nybelina* sp. from Blue Marlin, White Marlin and Yellowfin Tuna. Bosques-

Rodriguez (2004) described a similar *Nybelina* sp. from *Lutjanus synagris* and *Etelis oculatus*. The three *Nybelina* sp. collected in the present study were found on only one *Cephalopholis fulva* (Table 7), although 15 specimens of this species were examined, and represents a new host record for this genus.

Phylum *Nematoda*

The nematodes commonly known as roundworms are the most abundant phyla of animals on Earth. There are over 80,000 described species, but some scientists estimate that there may be as many as half a million more species to be discovered. More than 15,000 known species of roundworms are parasites.

Class *Rhabditea*

Subclass *Rhabditia*

Order *Ascaridida*

Family *Anisakidae*

The subclass *Rhabditia*, is mostly comprised of parasitic nematodes, though there are some free-living species as well. Morphological structures such as phasmids and amphids are poorly developed or absent in this group. The Family Anisakidae has a wide distribution both geographically and in the number of marine species infected. The life cycle of this group is complex. Adults can be found primarily in marine mammals and birds. Juveniles can be found in other marine species such as fishes and cephalopods. Anisakiasis is a human disease caused by species of the genus *Anisakis*, *Contracaecum*, *Hysterothylacium* and *Pseudoterranova*.

Humans can be infected with this parasite by eating uncooked fish. Juveniles die at high temperatures (70 °C) or when frozen -20 °C for at least 24 hours.

Anisakis simplex (Rudolphi, 1809) (Fig. 53)

Rudolphi (1809) described this roundworm from marine mammals where it produces serious damage in the digestive track. A variety of marine mammals and fishes, can host adults of this parasite however it has several juvenile intermediate stages in different hosts (Moreno-Ancillo *et al.* 1997). Humans can be infected with this worm by eating uncooked infected fishes. The symptoms are similar to that of Crohn's disease (disease affects between 400,000 and 600,000 people in North America) abdominal pain, diarrhea, visibly bloody, vomiting, or weight loss. The juvenile larvae penetrate the stomach from 1 to 12 hours after ingestion or up to two weeks in the case of intestinal penetration (Roberts and Janovy 2000).

In the present study, 44 *A. simplex* were collected from the stomach and intestines in five *Epinephelus guttatus*; three on one *Epinephelus adscensionis*; 31 from *Mycteroperca bonaci* and 17 in three *Mycteroperca tigris*. I also found 111 on adipose tissue around intestines of two *Mycteroperca venenosa* (Table 9).

Contraccaecum (Railliet and Henry) (Fig. 54)

Adults of this roundworm, as in the others from the family Anisakidae, are found in marine mammals and birds. Some members can cause severe peritonitis and death of their host (Fletcher *et al.* 1998). All adult forms in fishes reported in the genus probably belong to the genus *Hysterothylacium* (Williams and Bunkley-Williams, 1996). They differ by having the excretory pore at the level of the nerve ring in *Hysterothylacium* spp. and near to the lips in *Contraccaecum* spp. (Williams and Bunkley-Williams 1996). In the present study, three *Contraccaecum* sp. were found from *Epinephelus striatus*. (Table 9)

***Hysterothylacium* Ward and Magath, 1917 (Fig. 55)**

The larval form of the genus *Hysterothylacium* encysts in fishes in a similar manner as *Contraccaecum* larvae. Overstreet and Meyer (1981) found *Hysterothylacium* larvae could penetrate the stomach epithelium of rhesus monkeys that ingested these worms. Bullock *et al.* (1992) reported *Hysterothylacium* sp. from *Epinephelus itajara* and Vidal-Martinez *et al.* (1997) reported *Hysterothylacium* from *Epinephelus morio* from the Gulf of Mexico. In the present study, two *Hysterothylacium* sp. were collected from the stomach tissue of two *Epinephelus guttatus* (Table 9).

***Terranova* sp. (Fig. 56)**

Most species of genus *Terranova* parasitize aquatic hosts but they can also be found in terrestrial and semi aquatic reptiles. Powel *et al.* (1998) reported a larva stage in *Eleutherodactylus armstrongi*. Adult nematodes of the genus *Terranova* attack the digestive tract of Elasmobranchs, fishes, reptiles and whales (Rückert, 2006). Rückert (2006) reported *Terranova* sp. from *Epinephelus coioides* and *Epinephelus fuscoguttatus*. Vidal-Martínez *et al.* (1997) reported *Pseudoterranova* sp. from *Epinephelus morio* from the Gulf of Mexico. In the present study, one *Terranova* sp. from *Epinephelus guttatus* was collected (Table 9).

Family *Cucullanidae* Cobbold, 1864

Genus *Cucullanus* Müller, 1777

***Cucullanus* sp. (Fig. 57)**

The genus *Cucullanus* (Müller, 1777) contains species with a rather uniform morphology and many similarities (Moravec *et al.* 1993). The correct identification of species is based mostly on the length and shape of the spicules, position of the excretory pore and deirids, and on

the number and arrangement of caudal papillae (González-Solis *et al.* 2007). Yamaguti (1961) reported *Cucullanus stossichi* from *Mycteroperca* sp. from Italy.

In this study, one *Cucullanus* sp. was found in *Mycteroperca venenosa* (Table 9).

Phylum Annelida

Class Clitelata

Subclass Hirudinea Lamarck, 1818

Family Piscicolidae Johnston, 1865

Subfamily Piscicolinae Caballero, 1956

Genus Trachelobdella Diesing 1850

Trachelobdella lubrica (Grube, 1840) (Fig. 58)

Trachelobdella lubrica is an ectoparasite, commonly found on the gills chambers, has been reported only on inshore fishes. *T. lubrica* is a vector of *Trypanosoma* sp. (protozoa) between inshore fishes (Williams and Bunkley-Williams 1996). Pearse (1934) reported this worm from the Dry Tortugas, Florida. Williams (1982) reported *T. lubrica* from *Epinephelus guttatus* and *E. striatus* from Puerto Rico. Williams *et al.* (1996) reported *Cephalopholis cruentatus* (as *Epinephelus cruentatus*) and *Epinephelus guttatus* infected with *T. lubrica* from Bahamas and Mayagüez Bay, Puerto Rico respectively.

Bosques-Rodriguez (2004) reported this worm in the Caribbean from *Lutjanus griseus* and *L. jocu*. In the present study, two *Trachelobdella lubrica* were collected from two *Epinephelus guttatus* (Table 10).

Phylum Arthropoda

Subphylum **Crustacea** Brünnich,

Class **Maxillopoda** Dahl, 1956

Subclass **Copepoda** Milne-Edwards, 1840

Copepods are aquatic crustaceans like crabs and shrimp. There are both free living and parasitic members. Considering their size, diversity, and abundance they can be regarded as the “insects of the seas”. In the present study, 12 species of Copepoda were collected from six species of groupers from Puerto Rico.

Order Siphonostomatoida

Family **Caligidae** (Burmeister, 1834)

Genus **Caligus** O.F. Müller, 1785

In 1758, Müller described this genus to place the two species of copepods that he found. Williams and Bunkley-Williams (1996) mentioned the *Caligus* genus as the second most mentioned species of parasites in scientific articles and Ho *et al.* (2000) described them as the most commonly reported copepod species on marine fishes. In the present study, one species of *Caligus* was collected.

Caligus irritans Heller, 1868 (Fig. 59)

This copepod is usually seen by anglers and can be found most of the time on the fish's mouth or skin. Williams and Bunkley-Williams (1994) reported this copepod from *Lutjanus griseus* from Joyuda Lagoon, Puerto Rico. Bosques-Rodriguez (2004) also reported this on *L. griseus* and *L. mahogaini*. In the present study, six *Caligus irritans* were collected; one from *Cephalopholis fulva* and five from *Epinephelus guttatus* (Table 11).

Order Siphonostomatoida

Family ***Caligidae*** (Burmeister, 1834)

Genus ***Lepeophtheirus*** (Nordmann, 1832)

At least 58 species and subspecies belong to the genus *Lepeophtheirus*. In the present study, two species of this genus from *Cephalopholis fulva*, *Epinephelus guttatus* and *Mycteroperca venenosa* were collected.

Lepeophtheirus bermudensis (Heegaard 1943) (Fig. 60)

In our research the information of this species is very limited. Williams and Bunkley-Williams (1996) state that *Lepeophtheirus bermudensis* is very rare and virtually unstudied. Records of this species were reported on Skipjack tuna by Williams and Bunkley-Williams (1996) from Bermuda. In the present study, 2 from one *Mycteroperca bonaci* and 39 from two *M. venenosa* were collected (Table 14). *Mycteroperca bonci* and *M. venenosa* are a new host record for this parasite. The high number of infestation in *Mycteroperca venenosa* indicates a high preference for this species of groupers (Table 11). It is also the first report of *L. bermudensis* on the Serranidae family.

Lepeophtheirus dissimulatus (Wilson, 1905) Ball, 1963 (Fig. 61)

This parasite is found on a variety of hosts, but groupers are apparently the preferred host. Yamaguti (1963a) reported this worm from *Epinephelus labriformis* from Galapagos, *E. morio*, *E. striatus* and *Mycteroperca venenosa* from Bermudas (Table3). Steele Llinas (1982) reported also *L. dissimulatus* from *Epinephelus striatus* and *Mycteroperca tigris* from Puerto Rico. Bunkley-Williams *et al.* (1999) report this copepod parasite from *Mycteroperca bonaci* from Punta Betin, Colombia. *L. dissimulates* has been reported on the skin of *Semicossyphus darwinni* by Castro and Baeza (1981) and Olviva (1982) from the Pacific coast of Chile. In the

present study, 32 *L. dissimulatus* were collected; one from *Cephalopholis fulva*; 12 from three *Epinephelus guttatus*; four from two *Epinephelus morio*, 11 from *Mycteroperca venenosa* and four from one *Mycteroperca tigris* (Table 11). These data agree with the preference of this parasite for groupers as hosts.

Order ***Siphonostomatoidea*** Thorell, 1859

Family ***Hatschekiidae*** Kabata, 1979

Genus ***Hatschekia*** Poche, 1902

Copepods of the genus *Hatschekia* are ectoparasites on the gills of teleosts, most commonly found in tropical and sub-tropical waters (Scott-Holland *et al.* 2006). The genus *Hatschekia* has successfully radiated to parasitize over 80 fish species worldwide including at least seven families from the Caribbean; Lutjanidae, Serranidae, Labridae, Pomacanthidae, Diodontidae, Blenniidae, and Holocentridae. With the exception of *Hatschekia amplicapa* (Pearse) found on *Sphyraena barracuda*, all reports from the Caribbean are from demersal host fishes (Collins 1984). In the present study, three species of *Hatschekia* were collected from *Cephalopholis fulva*, *C. cruentata*, *Epinephelus guttatus* and *E. adscensionis* (Table 11)

Hatschekia insolita Wilson, 1913 (Fig. 62)

Synonym *Hatschekia serrana* Pearse, 1952

Wilson (1913) described this copepod found on *Epinephelus adscensionis* from Montego Bay, Jamaica. Pearse (1952) described *H. serrana* as new species, from *Epinephelus morio* and *Mycteroperca bonaci* from Alligator harbor, Florida, but Jones (1985) found *H. serrana* as synonym of *H. insolita*. *H. insolita* differs from other members of this genus by the relative length of the cephalothorax about 1/3 the total body length (Jones 1985). Vidal-Martinez and Poulin (2003) reported this worm from *Epinephelus morio* from Mexico.

In the present study, 24 *H. insolita* were collected; 20 from five *Epinephelus guttatus*; two from one *Cephalopholis fulva* and two from one *Epinephelus adscensionis* (Table 14). *Cephalopholis fulva* and *Epinephelus guttatus* are new host record for this parasite. The high intensity of infection (Table 11) shows a high preference of this copepod for *Epinephelus guttatus*.

New species of *Hatschekia*: In the present study, two new species of *Hatschekia* were found in *Cephalopolis cruentata* and *Mycteoperca venenosa*. Its morphology doesn't relate to any known species of *Hatschekia* in the size of the second antenna and the length and width of the body.

***Hatschekia* sp. 1 (Fig. 63)**

Hatschekia sp. 1 has all the morphological characteristics of the genus *Hatschekia*. The *Hatschekia* species is closely related in morphology to the *Hatschekia elongata* (Redkar *et al.* 1950), but it differs in shape and length of the second legs and the body length and width. *Hatschekia* sp. 1 has a length of 2 mm and an egg string of 0.85 mm with 6 egg sacs. The *Hatschekia* sp. 1 morphology doesn't relate to any known species so we agree that this copepod is a new species. In the present study, three *Hatschekia* sp. 1 were collected from two *Cephalopholis cruentata* (Table 11). Is the first record of *Hatschekia* genus on *Cephalopholis cruentata*.

***Hatschekia* sp. 2 (Fig. 64)**

Hatschekia sp. 2 has all the morphological characteristics of the genus *Hatschekia*. Its morphology does not relate to any known species of *Hatschekia*, based on body length, the presence of an additional interpodal bar, and extremely large second antennae. In the present

study, one *Hatschekia* sp. 2 was collected from *Mycteroperca venenosa* (Table 11). Is the first record of *Hatschekia* genus on *M. venenosa*.

Class **Malacostraca** Latreille, 1802

Superorder **Peracarida** Calman, 1904

Order **Isopoda** Latreille, 1817

Although they are primarily aquatic organisms, isopods can be found in nearly all environments. They range in length from 0.5 mm to 500 mm and there are both free living and parasitic isopods. The name defines an important characteristic of this group that all the legs have almost similar size and shape. In the present study 60% of groupers had at least one isopod parasite (Table 9).

Suborder **Flabellifera** Sars, 1882

Familia **Aegidae** Leach, 1815

Genus **Rocinella** Leach, 1899

Rocinella signata Schiødt and Meinert, 1879 (Fig. 68)

Rocinella signata is found in the tropical western Atlantic. It swims between hosts, sucking blood and moving to another host. This isopod does not have host preference and even some swimmers and scuba divers have been bitten by this aggressive organism (Garzón-Ferreira 1990).

Bosques-Rodriguez (2004) reported *R. signata* from *Lutjanus analis*, *L. apodus* and *L. griseus*. Williams and Bunkley-Williams (1996) also reported this isopod on Cero, King

Mackerel and Great Barracuda. In the present study, one *Rocinella signata* was collected from the gills of *Epinephelus itajara* (Table 15).

Family ***Corallanidae*** Hansen, 1890

Genus ***Excorallana*** Stebbing, 1904

Excorallana tricornis (Hansen, 1890) (Fig. 69)

Excorallana tricornis is a facultative parasite that can be found in several genera of Caribbean marine fishes (Delaney 1984). Two subspecies of this isopod, *Excorallana tricornis tricornis* (Hansen, 1890) and *Excorallana tricornis occidentalis* (Richardson, 1905), have been reported; however, in the present study they were identified only to species level. Pearse (1952) reported this crustacean from *Epinephelus itajara* from the Gulf of Mexico. Semmens *et al.* (2006) reported a predominance of *Excorallana tricornis* on *Epinephelus striatus*. They also reported one in one *Mycteroperca tigris*. In the present study, one *Excorallana tricornis* was collected from *Epinephelus guttatus*, 13 from two *Epinephelus striatus* and two from one *Mycteroperca venenosa* (Table 12). *Mycteroperca venenosa* represents a new host record for this parasitic isopod.

Excorallana cf costata Lemos de Castro, 1960 (Fig. 70)

This species differs from other members of this genus in the size and length of the antennae and in the shape of the body. This identification is tentative because *Excorallana costata* was previously known only from Brazil and was not known to associate with fishes (Delaney, 1984, 1990). In the present study, 17 *Excorallana cf costata* were collected; seven from one *Epinephelus itajara*, six from three *Epinephelus mystacinus*, two from two *Epinephelus striatus*, one from *Mycteroperca venenosa* and one from *Mycteroperca tigris* (Table 12).

***Excorallana* sp. (Fig. 71)**

In the present study, one was collected from *Mycteroperca tigris* (Table 12). It differs from other members of the genus in the size and length of the antennae and on the shape of the body. It shows a singular empty space or blank space like tie butterfly in the center of most of the segments.

Family ***Cymothoidae*** Leach, 1814

Genus ***Anilocra*** Leach, 1818

Anilocra haemuli Williams and Williams, 1981 (Fig. 72)

Anilocra haemuli infects a variety of grunts and groupers throughout the West Indies (Williams and Williams 1981) and can cause extensive damage to the host. Grutter and Lester (2002) made a study using the cleaner fish *Labroides dimidiatus* to reduce infection of *Anilocra haemuli* and other parasitic isopods that infect the coral reef fish *Hemigymnus melapterus*. Williams and Williams (1981) and Bunkley-Williams *et al.* (1998, 1999) reported *A. haemuli* from *Paranthias furcifer* from Venezuela and Colombia respectively. Bunkley-Williams *et al.* (1999) reported *A. haemuli* from *Mycteroperca bonaci* and *M. rubra* from Colombia. In the present study, two were collected from one *Epinephelus adscensionis* (Table 12).

Genus ***Cymonothoa*** Fabricius, 1787

Cymonothoa oestrum (Linnaeus, 1793) (Fig. 73)

Cymonothoa oestrum occurs inside of the mouth on the tongue of its host facing toward the mouth opening. Sometimes males are found on the gill arches. In the Caribbean many people believe that fish which commonly have ciguatera, can be safely eaten if it has this isopod attached, but Williams and Bunkley-Williams (1996) remark that this is only Caribbean folklore.

Additional research is needed to confirm or deny this idea. *Cymonothoa oestrum* commonly infects Jacks (Carangidae) throughout the tropical and subtropical western Atlantic (Bunkley-Williams *et al.* 1996, 1998). Williams and Bunkley Williams (1994) reported this crustacean from *Cephalopholis fulva* from the Bermuda Aquarium. In the present study, two *Cymonothoa oestrum* was collected from the gills of *Mycteroperca bonaci* and one from the eye of *Cephalopholis cruentata* (Table 12).

Genus ***Nerocila*** Leach, 1818

***Nerocila* sp.**

Members of the genus *Nerocila* normally feed on one fish then leave, moult and reattach to another fish and so on until they complete their juvenile moults. Aloo *et al.* (2004) reported *Nerocila* sp. from *Leptoscarus vagiensis* from the Kenyan Coast. On groupers, Bullock *et al.* (1992) reported *Nerocila acuminata* from *Epinephelus itajara*. In the present study, one was collected attached to the caudal fin on *Paranthias furcifer* (Table 12) from Bermuda.

Family ***Tridentellidae*** Bruce, 1984

This family is closely related to Corallanidae, Aegidae, Cymothoidae and Cirolanidae. Tridentellidae is easily recognized by the presence of a large maxillipadel endite.

Genus ***Tridentella*** Richardson, 1905

Tridentella virginiana (Richardson, 1900) (Fig. 73)

Tridentella virginiana are very common in the nares of groupers. Delaney (1990) described *T. williamsi* from two species of groupers caught on British Virgin Islands. Apparently *Tridentella* in the Caribbean have a preference for groupers. In Puerto Rico, Bunkley-Williams *et al.* (1999) reported one from *Mycteroperca bonaci*. In the present study

four *Tridentella virginiana* were collected from the nostris of one *Mycteroperca bonaci* and one from *Epinephelus mystacinus* (Table 15).

Suborder **Gnathiidae** Leach, 1814

Family **Gnathiidae** Leach, 1814

Genus **Gnathia** Leach, 1814

***Gnathia* sp. (Fig. 74)**

Gnathia sp. has no host specificity, but is rarely reported from big game fishes (Williams and Bunkley-Williams, 1996). We can find them on the gill filaments of its host, sucking blood. We can usually find a large number of these crustacea on fish caught before the sunrise. Only the larval stage known as praniza are parasites. After a period of time it leaves its host, matures and occupies benthic habitats, most of the time coral reefs, becoming a free living isopod that does not feed on blood (Roberts and Janovy 2000).

Bunkley-Williams *et al.* (1999) reported *Gnathia* sp. on *Epinephelus niveatus* from Colombia. In the present study, 149 *Gnathia* sp. were collected; 6 from 2 *Cephalopholis cruentata*, 4 from 4 *Cephalopholis fulva*, 19 from 5 *Epinephelus guttatus*, 1 from *Epinephelus striatus*, 81 from *Mycteroperca bonaci*, 3 from 1 *Mycteroperca interstitialis*, 34 from 2 *Mycteroperca venenosa* and 3 from 2 *Mycteroperca tigris* (Table 16). *Mycteroperca bonaci* and 1 *Mycteroperca venenosa* were caught before the sunrise and the high number of infection confirms the suggestion that if we catch a fish before the sunrise the quantity of *Gnathias* increases compared with fishes caught after the sunrise (Table 12).

Table 3. Metazoan parasites Reported from Groupers Worldwide by host

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Alphestes afer</i> (Bloch, 1793)	Digenea	<i>Stephanostomum microstephanum</i> Manter, 1934	Puerto Rico	Dyer <i>et al.</i> (1986)
<i>Alphestes multiguttatus</i> (Günther, 1867)	Digenea	<i>Bucephalus heterotentaculatus</i> Bravo- Hollis and Sogandares Bernal, 1956	Baja California, Mexico	Arai (1963)
		<i>Lecithophyllum intermedium</i> (Manter, 1934)	Baja California, Mexico	Arai (1963)
		<i>Lepidapedon elongatum</i> Lebour, 1908	North Pacific Sea, Panama	Caballero <i>et al.</i> (1955)
<i>Anyperodon leucogrammicus</i> (Valenciennes, 1828)	Monogenea	<i>Ancyrocephalus manilensis</i> Tubangui, 1931	Malaysia	Lim, (1998)
			Manila	Yamaguti (1963b)
<i>Cephalopholis argus</i> Bloch and Schneider, 1801	Cestoda larva	<i>Scolex polymorphus</i> (Rudophi 1819)	French Polynesia	Lo <i>et al.</i> (1998)
	Copepoda	<i>Caligus</i> sp. (Muller, 1785)	French Polynesia	Lo <i>et al.</i> (1998)
		<i>Hatschekia</i> sp. (Poche, 1902)	French Polynesia	Lo <i>et al.</i> (1998)
	Digenea	<i>Lecithochirium</i> sp. Lühe, 1901	French Polynesia	Lo <i>et al.</i> (1998)
	Isopoda	<i>Gnathia</i> sp.	French Polynesia	Lo <i>et al.</i> (1998)
	Monogenea	<i>Benedenia</i> sp. (Diesing, 1858)	French Polynesia	Lo <i>et al.</i> (1998)
	Nematoda	<i>Camallanus</i> sp. Railliet et Henry, 1915	French Polynesia	Lo <i>et al.</i> (1998)
		<i>Spirocamallanus istiblenni</i> Nobel, 1966	French Polynesia	Lo <i>et al.</i> (1998)
<i>Cephalopholis boenak</i> (Bloch, 1790)	Cestoda larva	<i>Anthobothrium</i> sp. (Van Beneden, 1850)	Great Barrier Reef	Chambers <i>et al.</i> (2000)
	Digenea	<i>Gonapodasmius branchialis</i> (Yamaguti, 1970)	China	Shen (1990a)
			Xisha Island	Shen (1990b)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Cephalopholis boenak</i> (Bloch, 1790)	Digenea	<i>Gonapodasmius pacificus</i> Yamaguti (1938)	Xisha Island, China	Gu and Shen (1983a)
<i>Cephalopholis cruentatus</i> (Lacepede, 1802) (as <i>Ephinephelus cruentatus</i>)	Digenea	<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960)	West Indies	Dyer <i>et al.</i> (1992)
		<i>Hamacreadium mutabile</i> Linton, 1910	Bermudas	Yamaguti (1971)
	Hirudinae	<i>Trachelobdella lubrica</i> (Grube, 1840)	Bahamas	Williams <i>et al.</i> (1994)
	Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	St. John, U.S. Virgin Islands	Williams and Williams (1981)
			Dominican Republic	Williams and Williams (1981)
			Bahamas	Williams and Williams (1981)
<i>Cephalopholis cyanostigma</i> (Valenciennes, 1828)	Cestoda larva	<i>Caulobothrium</i> sp. (Van Beneden, 1850)	Great Barrier Reef	Chambers <i>et al.</i> (2000)
<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Copepoda	<i>Sagum flagellatum</i> (Wilson, 1913)	Puerto Rico	Steele-Llinas (1982)
	Digenea	<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960) (as <i>Hamacreadium lintoni</i>)	Puerto Rico	Siddiqi and Cable (1960)
		<i>Gonapodasmius</i> sp. (Justine, 1981)	Puerto Rico	Bunkley-Williams <i>et al.</i> (1996)
		<i>Hamacreadium mutabile</i> Linton, 1910	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Helicometrina nimia</i> Linton, 1910	Bahama Islands	Sparks (1957)
			Gulf of Mexico	Caballero (1990)
			Jamaica	Nahhas and Carlson (1994)
		<i>Neolepidapedon equilatum</i> Siddiqi and Cable, 1960	Puerto Rico	Siddiqi and Cable (1960)
		<i>Opecoelus mexicanus</i> Manter, 1940	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Stephanostomum casum</i> (Linton, 1910)	Jamaica	Nahhas and Carlson (1994)
	Isopoda	<i>Cymothoa oestrum</i> (Linnaeus, 1793)	Bermuda Aquarium	Williams <i>et al.</i> (1994)
<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Ephinephelus fulva</i>)	Digenea	<i>Apododocotyle oscitans</i> (Linton, 1910)	West Indies	Dyer <i>et al.</i> (1992)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Ephinephelus fulva</i>)	Digenea	<i>Hamacreadium mutabile</i> Linton, 1910	West Indies	Dyer <i>et al.</i> (1992)
		<i>Pseudoplagioporus brevivitellus</i> Siddiqi and Cable, 1960	Mona Island, Puerto Rico	Dyer <i>et al.</i> (1992)
	Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	Puerto Rico	Williams and Williams (1981)
			St. John, U.S. Virgin Islands	
			St. Thomas, U.S. Virgin Islands	
			St. Croix, U.S. Virgin Islands	
			Dominican Republic	
			Bahama Islands	
			Guadalupe	
<i>Cephalopholis miniata</i> (Forsskål, 1775)	Digenea	<i>Hamacreadium mutabile</i> Linton, 1910	Red Sea and Gulf of Aden	Parukhin (1970)
		<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Opecoelus mexicanus</i> Manter, 1940	Red Sea and Gulf of Aden	Parukhin (1970)
		<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	Red Sea	Nagaty and Abdel Aal (1962a)
		<i>Phyllodistomum mamaevi</i> Parukhin, 1976	Red Sea and Gulf of Aden	Parukhin (1970)
			Southern Seas	Parukhin (1976)
<i>Cephalopholis panamensis</i> (Steindachner, 1876)	Digenea	<i>Helicometra torta</i> Linton, 1910	Chamela Bay, Mexico	Pérez-Ponce de León <i>et al.</i> (1999)
<i>Cephalopholis sonnerati</i> (Valenciennes, 1828)	Digenea	<i>Lasiotocus bengalensis</i> Ahmad and Gupta, 1985	Bay of Bengala, Orissa	Ahmad and Gupta (1985)
		<i>Lasiotocus puriensis</i> Ahmad and Gupta, 1985		

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Cephalopholis sonnerati</i> (Valenciennes, 1828)	Digenea	<i>Retractomonorchis gibsoni</i> Ahmad, 1991	Arabian Sea, Off Bombay Coast, India	Ahmad (1991)
		<i>Retractomonorchis madhavae</i>		Ahmad (1984b)
<i>Cephalopholis urodeta</i> (Forster, 1801)	Digenea	<i>Opecoelus mexicanus</i> Manter, 1940	Naha, Okinawa	Yamaguti (1942)
	Monogenea	<i>Diplectanum parvus</i> Justine, 2007	New Caledonia	Justine (2007)
<i>Cephalopholis urodeta</i> (Forster, 1801) (as <i>Cephalopholis urodelus</i>)	Digenea	<i>Opecoelus mexicanus</i> Manter, 1940	Naha, Okinawa	Yamaguti (1958)
<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Copepoda	<i>Caligus</i> sp. (Muller, 1785)	Philippines	Koesharyani and Yuasa (2001) Koesharyani <i>et al.</i> (1999a)
		<i>Lepeophtheirus</i> sp.	Philippines	Koesharyani <i>et al.</i> (1999a)
	Digenea	<i>Mitotrema anthostomatum</i> Manter, 1963	Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1996)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)	Thailand	Leong (2001) Koesharyani <i>et al.</i> (1999b)
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999	Thailand	Leong (2001)
		<i>Haliotrema</i> sp. Johnston and Tiegs, 1922	Philippines	Koesharyani <i>et al.</i> (1999a), (1998)
		<i>Megalocotyloides convolute</i>	Thailand	Leong (2001)
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)	Thailand	Leong (2001)
		<i>Neobenedenia girellae</i> (Hargis, 1955)	Thailand	Leong (2001)
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	Thailand	Leong (2001)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Monogenea	<i>Pseudorhabdosynochus lanteuensis</i>	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus</i> sp. Yamaguti, 1958	Philippines	Koesharyani <i>et al.</i> (1999a)
<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Copepoda	<i>Caligus spinosurculus</i> Pearse, 1951	Bahamas	Yamaguti (1963a)
		<i>Dentigyrps curtus</i> Wilson, 1913	Puerto Rico	Steele-Llinas (1982)
		<i>Hatschekia incata</i> Wilson, 1913	Jamaica	Yamaguti (1963a)
		<i>Hatschekia insolita</i> Wilson, 1913	Jamaica	Yamaguti (1963a)
		<i>Hatschekia insolita</i> Wilson, 1913 (as <i>Hatschekia serrana</i> Pearse, 1952)	Alligator Harbour, Florida	Pearse (1952)
		<i>Sagum flagellatum</i> Wilson, 1913	Jamaica	Yamaguti (1963a)
	Digenea	<i>Brachyphallus parvus</i> (Manter, 1947) (as <i>Lecithochirum parvum</i>)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Cainocreadium longisaccum</i> (Siddiqi et Cable, 1960) (as <i>Hamacreadium</i> <i>longisaccum</i>)	Puerto Rico	Siddiqi and Cable (1960)
		<i>Hamacreadium confusum</i> Overstreet, 1969	Jamaica	Nahhas and Carlson (1994)
		<i>Helicometra torta</i> Linton, 1910	Biscayne Bay, Florida	Overstreet (1969)
			Biscayne Bay, Florida	Overstreet (1969)
		<i>Hemacreadium torta</i> Linton, 1910	Florida , Puerto Rico, Bimini	Yamaguti, (1971)
		<i>Lecithochirium musculus</i> (Looss, 1907) Nasir and Diaz, 1971	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Myzoxenus lachnolaimi</i> Manter, 1947	West Indies	Dyer <i>et al.</i> (1992)
		<i>Neolepidapedon epinepheli</i> Siddiqi and Cable, 1960	Puerto Rico	Siddiqi and Cable (1960)
		<i>Opecoeloides vitellosus</i> (Linton, 1900)	Jamaica	Nahhas and Cable (1964)

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<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Digenea	<i>Opecoeloides vitellus</i> (Linton, 1900)	Jamaica	Yamaguti, (1971)
			Puerto Rico	Yamaguti, (1971)
		<i>Postporus epinepheli</i> (Manter, 1947)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Stephanostomum dentatum</i> (Linton, 1901)	Dry Tortugas, Florida	Manter (1947)
			Tortugas, Florida	Manter (1947)
	Monogenea	<i>Pseudorhabdosynochus bocqueti</i> (Oliver and Paperna, 1984)	Brazil	Vinicius (2004)
		<i>Pseudorhabdosynochus monaensis</i> Dyer 1994	Mona Island, Puerto Rico	Dyer <i>et al.</i> (1994)
<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Copepoda	<i>Hatschekia petiti</i> Nunes-Ruivo, 1954	Senegal	Yamaguti (1963a)
	Copepoda	<i>Pseudolernanthropus posteli</i> (Delamare-Deboutteville et Nunes-Ruivo, 1954)	Senegal	Yamaguti (1963a)
	Digenea	<i>Allonematobothrium ghanense</i> (Fischthal and Thomas, 1968)	Ghana	Fischthal and Thomas (1968)
		<i>Lecithochirium musculus</i> (Looss, 1907) Nasir and Diaz, 1971	Ghana	Fischthal and Thomas (1972)
		<i>Lecithocladium aegyptensis</i> Fischthal and Kuntz, 1963	Mediterranean Coast, Israel	Fischthal (1980)
		<i>Lepidapedoides nicolli</i> (Manter, 1934)	Atlantic coast of Africa	Gaevskaya and Aljoshkina (1983)
			Ghana	Fischthal and Thomas (1970a)
		<i>Prosorhynchus caudovatum</i> Manter, 1940	Mediterranean Coast, Israel	Fischthal (1980)
<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Cestoda	<i>Grillotia musculicola</i> (Yamaguti, 1934)	Japan	Yamaguti, (1959)
	Copepoda	<i>Caligus epinepheli</i> Yamaguti, 1936	Inland sea, Japan	Yamaguti (1963a)

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<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Copepoda	<i>Lernaeenicus ramosus</i> Kirtisinghe, 1956	Japan	Yamaguti (1963a)
		<i>Lernanthropus chrysophrys</i> Shishido, 1898	Japan	
		<i>Pseudolernanthropus epinepheli</i> Yamaguti et Yamasu, 1960	Inland sea, Japan	
		<i>Thysanote epinepheli</i> Yamaguti, 1939	Inland sea, Japan	
	Digenea	<i>Aphanurus stossichii</i> (Monticelli, 1891)	Fujian, China	Wang (1982b)
		<i>Bianium plicatum</i> (Linton 1928)	Fujian, China	Wang (1982a)
		<i>Bivesicula claviformis</i> Yamaguti, 1934	Japan	Yamaguti (1938a)
		<i>Bivesicula epinepheli</i> Yamaguti, 1938	Inland sea, Japan	Yamaguti (1958)
		<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	Inland Sea and Pacific coast of Japan	Yamaguti (1939)
			Japan	Yamaguti (1934a)
		<i>Coitocaecum glandulosum</i> Yamaguti, 1934	Toyama Bay, Japan	Yamaguti (1958)
		<i>Coitocaecum gymnophallum</i> Nicoll, 1915	Japan	Yamaguti (1934a)
		<i>Crowcrocaecum epinepheli</i> Wang, 1982	China	Wang (1982a)
		<i>Dactylostomum epinepheli</i> Wang, 1982	China	Wang (1982a)
		<i>Derogenes epinepheli</i>	Fujian, China	Wang (1982b)
		<i>Gonapodasmius pristipomatis</i> (Yamaguti, 1934)	Inland Sea, Japan	Yamaguti (1958)
				Yamaguti, (1971)
			Japan	Yamaguti (1938b)

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<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Digenea	<i>Hamacreadium epinepheli</i> Yamaguti, 1934	Inland Sea	Yamaguti, (1971)
		<i>Hamacreadium mutabile</i> Linton, 1910 (as <i>Hamacreadium epinepheli</i> Yamaguti, 1934)	Inland Sea	Yamaguti (1958)
		<i>Helicometra epinepheli</i> Yamaguti, 1934	Fujian, China	Wang (1982a)
			Fujian, China	Wang <i>et al.</i> (1992)
			Japan	Yamaguti (1934a)
		<i>Hysterolecithoides epinepheli</i> Yamaguti, 1934	Indland Sea, Japan	Yamaguti (1934a)
		<i>Opecoeloides glandulosa</i> (Yamaguti, 1934)	Pacific coast of Japan, Toyama Bay, Sea of Japan	Yamaguti, (1971)
		<i>Opecoelus lobatus</i> Ozaki, 1925	Japan	Yamaguti (1934a)
				Yamaguti (1940)
		<i>Proctoeces maculates</i> (Looss, 1901)	Inland sea, Japan	Yamaguti (1934a)
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	Inland Sea, Japan	Yamaguti (1939)
			Inland Sea, Japan	Yamaguti, (1971)
			Fujian, China	Wang (1982a)
		<i>Tormopsolus orientalis</i> Yamaguti, 1934	Inland Sea, Japan	Yamaguti (1958)
			Japan	Yamaguti (1939)
		<i>Tubulovesicula magnacetabulum</i> Yamaguti, 1939	Inland Sea, Japan	Yamaguti (1958)
			Japan	Yamaguti (1939)

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<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Monogenea	<i>Allobedenenia convoluta</i> (Yamaguti, 1937)	Inland Sea, Japan	Yamaguti, (1963b)
		<i>Benedenia epinepheli</i> (Yamaguti, 1937)	Inland Sea, Japan	Yamaguti, (1963b)
			Japan	Ogawa <i>et al.</i> (1995b)
		<i>Diplectanum epinepheli</i> Yamaguti, 1938	Japan	Yamaguti, (1963b)
		<i>Encotyllabe spari</i> (Yamaguti, 1934)	Inland Sea, Japan	Yamaguti, (1963b)
		<i>Microcotyle sebastisci</i> Yamaguti, 1958	Inland Sea, Sagami Bay, Japan	Yamaguti, (1963b)
		<i>Neobenedenia girellae</i> (Hargis, 1955)	Japan	Ogawa <i>et al.</i> (1995a)
		<i>Pseudolamellodiscus epinepheli</i> (Yamaguti, 1958)	Japan	Yamaguti, (1963b)
			Inland Sea of Japan	Yamaguti, (1963b)
	Nematoda	<i>Contracaecum epinepheli</i> Yamaguti, 1941	Japan	Yamaguti, (1961)
		<i>Philometra lateolabracis</i> (Yamaguti, 1935)	Japan	Yamaguti, (1961)
		<i>Philometra pinnicola</i> (Yamaguti, 1935)	Japan	Yamaguti, (1961)
<i>Epinephelus albaricus</i> (Bloch)	Monogenea	<i>Benedenia</i> sp. (Diesing, 1858)	Thailand	Hamid (2001)
		<i>Diplectanum penangi</i> Liang and Leong, 1991		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958		
		<i>Pseudorhabdosynochus latesi</i> Tripathi, 1955		
		<i>Pseudorhabdosynochus monosquamodiscusi</i> (Balasuriya and Leong, 1995)		
<i>Epinephelus albomarginatus</i> Boulenger, 1903	Digenea	<i>Lepidapedoides nicolli</i> (Manter, 1934)	South Africa	Bray (1985)

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<i>Epinephelus amblycephalus</i> (Bleeker, 1857)	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999		
		<i>Megalocotyloides convolute</i>		
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)		
		<i>Neobenedenia girellae</i> (Hargis, 1955)		
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)		
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958		
		<i>Pseudorhabdosynochus lanteuensis</i>		
<i>Epinephelus analogus</i> Gill, 1864	Digenea	<i>Helicometrina nimia</i> Linton, 1910	Gulf of Panama	Sogandares-Bernal (1959)
		<i>Lepidapedoides epinepheli</i> (Bravo Hollis and Manter, 1957)	Mexico	Bravo-Hollis and Manter (1957)
		<i>Lepidapedoides nicolli</i> (Manter, 1934)	California, United State of America	Winter (1960)
		<i>Prosorhynchus gonoderus</i> Manter, 1940	Gulf of Panama	Sogandares-Bernal (1959)
			Panama Pacific	Yamaguti, (1971)
		<i>Prosorhynchus ozakii</i> Manter 1934	Gulf of Panama	Sogandares-Bernal (1959)
			Panama Pacific	Yamaguti, (1971)
		<i>Prosorhynchus pacificum</i> Manter 1940	California, United State of America	Winter (1960)
			Sinaloa, Mexico	Yamaguti, (1971)
	Monogenea	<i>Trochopus pseudomarginatus</i> Bravo-Hollis, 1958	Puerto Vallarta, Mexico	Yamaguti, (1963b)

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<i>Epinephelus andersoni</i> Boulenger, 1903	Digenea	<i>Prosorhynchus caudovatum</i> Manter, 1940	South Africa	Bray (1984)
<i>Epinephelus areolatus</i> (Forsskål, 1775)	Digenea	<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	Arabian Gulf	Saoud <i>et al.</i> (1986)
		<i>Hirudinella ventricosa</i> (Pallas, 1774) Baird, 1853	Southern Seas	Parukhin (1976)
		<i>Lepidapedoides levenseni</i> (Linton, 1907)		
		<i>Monascus filiformis</i> (Rudolphi, 1819)		
		<i>Prosogonotrema bilabiatum</i> Perez Vigueras, 1940		
		<i>Prosorhynchus chorinemi</i> Yamaguti, 1952		
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	India	Hafeezullah and Siddiqi (1970)
		<i>Prosorhynchus ozakii</i> Manter 1934	Red Sea and Gulf of Aden	Parukhin (1970)
		<i>Stephanostomum dentalum</i> (Linton, 1901)		
<i>Epinephelus awoara</i> (Temminck and Schlegel, 1842)	Copepoda	<i>Caligus nanhaiensis</i> Wu and Pan, 1997	China	Wu <i>et al.</i> (1997)
				Wu and Pan (1997)
	Digenea	<i>Gonapodasmius pacificus</i> Yamaguti (1938)	China	Shen (1990a)
		<i>Helicometra aposinuata</i> Pritchard, 1966	Fujian, China	Wang <i>et al.</i> (1992)
		<i>Plagioporus oligolecithosus</i>	Fujian, China	Wang <i>et al.</i> (1992)
<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Digenea	<i>Prosorhynchus macintoshi</i> (Velásquez, 1959)	Philippines	Yamaguti, (1971)
		<i>Prosorhynchus macintoshi</i> (Velásquez, 1959) (as <i>Prosorhynchus mcintoshi</i>)		Velasquez (1959)

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<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Digenea	<i>Proisorhynchus macintoshi</i> (Velásquez, 1959) (as <i>Proisorhynchus mcintoshi</i>)	Philippine	Velasquez (1966)
				Velasquez (1975)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		Hamid (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		Leong (2001)
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999		Hamid (2001)
		<i>Diplectanum penangi</i> Liang and Leong, 1991		
		<i>Megalocotyloides convolute</i>		Leong (2001)
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)		
		<i>Neobenedenia girellae</i> (Hargis, 1955)		
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)		
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958		Hamid (2001) Leong (2001)
		<i>Pseudorhabdosynochus lanteuensis</i>		Leong (2001)
		<i>Pseudorhabdosynochus latesi</i> Tripathi, 1955		Hamid (2001)
		<i>Pseudorhabdosynochus monosquamodiscusi</i> (Balasuriya and Leong, 1995)		
<i>Epinephelus bontoides</i> (Bleeker, 1855)	Monogenea	<i>Neobenedenia girellae</i> (Hargis, 1955)	Philippines	Koesharyani et al. (1999a), (1998)

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<i>Epinephelus bruneus</i> Bloch, 1793	Digenea	<i>Allopodocotyle epinepheli</i> (Yamaguti, 1942)	Tsushima Islands	Machida <i>et al.</i> (1970)
		<i>Erilepturus hamati</i> (Yamaguti, 1934)		Ichihara (1974)
<i>Epinephelus bruneus</i> Bloch, 1793 (as <i>Epinephelus moara</i>)	Monogenea	<i>Benedenia epinepheli</i> (Yamaguti, 1937)	Japan	Ogawa <i>et al.</i> (1995b)
<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Digenea	<i>Allopodocotyle epinepheli</i> (Yamaguti, 1942)	Japan	Yamaguti (1942)
		<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	Arabian Gulf	Saoud <i>et al.</i> (1986)
			Japan	Yamaguti (1942)
		<i>Hamacreadium mutabile</i> Linton, 1910	Red Sea	Ramadan (1983)
		<i>Hamacreadium mutabile</i> Linton, 1910 (as <i>Hamacreadium epinepheli</i> Yamaguti, 1934)	Pacific coast of Japan	Yamaguti (1958)
		<i>Podocotyle epinepheli</i> Yamaguti, 1942	Naha, Okinawa Island	Yamaguti (1958)
		<i>Proisorhynchus epinepheli</i> Yamaguti, 1939	Arabian Gulf	Saoud <i>et al.</i> (1988b)
			India	Hafeezullah and Siddiqi (1970)
		<i>Stephanostomum nagatyti</i> Saoud <i>et al.</i> 1988	Arabian Gulf	Saoud <i>et al.</i> (1988a)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearns, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999		
		<i>Haliotrema epinepheli</i> Young, 1968	Red Sea	Paperna (1972)
		<i>Megalocotyloides convolute</i>	Thailand	Leong (2001)
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)		

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<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Monogenea	<i>Microcotyle mouwoi</i> Ishii et Sawada, 1938	Japan	Yamaguti, (1963b)
		<i>Neobenedenia girellae</i> (Hargis, 1955)	Thailand	Leong (2001)
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)		
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958		
		<i>Pseudorhabdosynochus lanteuensis</i>		
		<i>Tetrancistrum sigani</i> Goto et kikuchi, 1917	Japan	Yamaguti, (1963b)
<i>Epinephelus coioides</i> (Hamilton, 1822)	Copepoda	<i>Caligus cf epinepheli</i> Yamaguti, 1936	Indonesia	Yuniar <i>et al.</i> (2007)
		<i>Caligus epidemicus</i> Hewitt, 1971	Taiwan	Vo <i>et al.</i> 2008
		<i>Caligus multispinosus</i> Shen, 1957		
		<i>Caligus</i> sp. (Muller, 1785)	Philippines	Koesharyani <i>et al.</i> (1999a)
		<i>Lepeoptheirus</i> sp.	Philippines	Koesharyani and Yuasa (2001)
				Koesharyani <i>et al.</i> (1999a), (1998)
		<i>Pennellidae</i> sp. Oken, 1816	Indonesia	Yuniar <i>et al.</i> (2007)
	Hirudinae	<i>Not Identified</i>	Australia	Cruz-Lacierda <i>et al.</i> (1999)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kear, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)	Malaysia Thailand	Lim (1998) Leong (2001)
		<i>Dactylogyrus</i> sp. Diesing, 1850	Australia	Cruz-Lacierda <i>et al.</i> (1999)

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<i>Epinephelus coioides</i> (Hamilton, 1822)	Monogenea	<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999	Thailand	Leong (2001)
		<i>Megalocotyloides convolute</i>	Thailand	Leong (2001)
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)	Malaysia Thailand	Lim, (1998) Leong (2001)
		<i>Neobenedenia girellae</i> (Hargis, 1955)	Thailand Philippines	Leong (2001) Koesharyani et al.(1999a, 1998)
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)	Thailand China Southeast Asia	Leong (2001) Zhang (2001) Lim, (1998)
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti,1958	Malaysia Thailand China Indonesia	Lim (1998) Leong (2001) Zhang (2001) Rückert (2006)
		<i>Pseudorhabdosynochus lanteuensis</i>	Thailand	Leong (2001)
<i>Epinephelus coioides</i> (Hamilton, 1822) (as <i>Epinephelus suillus</i>)	Monogenea	<i>Benedenia</i> sp. (Diesing, 1858)	Thailand	Hamid (2001)
		<i>Diplectanum penangi</i> Liang and Leong, 1991		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti,1958		
		<i>Pseudorhabdosynochus latesi</i> Tripathi, 1955		
		<i>Pseudorhabdosynochus monosquamodiscusi</i> (Balasuriya and Leong, 1995)		
<i>Epinephelus costae</i> (Steindachner, 1878)	Monogenea	<i>Pseudorhabdosynochus bouaini</i> Neifar and Euzet, 2007	Gulf of Gabès, Tunisia	Neifar and Euzet (2007)
		<i>Pseudorhabdosynochus dolicolpos</i> Neifar and Euzet, 2007		
		<i>Pseudorhabdosynochus enitsuji</i> Neifar and Euzet, 2007		

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<i>Epinephelus costae</i> (Steindachner, 1878)	Monogenea	<i>Pseudorhabdosynochus sinediscus</i> Neifar and Euzet, 2007	Gulf of Gabès, Tunisia	Neifar and Euzet (2007)
		<i>Pseudorhabdosynochus sosia</i> Neifar and Euzet, 2007		
<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Digenea	<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Lepidapedoides dollfusi</i> (Durio and Manter, 1968)		
		<i>Multitestis pyriformis</i> Manter, 1963	Australian	Bray and Cribb (1998)
		<i>Plagioporus epinepheli</i> Shen, 1985	Xisha Island	Shen (1985a)
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	Xisha Island, China	Gu and Shen (1983a)
		<i>Pseudopecoelina xishaense</i> Gu and Shen, 1983		
	Monogenea	<i>Neobenedenia girellae</i> (Hargis, 1955)	Japan	Ogawa <i>et al.</i> (1995b)
<i>Epinephelus diacanthus</i> (Valenciennes, 1828)	Digenea	<i>Helicometrina nimia</i> Linton, 1910	Karachi Coast, Karachi	Bilqees (1981)
			Pakistan	Zaidi and Khan (1977)
		<i>Proctotrematoides diacanthi</i>	Karachi Coast, Karachi, Pakistan	Bilqees (1981)
			Pakistan	Zaidi and Khan (1977)
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	India	Hafeezullah and Siddiqi (1970)
<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Digenea	<i>Allopodocotyle epinepheli</i> (Yamaguti, 1942)	French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Bivesicula claviformis</i> Yamaguti, 1934	Malaysia	Fischthal and Kuntz (1965)
			Red Sea	Nagaty (1948)

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<i>Epinephelus fasciatus</i> (Forsskal, 1775)	Digenea	<i>Bivesicula claviformis</i> Yamaguti, 1934	Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1994)
			Xisha Island	Shen (1985b)
			Xisha Island, China	Gu and Shen (1983a)
		<i>Brachyphallus parvus</i> (Manter, 1947) (as <i>Lecithochirum parvum</i>)	Okinawa, Japan	Dyer <i>et al.</i> (1988)
		<i>Erilepturus hamati</i> (Yamaguti, 1934)	Japan	Yamaguti (1934a)
		<i>Folliculovarium xishaense</i> Gu and Shen, 1983	Xisha Island, China	Gu and Shen (1983a)
		<i>Gonapodasmius pacificus</i> Yamaguti (1938)	China	Shen (1990a)
		<i>Helicometra borneensis</i> Fischthal and Kuntz, 1965	Malaysa	Fischthal and Kuntz (1965)
		<i>Helicometra epinepheli</i> Yamaguti, 1934	Japan	Yamaguti (1934a)
		<i>Helicometra fasciata</i> (Rudolphi, 1819)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Red Sea and Gulf of Aden	Parukhin (1970)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
			Southern Seas	Parukhin (1976)
		<i>Helicometra nasae borneensis</i> Fischthal et Kuntz, 1965	N. Borneo	Yamaguti, (1971)
		<i>Helicometra nasae</i> Nagaty and Abdel-Aal, 1962	Red Sea	Nagaty and Abdel Aal (1962b)
		<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996 (as <i>Lepidapedoides kerapus</i>)	French Polynesia	Rigby <i>et al.</i> (1997)

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<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Digenea	<i>Rhipidocotyle angusticollae</i> Chandler, 1941	Red Sea	Shalaby and Hassanine (1996)
		<i>Tubulovesicula magnacetabulum</i> Yamaguti, 1939	Okinawa, Japan	Dyer <i>et al.</i> (1988)
		<i>Uteroversiculurus hamati</i> (Yamaguti, 1934) Skrj. Et Gusch, 1954	Japan	Yamaguti (1958)
	Monogenea	<i>Haliotrema epinepheli</i> Young, 1968	Red Sea	Paperna (1972)
<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus alexandrinus</i>)	Copepoda	<i>Hatschekia cadenati</i> Nunes-Ruivo, 1954	Senegal	Yamaguti (1963a)
		<i>Hatschekia cernae</i> Goggio, 1905	Senegal	Yamaguti (1963a)
		<i>Lepeophtheirus rotundiventris</i> Bassett-Smith, 1898	Castiglione	Yamaguti (1963a)
		<i>Lernaeenicus ramosus</i> Kirtisinghe, 1956	Japan	Yamaguti (1963a)
	Digenea	<i>Hamacreadium mutabile</i> Linton, 1910 (as <i>Hamacreadium epinepheli</i> Yamaguti, 1934)	Inland Sea	Yamaguti (1958)
<i>Epinephelus flavolimbatus</i> Poey, 1865	Monogenea	<i>Microcotyle pomacanthi</i> MacCallum, 1915	N.Y. Aquarium	Yamaguti, (1963b)
	Isopoda	<i>Rocinela</i> sp.	Venezuela	Bunkley-Williams <i>et al.</i> (2006)
<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)	Copepoda	<i>Caligus</i> sp. (Muller, 1785)	Malaysia	Leong and Wong (1988)
		<i>Lepeophtheirus</i> sp.	Philippines	Koesharyani <i>et al.</i> (1999a)
				Koesharyani and Yuasa (2001)
	Digenea	<i>Mitotrema anthostomatum</i> Manter, 1963	Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1996)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearns, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999		

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<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)	Monogenea	<i>Megalocotyloides convolute</i>	Thailand	Leong (2001)
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)		
		<i>Neobenedenia girellae</i> (Hargis, 1955)		
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)	Thailand China	Leong (2001) Zhang (2001)
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	Thailand Indonesia	Leong (2001) Rückert (2006)
		<i>Pseudorhabdosynochus lanteuensis</i>	Thailand	Leong (2001)
<i>Epinephelus goreensis</i> (Valenciennes, 1830)	Digenea	<i>Podocotyle temensis</i> Fischthal et Tomas, 1970	Ghana	Fischthal and Thomas (1970b)
			Tema, Ghana	Yamaguti, (1971)
		<i>Proisorhynchus caudovatum</i> Manter, 1940	Ghana	Fischthal and Thomas (1968)
				Yamaguti, (1971)
<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Copepoda	<i>Pseudolernanthropus angulatus</i> (Kroyer, 1863)	Puerto Rico	Steele-Llinas (1982)
		<i>Sagum flagellatum</i> (Wilson, 1913)		
	Digenea	<i>Atalostrophion promicrops</i> MacCallum, 1915)	Florida	MacCallum (1915)
		<i>Cainocreadium longisaccum</i> (Siddiqi et Cable, 1960)	Puerto Rico	Bunkey-Williams <i>et al.</i> (1996)
				Dyer <i>et al.</i> (1985)
		<i>Hamacreadium mutabile</i> Linton, 1910	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Lecithochirium floridense</i> (Manter, 1934)		

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<i>Epinephelus guttatus</i> (Linnaeus, 1758) (as <i>Epinephelus maculosus</i>)	Digenea	<i>Lepidapedoides levenseni</i> (Linton, 1907)	Bermuda	Linton (1907)
		<i>Opechona levinseni</i> (Linton, 1907)		
<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Digenea	<i>Paraprosorhynchus jupe</i> Kohn, 1967	Brazil	Kohn (1967)
		<i>Postporus epinepheli</i> (Manter, 1947)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Stephanostomum dentalum</i> (Linton, 1901)	Puerto Rico	Dyer <i>et al.</i> (1998)
	Hirudinae	<i>Trachelobdella lubrica</i> (Grube, 1840)	Puerto Rico	Williams (1982) Williams <i>et al.</i> (1994)
	Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	Puerto Rico	Williams and Williams (1981)
			St. John, U.S. Virgin Islands	
			Anegada, British Virgin Islands	
	Monogenea	<i>Neobenedenia melleni</i> (MacCallum, 1927)	Bahamas	Mueller <i>et al.</i> (1994)
	Monogenea	<i>Neobenedenia pargueraensis</i> Dyer <i>et al.</i> 1992	Puerto Rico	Dyer <i>et al.</i> (1992)
<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Copepoda	<i>Grandiungus promicrops</i> Pearse, 1952	Gulf of Mexico, Texas	Pearse (1952)
		<i>Tuxophorus caligodes</i> (Wilson, 1908)		
	Digenea	<i>Hypocreadium myohelicutum</i> Bravo-Hollis and Manter, 1957	Costa Rica	Pérez-Ponce de Leon <i>et al.</i> (1998)
		<i>Lecithochirium microstomum</i> Chandler, 1935	Dry Tortugas, Florida	Manter (1947)
			Gulf of Mexico	Bullock <i>et al.</i> (1992)

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<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Digenea	<i>Postporus epinepheli</i> (Manter, 1947)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Proisorhynchus pacificum</i> Manter 1940		
		<i>Proisorhynchus promicropsi</i> Manter, 1940	Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1940b)
				Manter (1947)
			Gulf of Mexico	Bullock <i>et al.</i> (1992)
		<i>Stephanostomum promicropsi</i> Manter, 1947	Dry Tortugas, Florida	Manter (1947)
			Florida	Hutton and Sogandares-Bernal (1960)
				Sogandares-Bernal and Hutton (1959)
			Gulf of Mexico	Bullock <i>et al.</i> (1992)
	Hirudinae	<i>Trachelobdella</i> sp. (Diesing, 1850)	Dry Tortugas, Florida	Pearse (1934)
	Isopoda	<i>Excorallana tricornis</i> (Hansen, 1890)	Gulf of Mexico, Texas	Pearse (1952)
		<i>Nerocila acuminata</i> (Schioedte and Meinert, 1881)		
		<i>Rocinela signata</i> (Schioedte and Meinert, 1879)		
<i>Epinephelus labriformis</i> (Jenyns, 1843)	Monogenea	<i>Pseudorhabdosynochus americanum</i> (Price, 1937)	Brazil	Vinicius (2004)
	Nematoda	<i>Heterotyphlum eurycheilum</i> (<i>Podisus fretus</i> Olsen, 1916)	Gulf of Mexico	Olsen (1952)
		<i>Hysterothylacium</i> sp. (Ward and Magath, 1917)		
	Copepoda	<i>Lepeophtheirus dissimulates</i> Wilson, 1905	Galapagos	Yamaguti (1963a)

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<i>Epinephelus labriiformis</i> (Jenyns, 1843)	Copepoda	<i>Lepeophtheirus edwardsi</i> Wilson, 1905	Charles Island	Yamaguti (1963a)
	Digenea	<i>Elytrophallus mexicanus</i> Manter, 1940	Galapagos Islands	Manter (1940a)
		<i>Hamacreadium mutabile</i> Linton, 1910	Pacific Coast of Mexico	Lamothe-Argumedo (1969b)
		<i>Helicometra torta</i> Linton, 1910	Ecuador	Yamaguti (1958)
			Galapagos Islands	Manter (1940a)
		<i>Hemacreadium torta</i> Linton, 1910	Ecuador	Yamaguti, (1971)
		<i>Lepidapedoides oaxacensis</i> (Lamothe-Argumedo, 1969)	Pacific Coast of Mexico	Lamothe-Argumedo (1969a)
	Monogenea	<i>Benedenia jaliscana</i> Bravo-Hollis, 1951	Japan	Yamaguti, (1963b)
		<i>Benedenia jaliscana</i> Bravo-Hollis, 1951	Puerto Vallarta, Jalisco, Mexico	
		<i>Trochopus pseudomarginatus</i> Bravo-Hollis, 1958	Puerto Vallarta, Mexico	
<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Digenea	<i>Neoprosorhynchus purius</i> Dayal, 1948	India	Chauhan (1953)
			India	Dayal (1948)
			Puri, India	Yamaguti (1958)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearns, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999		
		<i>Megalocotyloides convolute</i>		
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)		

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<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Monogenea	<i>Neobenedenia girellae</i> (Hargis, 1955)	Thailand	Leong (2001)
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)		
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958		
		<i>Pseudorhabdosynochus lanteuensis</i>		
<i>Epinephelus latifasciatus</i> (Temminck and Schlegel, 1842)	Digenea	<i>Gonapodasmius branchialis</i> Yamaguti, 1970	Bay of Bengala	Muruges and Madhavi (1994)
<i>Epinephelus longispinis</i> (Kner, 1864)	Digenea	<i>Bivesicula claviformis</i> Yamaguti, 1934	Tsushima Islands	Machida <i>et al.</i> (1970)
		<i>Vesicocoelium solenophagum</i>	Jiulong river, Fujian, China	Tang and Xu (1979)
<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Acanthocephala	<i>Acanthocephalus</i> sp. (Koelreuther, 1771)	Malaysia	Leong and Wong (1988)
	Cestoda	<i>Tetraphyllidae</i> sp.	Malaysia Thailand	Leong and Wong (1988) Chinabut (1998)
	Copepoda	<i>Caligus acanthopagris</i> Lin, Ho & Chen 2000	Taiwan	Ho <i>et al.</i> 2000
		<i>Caligus epidemicus</i> Hewitt, 1971	Taiwan	Roubal (1995)
		<i>Caligus orientalis</i> Gussev, 1951	Kenkyu	Urawa and Kato 1991
		<i>Caligus punctatus</i> Shiino, 1955	Taiwan	Lin <i>et al.</i> (1996)
		<i>Caligus rotundigenitalis</i> Yu, 1933		
		<i>Caligus</i> sp. (Muller, 1785)	Thailand Indonesia Malaysia	Chinabut (1998) koesharyani <i>et al.</i> (1999a) Leong and Wong (1990)
		<i>Ergasilus borneoensis</i> Yamaguti, 1954	Malaysia	Leong and Wong (1988)
		<i>Ergasilus lobus</i> (Lin, 1997)	Taiwan	Lin and Ho 1998

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<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Copepoda	<i>Lepeoptheirus</i> sp.	Philippines	Koesharyani and Yuasa (2001)
				Koesharyani et al. (1999a), (1998)
		<i>Thebius</i> sp.	Thailand	Chinabut (1996) Chinabut (1998)
	Digenea	<i>Allopodocotyle serrani</i> (Yamaguti, 1942)	Malaysia	Leong and Wong (1988)
		<i>Cardicola</i> sp. (Short, 1952)	Thailand Malaysia	Chinabut (1998) Leong and Wong (1988)
		<i>Ectenurus</i> sp. (Looss, 1907)	Malaysia	Leong and Wong (1988)
		<i>Erilepturus hamati</i> (Yamaguti, 1934)		
		<i>Gonapodasmius</i> sp. (Justine, 1981)	Thailand	Chinabut (1998) Chinabut (1996)
		<i>Helicometrina nimia</i> Linton, 1910	Malaysia	Leong and Wong (1990)
		<i>Lecithochirium neopacificum</i> Velasquez, 1962	Thailand Malaysia	Chinabut (1998) Leong and Wong (1988)
		<i>Prosorhynchus maternus</i> Bray and Justine, 2006	New Caledonia	Bray and Justine, 2006
		<i>Prosorhynchus pacificum</i> Manter 1940	India	Hafeezullah and Siddiqi (1970)
			Malaysa	Leong and Wong (1988)
			Malaysia Thailand	Leong and Wong (1988) Chinabut (1998)
		<i>Prosorhynchus</i> sp. (Odhner, 1905)	Malaysia	Leong and Wong (1988)
		<i>Pseudometadena celebesensis</i> Yamaguti, 1952		
		<i>Pseudopecoeloides</i> sp. (Yamaguti, 1940)	Thailand	Chinabut (1998) Chinabut (1996)
		<i>Stephanostomum</i> sp. (Looss, 1899)	Malaysia	Leong and Wong (1988)

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<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Digenea	<i>Telorhynchus arripidis</i> Crowcroft, 1947	Red Sea	Shalaby and Hassanine (1996)
	Hirudinae	<i>Not Identified</i>	Malaysia	Leong and Wong (1988)
	Isopoda	<i>Gnathia</i> sp.	Thailand	Chinabut (1996)
				Chinabut (1998)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)	Philippines	Koesharyani et al. (1999a, 1998)
			Thailand	Chinabut (1998) Leong Tak Seng (2001)
		<i>Cycloplectanum epinepheli</i> (Yamaguti 1938)	Thailand	Chinabut (1996) Chinabut (1998)
		<i>Dactylogyrus</i> sp. Diesing, 1850	Thailand	Ruangpan and Rungsichai (1993) Danayadol (1999)
		<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999	Thailand	Leong (2001)
		<i>Gyrodactylus</i> sp. Nordmann, 1832	Thailand	Chinabut (1996) Chinabut (1998)
		<i>Haliotrema</i> sp. Johnston and Tiegs, 1922	Philippines	Koesharyani and Yuasa (2001)
		<i>Megalocotyloides convolute</i>	Thailand	Leong (2001)
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)	Malaysia Thailand	Leong and Wong (1988, 1990) Leong 2001
		<i>Neobenedenia girellae</i> (Hargis, 1955)	Thailand Philippines	Leong (2001) Koesharyani and Yuasa (2001) Koesharyani et al.(1999a, 1998)
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	Malaysia	Leong and Wong (1988, 1990)

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<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Monogenea	<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	Malaysia Thailand	Lim (1998) Leong (2001) Chinabut (1998) Leong and Wong (1988, 1990)
		<i>Pseudorhabdosynochus lanteuensis</i>	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus</i> sp. Yamaguti, 1958	Philippines	Koesharyani and Yuasa (2001)
	Nematoda	<i>Contracaecum</i> sp. (Railliet and Henry, 1912)	Malaysia	Leong and Wong (1988)
		<i>Echinocephalus</i> sp. (Rüppell, 1830)		
		<i>Raphidascaris</i> sp. (larva)	Thailand Malaysia	Chinabut (1998) Leong and Wong (1990)
<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus gigas</i>)	Copepoda	<i>Hatschekia cadenati</i> Nunes-Ruivo, 1954	Cape Bear, Prince Edward Island	Yamaguti (1963a)
		<i>Hatschekia cernae</i> Goggio, 1905	Senegal	Yamaguti (1963a)
		<i>Lepeophtheirus rotundiventris</i> Bassett-Smith, 1898	Castiglione	Yamaguti (1963a)
	Nematoda	<i>Philometra jordanoi</i> (López-Neyra, 1951)	Spain	Yamaguti, (1961)
<i>Epinephelus marginatus</i> (Lowe, 1834)	Digenea	<i>Didymozoon serrani</i> Monticelli, 1889		Monticelli (1889)
		<i>Lecithocladium aegyptensis</i> Fischthal and Kuntz, 1963	Mediterranea Coast, Israel	Fischthal (1980)
	Monogenea	<i>Pseudorhabdosynochus</i> <i>beverleyburtonae</i> (Oliver, 1984)	Brazil	Portes (2000)
<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus guaza</i>)	Monogenea	<i>Cycloplectanum beverleyburtonae</i> (Oliver, 1984)	Mediterranean Sea, Gulf of Lion	Oliver (1984)
		<i>Megalocotyle hexacantha</i> (Parona and Perugia 1889)	Mediterranean	Yamaguti, (1963b)
<i>Epinephelus merra</i> Bloch, 1793	Digenea	<i>Bivesicula claviformis</i> Yamaguti, 1934	Fiji Islands	Manter (1961)
			French Polynesia	Rigby <i>et al.</i> (1997)

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<i>Epinephelus merra</i> Bloch, 1793	Digenea	<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Hamacreadium mutabile</i> Linton, 1910	Red Sea	Nagaty (1941)
		<i>Helicometra epinepheli</i> Yamaguti, 1934	Bahama Islands	Sparks (1957)
		<i>Helicometra fasciata</i> (Rudolphi, 1819)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996 (as <i>Lepidapedoides kerapus</i>)	French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Opecoelus sphaericus</i> Ozaki, 1925	Okinawa, Japan	Dyer <i>et al.</i> (1988)
		<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	New Caledonia	Durio and Manter (1968b)
		<i>Pearsonellum corventum</i> Overstreet and Køie, 1989	Great barrier reef, Australia	Overstreet and Køie (1989)
			Heron Island, Australia	Lester and Sewell (1990)
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	New Caledonia	Durio and Manter (1968a)
		<i>Pseudoplagioporus interruptus</i> Durio and Manter, 1968	New Caledonia	Durio and Manter (1968b)
		<i>Tubulovesicula angusticauda</i> (Nicoll, 1915)	N. Queensland	Yamaguti, (1971)
			South Vietnam	King (1964)

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<i>Epinephelus merra</i> Bloch, 1793	Monogenea	<i>Diplectanum melanesiense</i> Laird, 1958	Japan	Yamaguti, (1963b)
			New Hebrides	Yamaguti, (1963b)
		<i>Haliotrema epinepheli</i> Young, 1968	Red Sea	Paperna (1972)
<i>Epinephelus morio</i> (Valenciennes, 1828)	Copepoda	<i>Hatschekia insolita</i> Wilson, 1913 (as <i>Hatschekia serrana</i> Pearse, 1952)	South eastern Mexico	Vidal Martinez and Poulin (2003)
		<i>Lepeophtheirus dissimulates</i> Wilson, 1905	Bermuda	Yamaguti (1963a)
		<i>Lepeophtheirus edwardsi</i> Wilson, 1905	Bermuda	Yamaguti (1963a)
	Digenea	<i>Allonematobothrium yucatanense</i> Moravec <i>et al.</i> 1997	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Barisomum erubescens</i> Linton, 1910	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Helicometra torta</i> Linton, 1910	Dry Tortugas, Florida	Linton (1910)
			Dry Tortugas, Florida	Manter (1933)
			Dry Tortugas, Florida	Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
			Yucatan, Mexico	Aguirre-Macedo and Bray (1996)
		<i>Helicometrina nimia</i> Linton, 1910	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Hemacreadium torta</i> Linton, 1910	Florida, Puerto Rico, Bimini	Yamaguti, (1971)
		<i>Lecithochirium floridense</i> (Manter, 1934)	Yucatan Peninsula, Mexico	Aguirre-Macedo and Bray (1996)
			Mexico	Moravec <i>et al.</i> (1997)
		<i>Lecithochirium musculus</i> (Looss, 1907) Nasir and Diaz, 1971	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Lecithochirium oridense</i>	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)

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<i>Epinephelus morio</i> (Valenciennes, 1828)	Digenea	<i>Lepidapedoides levenseni</i> (Linton, 1907)	Dry Tortugas, Florida	Linton (1910)
				Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Lepidapedoides trachinoti</i> (Hanson, 1950) (as <i>Lepidapedon trachinoti</i>)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Lepidapedon levenseni</i> (Linton, 1900)	Tortugas, Florida	Manter (1947)
		<i>Postporus epinepheli</i> (Manter, 1947)	Barrier Reef, belice	Fischthal (1977)
			Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Stephanostomum dentalum</i> (Linton, 1901)	Dry Tortugas, Florida	Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
			Yucatan, Mexico	Aguirre-Macedo and Bray (1996)
	Monogenea	<i>Neobenedenia melleni</i> (MacCallum, 1927)	Gulf of Mexico	Bullard <i>et al.</i> (2000)
		<i>Neobenedenia melleni</i> (MacCallum, 1927)	Bahamas	Mueller <i>et al.</i> (1994) Bullard <i>et al.</i> 2000
		<i>Pseudorhabdosynochus yucatanenses</i> Vidal-Martinez et al. 1997	Mexico Brazil	Flores Crespo and Flores Crespo (2003) Vidal Martinez and Poulin (2003) Vinicius (2004)
	Nematoda	<i>Philometra margolisi</i> (Moravec, Vidal-Martínez et Aguirre-Macedo, 1995)	South eastern Mexico	Vidal Martinez and Poulin (2003)

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<i>Epinephelus morio</i> (Valenciennes, 1828)	Nematoda	<i>Philometra salgadoi</i> (Moravec, Vidal-Martínez et Aguirre-Macedo, 1995)	South eastern Mexico	Vidal Martinez and Poulin (2003)
		<i>Pseudoterranova</i> sp. Larva anisakiasis	Mexico	Laffon –Leal <i>et al.</i> (2000)
<i>Epinephelus morrhua</i> (Valenciennes, 1833)	Copepoda	<i>Lernaeenicus ramosus</i> Kirtisinghe, 1956	Ceylon	Yamaguti (1963a)
<i>Epinephelus mystacinus</i> (Poey, 1852)	Digenea	<i>Lobatozoum bilobatum</i> Hyman, 1963	Bahama Islands	Hyman (1963)
		<i>Stephanostomum microstephanum</i> Manter, 1934	Cuba	Pérez-Vigueras (1955)
<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Digenea	<i>Lepidapedoides nicolli</i> (Manter, 1934)	Dry Tortugas, Florida	Manter (1934)
				Manter (1947)
		<i>Lepidapedoides nicolli</i> (Manter, 1934) (as <i>Lepidapedon nicolli</i>)	Florida	Yamaguti (1958)
		<i>Prosorhynchus ozakii</i> Manter 1934	Dry Tortugas, Florida	Manter (1934)
				Manter (1940b)
				Manter (1947)
		<i>Stephanostomum microstephanum</i> Manter, 1934	Bahama Islands	Sparks (1957)
			Dry Tortugas, Florida	Manter (1934)
				Manter (1947)
	Isopoda	<i>Gnathia</i> sp.	Colombia	Bunkley-Williams <i>et al.</i> (1999)
	Monogenea	<i>Pseudorhabdosynochus sulamericanus</i> Santos et al. 2000	Brazil	Portes (2000) Vinicius (2004)
<i>Epinephelus ongus</i> (Bloch, 1790)	Digenea	<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Pearsonellum corventum</i> Overstreet and Køie, 1989	Great barrier reef, Australia	Overstreet and Køie (1989)

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<i>Epinephelus ongus</i> (Bloch, 1790)	Digenea	<i>Pearsonellum corventum</i> Overstreet and Køie, 1989	Heron Island, Australia	Lester and Sewell (1990)
<i>Epinephelus polyphekadion</i> (Bleeker, 1849)	Digenea	<i>Apertile overstreeti</i> Toman, 1992	Seychelles, Indian Ocean	Toman (1992)
	Monogenea	<i>Benedenia</i> sp. (Diesing, 1858)	Philippines	Koesharyani and Yuasa (2001)
<i>Epinephelus polyphekadion</i> (Bleeker, 1849) (as <i>Epinephelus microdon</i>)	Digenea	<i>Bivesicula palauensis</i> Shimazu and Machida, 1995	Palau Islands	Shimazu and Machida (1995)
<i>Epinephelus quernus</i> Seale, 1901	Digenea	<i>Allonematobothrium epinepheli</i> Yamaguti 1965	Hawaii	Yamaguti (1965)
		<i>Gonapodasmius branchialis</i> Yamaguti, 1970		Yamaguti, (1971)
				Yamaguti (1970)
		<i>Gonapodasmius haemuli</i> Pozdnyakov, 1994	Pacific Sea	Pozdnyakov (1994)
		<i>Lepidapedoides querni</i> Yamaguti 1970	Hawaii	Yamaguti (1970)
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939		
<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	Digenea	<i>Allopodocotyle epinepheli</i> (Yamaguti, 1942)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Bivesicula claviformis</i> Yamaguti, 1934	French Polynesia	Rigby <i>et al.</i> (1997)
			Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1994)
		<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)

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<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	Digenea	<i>Helicometra fasciata</i> (Rudolphi, 1819)	French Polynesia	Rigby <i>et al.</i> (1997)
<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	Digenea	<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996 (as <i>Lepidapedoides kerapus</i>)	French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Pearsonellum corventum</i> Overstreet and Køie, 1989	Great barrier reef, Australia	Overstreet and Køie (1989)
			Heron Island, Australia	Lester and Sewell (1990)
<i>Epinephelus radiatus</i> (Day, 1867)	Digenea	<i>Gonapodasmius reticulum</i> Muruges and Madhavi, 1994	Bengala	Muruges and Madhavi (1994)
<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)	Copepoda	<i>Caligus epinepheli</i> Yamaguti, 1936	Inland Sea, Japan	Yamaguti (1963a)
	Digenea	<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	Tsushima Islands	Machida <i>et al.</i> (1970)
		<i>Erilepturus hamati</i> (Yamaguti, 1934)	Japan	Yamaguti (1940)
		<i>Uteroversiculurus hamati</i> (Yamaguti, 1934)	Inland Sea, Japan	Yamaguti (1958)
	Monogenea	<i>Benedenia epinepheli</i> (Yamaguti, 1937)	Japan	Ogawa <i>et al.</i> (1995b)
		<i>Metabenedeniella hoplognathi</i> (Yamaguti, 1942)		Yamaguti, (1963b)
	Acanthocephala	<i>Gorgorhynchus medium</i> (Linton, 1907)	Bermuda	Yamaguti (1963c)
<i>Epinephelus</i> sp.	Digenea	<i>Aephnidiogenetinae ptochus</i> Nicoll, 1915		Yamaguti (1958)
		<i>Ectenurus americanus</i> (Manter, 1947)	Jamaica	Yamaguti, (1971)
		<i>Elytrophallus mexicanus</i> Manter, 1940	Socorro and Clarion Island, Mexico	Yamaguti (1958)
		<i>Neidhartiinae coronata</i> Durio et Manter, 1968	New Caledonia	Yamaguti, (1971)
		<i>Pearsonellum</i> sp. (Overstreet)	Philippines	Si Si (1999)

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<i>Epinephelus</i> sp.	Digenea	<i>Prosorhynchus caudovatum</i> Manter, 1940	Suez	Yamaguti, (1971)
			Suez, Egypt	Yamaguti (1958)
		<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	Hawaii	Yamaguti, (1971)
		<i>Prosorhynchus freitasi</i> Negaty, 1937	Australia	Yamaguti, (1971)
		<i>Prosorhynchus</i> sp. (Odhner, 1905)	Philippines	Si Si (1999)
		<i>Stephanostomum dentalum</i> (Linton, 1901)	Florida	Yamaguti (1958)
	Hirudinae	<i>Not Identified</i>	Dhaka, Bangladesh	Somga <i>et al.</i> (2001)
	Monogenea	<i>Ancyrocephalus</i> sp.	Vietnam	Thi Hoa and Van Ut (2007)
		<i>Benedenia</i> sp. (Diesing, 1858)	Philippines	Si Si (1999)
		<i>Benedenia</i> sp. (Diesing, 1858) (as <i>Tareenia</i> sp.)		
		<i>Diplectanum</i> sp. (Diesing, 1858)		
		<i>Megacotyloides</i> sp.		
		<i>Neobenedenia girellae</i> (Hargis, 1955)		
		<i>Pseudorhabdosynochus</i> sp. Yamaguti, 1958		
		<i>Tareenia</i> sp.	Myanmar	
	Nematoda	<i>Raphidascaris anchoviellae</i> Chandler, 1935	Galveston Bay	Yamaguti, (1961)
<i>Epinephelus striatus</i> (Bloch, 1792)	Cestoda	<i>Otobothrium curtum</i> (Linton, 1909)	Dry Tortugas, Florida	Yamaguti, (1959)
	Copepoda	<i>Lepeophtheirus dissimulates</i> Wilson, 1905	Bermuda	Yamaguti (1963a)
			Puerto Rico	Steele-Llinas (1982)
		<i>Sagum flagellatum</i> (Wilson, 1913)		
	Digenea	<i>Atalosrophion epinepheli</i> MacCallum, 1917	New York	Yamaguti (1958)
		<i>Brachyphallus parvus</i> (Manter, 1947)	Dry Tortugas, Florida	Yamaguti (1958)
		<i>Brachyphallus parvus</i> (Manter, 1947) (as <i>Lecithochirum parvum</i>)		Manter, (1947)

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<i>Epinephelus striatus</i> (Bloch, 1792)	Digenea	<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960)	Puerto Rico	Dyer <i>et al.</i> (1985)
				Siddiqi and Cable (1960)
			West Indies	Dyer <i>et al.</i> (1992)
		<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960) (as <i>Hamacreadium lintoni</i>)	Puerto Rico	Siddiqi and Cable (1960)
		<i>Ectenurus americanus</i> (Manter, 1947)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Ectenurus virgulus</i> Linton, 1910	Biscayne Bay, Florida	Overstreet (1969)
		<i>Gonapodasmius tomex</i> (Linton, 1907)	Bermuda	Yamaguti, (1971)
				Linton (1907)
		<i>Hamacreadium mutabile</i> Linton, 1910	Gulf of Panama	Sogandares-Bernal (1959)
			West Indies	Dyer <i>et al.</i> (1992)
		<i>Hamacreadium</i> sp. Linton 1910	West Indies	Dyer <i>et al.</i> (1992)
		<i>Helicometra torta</i> Linton, 1910	Barrier Reef, Belize	Fischthal (1977)
			Biscayne Bay, Florida	Overstreet (1969)
			Dry Tortugas, Florida	Linton (1910)
				Manter (1930)
				Manter (1933)
				Manter (1947)
			Gulf of Panama	Sogandares-Bernal (1959)
			Puerto Rico	Siddiqi and Cable (1960)
		<i>Hemacreadium torta</i> Linton, 1910	Florida , Puerto Rico, Bimini	Yamaguti, (1971)
		<i>Lecithochirium floridense</i> (Manter, 1934)	Dry Tortugas, Florida	Manter (1934)
		<i>Lecithochirium microstomum</i> Chandler, 1935	Biscayne Bay, Florida	Overstreet (1969)

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<i>Epinephelus striatus</i> (Bloch, 1792)	Digenea	<i>Lecithochirium musculus</i> (Looss, 1907) Nasir and Diaz, 1971	Biscayne Bay, Florida	Overstreet (1969)
		<i>Lepidapedoides levenseni</i> (Linton, 1907)	Bermuda	Linton (1907)
			Colombia	Vélez (1978)
			Dry Tortugas, Florida	Linton (1910)
		<i>Lepidapedoides trachinoti</i> (Hanson, 1950) (as <i>Lepidapedon trachinoti</i>)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Maccallozoum epinepheli</i> MacCallum, 1917		MacCallum (1917)
		<i>Neolepidapedoides epinepheli</i> (Siddiqi and Cable, 1960)	Puerto Rico	Dyer <i>et al.</i> (1985)
				Siddiqi and Cable (1960)
		<i>Neolepidapedon epinepheli</i> Siddiqi and Cable, 1960	Puerto Rico	Siddiqi and Cable (1960)
		<i>Opechona levinseni</i> (Linton, 1907)	Bermuda	Yamaguti (1958)
		<i>Postporus epinepheli</i> (Manter, 1947)	Curacao and Jamaica	Nahhas and Cable (1964)
			Puerto Rico	Siddiqi and Cable (1960)
		<i>Sclerodistomum diodontis</i> Yamaguti, 1942	Colombia	Vélez (1978)
		<i>Stephanostomum casum</i> (Linton, 1910)	Dry Tortugas, Florida	Linton (1910)
		<i>Stephanostomum dentalum</i> (Linton, 1901)	Curacao and Jamaica	Nahhas and Cable (1964)
			Puerto Rico	Siddiqi and Cable (1960)
		<i>Stephanostomum pagrosomi</i> (Yamaguti, 1939)		Yamaguti (1971)
	Hirudinae	<i>Trachelobdella lubrica</i> (Grube, 1840)	Puerto Rico	Williams (1982)
	Isopoda	<i>Alcirona</i> sp.	Puerto Rico	Williams and Bunkley-Williams 1977

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<i>Epinephelus striatus</i> (Bloch, 1792)	Monogenea	<i>Neobenedenia melleni</i> (MacCallum, 1927)	Bahamas	Mueller <i>et al.</i> (1994)
		<i>Neobenedenia melleni</i> (MacCallum, 1927) (as <i>Benedenia melleni</i>)	Caribbean Sea off Bimini, British West Indies	Nigrelli (1947)
<i>Epinephelus summana</i> (Forsskål, 1775)	Digenea	<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	Arabian Gulf	Saoud <i>et al.</i> (1986)
		<i>Hamacreadium mutabile</i> Linton, 1910	Red Sea	Ramadan (1983)
		<i>Helicometrina qatarensis</i> Saoud <i>et al.</i> 1988	Arabian Gulf	Saoud <i>et al.</i> (1988a)
		<i>Pseudoplagioporus manteri</i>	Red Sea	Saoud and Ramadan (1984)
<i>Epinephelus taeniops</i> (Valenciennes, 1828)	Copepoda	<i>Hatschekia cadenati</i> Nunes-Ruivo, 1954	Senegal	Yamaguti (1963a)
<i>Epinephelus tauvina</i> (Forsskål, 1775)	Digenea	<i>Allonematobothrium epinepheli</i> Yamaguti 1965	China	Shen (1990a)
			Coast of Visakhapatnam, Bay of Bengala	Muruges <i>et al.</i> (1992)
			Waltair Coast, Bay of Bengala	Madhavi (1982)
			Xisha Island, China	Gu and Shen (1983a)
		<i>Allonematobothrium xishaense</i> Gu and Shen 1983	China	Shen (1990a)
			Xisha Island, China	Gu and Shen (1983a)
		<i>Allopodocotyle</i> sp. Pritchard, 1966	Philippines	Kolandasamy and Shaharom-Harrison (1999)
		<i>Bivesicula claviformis</i> Yamaguti, 1934	Japan	Shimazu and Machida (1995)
		<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	Arabian Gulf	Saoud <i>et al.</i> (1986)
		<i>Gonapodasmius epinepheli</i> Abdul-Salam, Sreelatha and Farah, 1990	Arabian Gulf	Abdul-Salam and Steelatha (1992)
				Abdul-Salam <i>et al.</i> (1990)

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<i>Epinephelus tauvina</i> (Forsskål, 1775)	Digenea	<i>Gonapodasmius pacificus</i> Yamaguti (1938)	China	Shen (1990a)
			Xisha Island, China	Gu and Shen (1983a)
		<i>Helicometrina qatarensis</i> Saoud <i>et al.</i> 1988	Arabian Gulf	Saoud <i>et al.</i> (1988a)
		<i>Indoglomeritrema epinepheli</i> Madhavi and Hanumantha Rao, 1983	Bay of Bengala	Madhavi and Hanumantha Rao (1983)
		<i>Phyllodistomum unicum</i> Odhner, 1902	Egypt	Odhner (1910)
			Red Sea	Yamaguti (1958)
		<i>Prosorhynchus pacificum</i> Manter 1940	Waltair Coast, Bay of Bengala	Madhavi (1974)
		<i>Prosorhynchus</i> sp. (Odhner, 1905)	Philippines	Kolandasamy and Shaharom-Harrison (1999)
		<i>Stephanostomum nagatyti</i> Saoud <i>et al.</i> 1988	Arabian Gulf	Saoud <i>et al.</i> (1988a)
	Monogenea	<i>Benedenia epinepheli</i> (Yamaguti, 1937)	Japan	Jithendran <i>et al.</i> (2005)
		<i>Benedenia</i> sp. (Diesing, 1858)	Kuwait	Al-Marzouq and Al-Rifae (1994)
<i>Epinephelus undulosus</i> (Quoy and Gaimard, 1824)	Digenea	<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	India	Hafeezullah and Siddiqi (1970)
		<i>Retractomonorchis nahhasi</i>	Arabian Sea, Off Bombay Coast, India	Ahmad (1984a)
	Monogenea	<i>Benedenia malaboni</i> (Velasquez, 1982)	Malaya	Lim (1998)
<i>Epinephelus cyanopodus</i> (Richardson, 1846) (as <i>Epinephelus hoedtii</i>)	Nematoda	<i>Hysterothylacium</i> sp. (Ward and Magath, 1917)	Okinawa, Japan	Hasegawa <i>et al.</i> 1991
<i>Mycteroperca bonaci</i> (Poey, 1860)	Cestoda	<i>Otobothrium curtum</i> (Linton, 1909)	Dry Tortugas, Florida	Yamaguti, (1959)
	Copepoda	<i>Dentigyrps curtus</i> Wilson, 1913 (as <i>Lepeophtheirus curtus</i>)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
		<i>Hatschekia insolita</i> Wilson, 1913 (as <i>Hatschekia serrana</i> Pearse, 1952)	Alligator Harbour, Florida	Pearse (1952)

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<i>Mycteroperca bonaci</i> (Poey, 1860)	Copepoda	<i>Lepeophtheirus dissimulates</i> Wilson, 1905	Colombia	Bunkley-Williams <i>et al.</i> (1999)
	Digenea	<i>Brachyphallus parvus</i> (Manter, 1947) (as <i>Lecithochirum parvum</i>)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Deretrema fusillus</i> Linton, 1940	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Helicometrina exacta</i> Linton, 1910	Dry Tortugas, Florida	Manter (1933)
		<i>Lecithochirium microstomum</i> Chandler, 1935	Biscayne Bay, Florida	Overstreet (1969)
		<i>Lepidapedoides nicolli</i> (Manter, 1934)	Venezuela	Nasir and Gomez (1977)
		<i>Neolepidapedon mycteropercae</i> Siddiqi and Cable, 1960	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Postporus epinepheli</i> (Manter, 1947)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Prosorhynchus atlanticum</i> Manter, 1940	Florida	Yamaguti (1958)
				Yamaguti, (1971)
		<i>Prosorhynchus ozakii</i> Manter 1934	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Prosorhynchus pacificum</i> Manter 1940	Apalachee Bay, Gulf of Mexico	Nahhas and Short (1965)
			Barrier Reef, Belice	Fischthal (1977)
			Biscayne Bay, Florida	Overstreet (1969)
			Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1940b)
			Curacao	Yamaguti, (1971)
		<i>Stephanostomum dentalum</i> (Linton, 1901)	Jamaica	Nahhas and Cable (1964)
	Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
		<i>Excorallana costata</i> (Lemos de Castro, 1960)	Colombia	Bunkley-Williams <i>et al.</i> (1999)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Mycteroperca bonaci</i> (Poey, 1860)	Isopoda	<i>Tridentella virginiana</i> (Richardson, 1905)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
	Monogenea	<i>Pseudorhabdosynochus capurroi</i> Vidal-Martinez e Mendoza-Franco, 1998	Mexico Brazil	Flores Crespo, Flores Crespo (2003) Vinicius (2004)
<i>Mycteroperca interstitialis</i> (Poey, 1860)	Copepoda	<i>Dentigyrps curtus</i> Wilson, 1913	Puerto Rico	Steele-Llinas (1982)
<i>Mycteroperca interstitialis</i> (Poey, 1860) (as <i>Mycteroperca foliata</i>)	Digenea	<i>Peracreadium mycteropercae</i> (Sogandares-Bernal, 1959)	B.W.I.	Yamaguti, (1971)
<i>Mycteroperca interstitialis</i> (Poey, 1860)		<i>Peracreadium mycteropercae</i> (Sogandares-Bernal, 1959)	Gulf of Panama	Sogandares-Bernal (1959)
		<i>Prosorhynchus pacificum</i> Manter 1940	Brasil	Amato (1982)
			Colombia	Vélez (1978)
			Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Stephanostomum casum</i> (Linton, 1910)	Colombia	Vélez (1978)
<i>Stephanostomum dentalum</i> (Linton, 1901)		Puerto Rico	Dyer <i>et al.</i> (1985)	
<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Digenea	<i>Brachyphallus parvus</i> (Manter, 1947) (as <i>Lecithochirum parvum</i>)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Dissosaccus laevis</i> (Linton, 1898)	Dry Tortugas, Florida	Manter (1931)
				Manter (1934)
		<i>Lecithochirium floridense</i> (Manter, 1934)		
		<i>Neolepidapedoides macrum</i> (Overstreet, 1969)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Prosorhynchus atlanticum</i> Manter, 1940	Florida	Yamaguti (1958)
			Biscayne Bay, Florida	Overstreet (1969)
			Brasil	Amato (1982)
Dry Tortugas, Florida	Manter (1940b)			

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Digenea	<i>Prosorhynchus pacificum</i> Manter 1940	Dry Tortugas, Florida	Manter (1947)
	Monogenea	<i>Neobenedenia melleni</i> (MacCallum, 1927)	Bahamas	Mueller <i>et al.</i> (1994)
		<i>Pseudorhabdosynochus kritskyi</i> Dyer <i>et al.</i> 1995	Gulf of Mexico	Dyer <i>et al.</i> (1995)
<i>Mycteroperca olfax</i> (Jeny, 1843)	Digenea	<i>Lepidapedoides nicolli</i> (Manter, 1934)	Galapagos Islands	Manter (1940a)
		<i>Lepocreadium hancocki</i> (Manter, 1940)	Florida	Yamaguti (1958)
		<i>Prosorhynchus ozakii</i> Manter 1934	Galapagos Islands	Manter (1940a)
			Pacific coast of Mexico	Yamaguti (1958)
		<i>Prosorhynchus pacificum</i> Manter 1940	Galapagos Islands	Manter (1940a)
		<i>Stephanostomum multispinosum</i> Manter, 1940	Galapagos Islands	Manter (1940a)
			Japan	Yamaguti (1958)
	Monogenea	<i>Neobenedenia isabellae</i> (Meserve, 1938)	Pacific Coast, Mexico	Meserve, 1938
<i>Mycteroperca rosacea</i> (Streets, 1877) (as <i>Mycteroperca pardalis</i>)	Acanthocephala	<i>Corynosoma obtusens</i> Lincicome, 1943	West coast of Mexico	Yamaguti (1963c)
	Monogenea	<i>Neobenedenia adenea</i> (Meserve, 1938)	Gulf of California	Yamaguti, (1963b)
		<i>Neobenedenia girellae</i> (Hargis, 1955)		
		<i>Neobenedenia melleni</i> (MacCallum, 1927) (as <i>Benedenia girellae</i>)	Gulf of California off La Paz, Mexico	Bravo-Hollis, 1957
<i>Mycteroperca rosacea</i> (Streets, 1877)	Digenea	<i>Hamacreadium mutabile</i> Linton, 1910	Mexico	Bravo-Hollis and Manter (1957)
		<i>Helicometrina nimia</i> Linton, 1910	Baja California, Mexico	Arai (1963)
		<i>Lecithochirium microstomum</i> Chandler, 1935	Pacific Coast of Mexico	Lamothe-Argumedo (1966)
		<i>Phyllodistomum marinae</i> Bravo-Hollis and Manter, 1957	Mexico	Bravo-Hollis and Manter (1957)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Mycteroperca rosacea</i> (Streets, 1877)	Monogenea	<i>Neobenedenia melleni</i> (MacCallum, 1927)	Bahamas	Mueller <i>et al.</i> (1994)
<i>Mycteroperca rubra</i> (Bloch, 1793)	Copepoda	<i>Hatschekia delamarei</i> Nunes-Ruivo, 1954	Senegal	Yamaguti (1963a)
	Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
<i>Mycteroperca</i> sp.	Digenea	<i>Bucephalus heterotentaculatus</i> Bravo- Hollis and Sogandares Bernal, 1956	Baja California	Yamaguti, (1971)
		<i>Elytrophallus mexicanus</i> Manter, 1940	James Island, Galapagos	Yamaguti (1958)
		<i>Neolepidapedon mycteropercae</i> Siddiqi and Cable, 1960	Puerto Rico	Siddiqi and Cable (1960)
		<i>Prosorhynchus atlanticus</i> Manter, 1940		
		<i>Prosorhynchus ozakii</i> Manter 1934	Curacao	Yamaguti, (1971)
		<i>Prosorhynchus pacificum</i> Manter 1940	Galapagos	
	Monogenea	<i>Neobenedenia adenea</i> (Meserve, 1938)	Socorro Isl., Mexico (Pacific)	Yamaguti, (1963b)
	Nematoda	<i>Cucullanus stossichi</i> Barreto, 1922	Italy	Yamaguti, (1961)
		<i>Raphidascaris anchoviellae</i> Chandler, 1935	Galveston Bay	
<i>Mycteroperca tigris</i> (Valenciennes, 1833)	Copepoda	<i>Dentigyrps curtus</i> Wilson, 1913	Puerto Rico	Steele-Llinas (1982)
		<i>Lepeophtheirus dissimulates</i> Wilson, 1905		
	Digenea	<i>Lepidapedoides parepinepheli</i> (Sogandares-Bernal, 1959)	Gulf of Panama	Sogandares-Bernal (1959)
		<i>Opechona</i> sp. Looss, 1907	West Indies	Dyer <i>et al.</i> (1992)
		<i>Prosorhynchus atlanticus</i> Manter, 1940		
		<i>Prosorhynchus pacificum</i> Manter 1940		

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Mycteroperca tigris</i> (Valenciennes, 1833)	Monogenea	<i>Diplectanum mycteropercae</i>	Brazil	Vinicius (2004)
<i>Mycteroperca tigris</i> (as <i>Epinephelus tigris</i>)	Isopoda	<i>Alcirona</i> sp.	Puerto Rico	Williams and Bunkley-Williams 1977
<i>Mycteroperca venenosa</i> (Linnaeus, 1758) (as <i>Mycteroperca apua</i>)	Acanthocephala	<i>Gorgorhynchus medium</i> (Linton, 1907)	Bermuda	Yamaguti (1963c)
	Copepoda	<i>Lepeophtheirus dissimulates</i> Wilson, 1905		Yamaguti (1963a)
<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Digenea	<i>Hamacreadium mutabile</i> Linton, 1910	Galapagos	Yamaguti (1958)
		<i>Helicometra mirzai</i> Siddiqi and Cable, 1960	West Indies	Dyer <i>et al.</i> (1992)
		<i>Helicometrina exacta</i> Linton, 1910	Dry Tortugas, Florida	Manter (1947)
		<i>Lecithochirium floridense</i> (Manter, 1934)	Cuba	Pérez-Vigueras (1958)
		<i>Lecithochirium monticelli</i> (Linton, 1898)	Bermuda	Linton (1907)
		<i>Neolepidapedon mycteropercae</i> Siddiqi and Cable, 1960	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Paracryptogonimus americanus</i> Manter, 1940	Barrier Reef, Belice	Fischthal (1977)
		<i>Postporus epinepheli</i> (Manter, 1947)	Dry Tortugas, Florida	Manter (1947)
		<i>Postporus mycteropercae</i> (Manter, 1947)	Florida	Yamaguti (1958)
		<i>Prosorhynchus atlanticum</i> Manter, 1940	Florida	Yamaguti (1958)
			Barrier Reef, Belice	Fischthal (1977)
			Belize	Fischthal (1978)
			Curacao and Jamaica	Nahhas and Cable (1964)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Digenea	<i>Prosorhynchus pacificum</i> Manter 1940	Dry Tortugas, Florida	Manter (1940b)
				Manter (1947)
			Gulf of Panama	Sogandares-Bernal (1959)
		<i>Stephanostomum dentalum</i> (Linton, 1901)	Dry Tortugas, Florida	Manter (1947)
			Florida	Yamaguti (1958)
			Gulf of Panama	Sogandares-Bernal (1959)
<i>Mycteroperca xenarcha</i> Jordan, 1888	Digenea	<i>Bucephalus heterotentaculatus</i> Bravo- Hollis and Sogandares Bernal, 1956	Baja California, Mexico	Arai (1963)
		<i>Hamacreadium mutabile</i> Linton, 1910	Galapagos Islands	Manter (1940a)
		<i>Lepidapedoides nicolli</i> (Manter, 1934)		
		<i>Prosorhynchus ozakii</i> Manter 1934	Pacific coast of Mexico	Yamaguti (1958)
		<i>Prosorhynchus pacificum</i> Manter, 1940	Galapagos Islands	Manter (1940a)
				Yamaguti (1958)
<i>Paranthias furcifer</i> (Valenciennes, 1828)	Digenea	<i>Elytrophallus mexicanus</i> Manter, 1940	Galapagos Islands	Manter (1940a)
			Socorro and Clarion Island	Yamaguti (1958)
		<i>Lecithochirium microstomum</i> Chandler, 1935	Galapagos Islands	Manter (1940a)
		<i>Opechona orientalis</i> (Layman, 1930)	Mexico	Yamaguti (1958)
		<i>Opecoelus mexicanus</i> Manter, 1940	Galapagos Islands	Manter (1940a)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Paranthias furcifer</i> (Valenciennes, 1828)	Digenea	<i>Opecoelus mexicanus</i> Manter, 1940	Mexico	Manter (1940a)
				Yamaguti (1958)
		<i>Prodistomum orientalis</i> (Layman, 1930)	Galapagos Islands	Manter (1940a)
	Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	Desecheo, Puerto Rico	Williams and Williams (1981)
			Mona Island, Puerto Rico	Williams and Williams (1981)
			Monito Island, Puerto Rico	Williams and Williams (1981)
			Dominican Republic	Williams and Williams (1981)
			Colombia	Williams and Williams (1981)
			Colombia	Bunkley-Williams <i>et al.</i> (1999)
	Monogenea	<i>Hemitagia galapagensis</i> (Meserve, 1938)	Galapagos Islands	Yamaguti, (1963b)
<i>Plectropomus leopardus</i> (Lacepède, 1802)	Copepoda	<i>Caligus</i> sp. (Muller, 1785)	Philippines	Koesharyani <i>et al.</i> (1999a)
	Copepoda	<i>Lepeoptheirus</i> sp.	Philippines	Koesharyani and Yuasa (2001)
				Koesharyani <i>et al.</i> (1999a), (1998)
	Digenea	<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Pearsonellum corventum</i> Overstreet and Køie, 1989	Australia	Overstreet and Thulin (1989)
			Heron Island, Australia	Lester and Sewell (1990)
		<i>Plerurus digitatus</i> (Looss, 1899)	Heron Island, Australia	Lester and Sewell (1990)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Plectropomus leopardus</i> (Lacepède, 1802)	Digenea	<i>Plerurus digitatus</i> (Looss, 1899)	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1993a)
		<i>Pseudopecoelus elongates</i>	Xisha Island	Shen (1990b)
		<i>Pseudoprosorhynchus hainanensis</i>	Xisha Island	Shen (1990b)
		<i>Rhipidocotyle clavivesiculatum</i> Shen, 1990	China	Ku and Shen (1975)
			Hainan Island	Shen (1990b)
			Xisha Island	Shen (1990b)
		<i>Thulinia microrchis</i> (Yamaguti, 1934)	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1993b)
	Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	Thailand	Leong (2001)
		<i>Benedenia</i> sp. (Diesing, 1858)		
		<i>Diplectanum grouperi</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Megalocotyloides convolute</i>		
		<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)		
		<i>Neobenedenia girellae</i> (Hargis, 1955)	Thailand Philippines	Leong (2001) Koesharyani <i>et al.</i> (1999a, 1998)
		<i>Neobenedenia</i> sp. (Yamaguti, 1963)	Thailand	Leong (2001)
		<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999		
		<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958		
		<i>Pseudorhabdosynochus lanteuensis</i>		
<i>Plectropomus maculatus</i> (Bloch, 1790)	Cestoda	<i>Uncibilocularis</i> sp. (Southwell, 1925)	Great Barrier Reef	Chambers <i>et al.</i> (2000)

Species of Grouper	Group of Parasite	Species of Parasite	Reported from	Reference
<i>Plectropomus maculatus</i> (Bloch, 1790)	Digenea	<i>Allopodocotyle plectropomi</i> (Manter, 1963) (as <i>Podocotyle plectropomi</i>)	Fiji Islands	Manter (1963a)
		<i>Cainocreadium serrani</i> Nagaty, 1956		Manter (1963a)
		<i>Mitotrema anthostomatum</i> Manter, 1963		Manter (1963b)
		<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	New Caledonia	Durio and Manter (1968b)
		<i>Prosorhynchus freitasi</i> Negaty, 1937		Durio and Manter (1968a)
		<i>Prosorhynchus thapari</i> Manter, 1953	Fiji Islands	Manter (1953)
			Sourthern seas	Parukhin (1976)
<i>Plectropomus</i> sp.	Digenea	<i>Prosorhynchus freitasi</i> Negaty, 1937	Australia	Yamaguti, (1971)
<i>Triso dermopterus</i> (Temminck and Schlegel, 1842)	Digenea	<i>Gonapodasmius hainanensis</i>	China	Gu and Shen (1983b)
			Xisha Island	Shen (1990b)
<i>Variola albimarginata</i> Baissac, 1952	Digenea	<i>Prosorhynchus platycephali</i> (Yamaguti, 1934)	Okinawa, Japan	Dyer <i>et al.</i> (1988)
<i>Variola louti</i> (Forsskål, 1775)	Digenea	<i>Bivesicula palauensis</i> Shimazu and Machida, 1995	Japan	Shimazu and Machida (1995)
		<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	Red Sea	Ramadan (1983)
		<i>Plerurus digitatus</i> (Looss, 1899)	French Polynesia	Rigby <i>et al.</i> (1997)
			Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1993a)
		<i>Prosorhynchus crucibulum</i> (Rudolphi, 1819)	Red Sea	Nagaty (1937)
		<i>Prosorhynchus platycephali</i> (Yamaguti, 1934)	Okinawa, Japan	Dyer <i>et al.</i> (1988)
				Hasegawa <i>et al.</i> (1991)
		<i>Prosorhynchus serrani</i> Durio and Manter, 1968	New Caledonia	Durio and Manter (1968a)

Table 4. Metazoan parasites Reported from Groupers Worldwide by Group of Parasite

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Acanthocephala	<i>Acanthocephalus</i> sp. (Koelreuther, 1771)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
	<i>Corynosoma obtusens</i> Lincicome, 1943	<i>Mycteroperca rosacea</i> (Streets, 1877) (as <i>Mycteroperca pardalis</i>)	West coast of Mexico	Yamaguti (1963c)
	<i>Gorgorhynchus medium</i> (Linton, 1907)	<i>Epinephelus</i> sp.	Bermuda	
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758) (as <i>Mycteroperca apua</i>)		
Cestoda	<i>Anthobothrium</i> sp. (Van Beneden, 1850)	<i>Cephalopholis boenak</i> (Bloch, 1790)	Great Barrier Reef	Chambers <i>et al.</i> (2000)
	<i>Caulobothrium</i> sp. (Van Beneden, 1850)	<i>Cephalopholis cyanostigma</i> (Valenciennes, 1828)	Great Barrier Reef	Chambers <i>et al.</i> (2000)
	<i>Grillotia musclicola</i> (Yamaguti, 1934)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti, (1959)
	<i>Otobothrium curtum</i> (Linton, 1909)	<i>Epinephelus striatus</i> (Bloch, 1792)	Dry Tortugas, Florida	Yamaguti, (1959)
		<i>Mycteroperca bonaci</i> (Poey, 1860)		
	<i>Scolex polymorphus</i> (Rudophi 1819)	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
	<i>Tetraphyllidae</i> sp.	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia Thailand	Leong and Wong (1988) Chinabut (1998)
	<i>Uncibilocularis</i> sp. (Southwell, 1925)	<i>Plectropomus maculatus</i> (Bloch, 1790)	Great Barrier Reef	Chambers <i>et al.</i> (2000)
Copepoda	<i>Caligus acanthopagris</i> Lin, Ho & Chen 2000	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Taiwan	Ho <i>et al.</i> 2000
	<i>Caligus cf epinepheli</i> Yamaguti, 1936	<i>Epinephelus coioides</i> (Hamilton, 1822)	Indonesia	Yuniar <i>et al.</i> (2007)
	<i>Caligus epidemicus</i> Hewitt, 1971	<i>Epinephelus coioides</i> (Hamilton, 1822)	Taiwan	Vo <i>et al.</i> 2008
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		Roubal (1995)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Copepoda	<i>Caligus epinepheli</i> Yamaguti, 1936	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland sea, Japan	Yamaguti (1963a)
		<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)		
	<i>Caligus multispinosus</i> Shen, 1957	<i>Epinephelus coioides</i> (Hamilton, 1822)	Taiwan	Vo <i>et al.</i> 2008
	<i>Caligus nanhaiensis</i> Wu and Pan, 1997	<i>Epinephelus awoara</i> (Temminck and Schlegel, 1842)	China	Wu <i>et al.</i> (1997)
				Wu <i>et al.</i> (1997)
				Wu and Pan (1997)
	<i>Caligus orientalis</i> Gussev, 1951	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Kenkyu	Urawa and Kato 1991
	<i>Caligus punctatus</i> Shiino, 1955		Taiwan	Lin <i>et al.</i> (1996)
	<i>Caligus rotundigenitalis</i> Yu, 1933			
	<i>Caligus</i> sp. (Muller, 1785)	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
		<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Philippines	Koesharyani and Yuasa (2001) Koesharyani <i>et al.</i> (1999a)
		<i>Epinephelus coioides</i> (Hamilton, 1822)		Koesharyani <i>et al.</i> (1999a)
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)	Malaysia	Leong and Wong (1988)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand Indonesia Malaysia	Chinabut (1998) koesharyani <i>et al.</i> (1999a) Leong and Wong (1990)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Philippines	Koesharyani <i>et al.</i> (1999a)
	<i>Caligus spinosurculus</i> Pearse, 1951	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Bahamas	Yamaguti (1963a)
	<i>Dentigyrps curtus</i> Wilson, 1913		Puerto Rico	Steele-Llinas (1982)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Copepoda	<i>Dentigyrps curtus</i> Wilson, 1913	<i>Mycteroperca interstitialis</i> (Poey, 1860)	Puerto Rico	Steele-Llinas (1982)
		<i>Mycteroperca tigris</i> (Valenciennes, 1833)		
	<i>Dentigyrps curtus</i> Wilson, 1913 (as <i>Lepeophtheirus curtus</i>)	<i>Mycteroperca bonaci</i> (Poey, 1860)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
	<i>Ergasilus borneoensis</i> Yamaguti, 1954	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
	<i>Ergasilus lobus</i> (Lin, 1997)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Taiwan	Lin and Ho 1998
	<i>Grandiungus promicrops</i> Pearse, 1952	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Gulf of Mexico, Texas	Pearse (1952)
	<i>Hatschekia cadenati</i> Nunes-Ruivo, 1954	<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus alexandrinus</i>)	Senegal	Yamaguti (1963a)
		<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus gigas</i>)	Cape Bear, Prince Edward Island	
		<i>Epinephelus taeniops</i> (Valenciennes, 1828)	Senegal	
		<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus alexandrinus</i>)		
	<i>Hatschekia cernae</i> Goggio, 1905	<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus alexandrinus</i>)		
	<i>Hatschekia cernae</i> Goggio, 1905	<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus gigas</i>)		
	<i>Hatschekia delamarei</i> Nunes-Ruivo, 1954	<i>Mycteroperca rubra</i> (Bloch, 1793)		
	<i>Hatschekia incata</i> Wilson, 1913	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Jamaica	Yamaguti (1963a)
	<i>Hatschekia insolita</i> Wilson, 1913			
	<i>Hatschekia insolita</i> Wilson, 1913 (as <i>Hatschekia serrana</i> Pearse, 1952)		Alligator Harbour, Florida	Pearse (1952)
	<i>Hatschekia insolita</i> Wilson, 1913 (as <i>Hatschekia serrana</i> Pearse, 1952)	<i>Epinephelus morio</i> (Valenciennes, 1828)	South eastern Mexico	Vidal Martinez and Poulin (2003)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Copepoda	<i>Hatschekia insolita</i> Wilson, 1913 (as <i>Hatschekia serrana</i> Pearse, 1952)	<i>Mycteroperca bonaci</i> (Poey, 1860)	Alligator Harbour, Florida	Pearse (1952)
	<i>Hatschekia petiti</i> Nunes-Ruivo, 1954	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Senegal	Yamaguti (1963a)
	<i>Hatschekia</i> sp. (Poche, 1902)	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
	<i>Lepeophtheirus dissimulates</i> Wilson, 1905	<i>Epinephelus labriformis</i> (Jenyns, 1843)	Galapagos	Yamaguti (1963a)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Bermuda	
		<i>Epinephelus striatus</i> (Bloch, 1792)	Bermuda	
			Puerto Rico	Steele-Llinas (1982)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
		<i>Mycteroperca tigris</i> (Valenciennes, 1833)	Puerto Rico	Steele-Llinas (1982)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758) (as <i>Mycteroperca apua</i>)	Bermuda	Yamaguti (1963a)
	<i>Lepeophtheirus edwardsi</i> Wilson, 1905	<i>Epinephelus labriformis</i> (Jenyns, 1843)	Charles Island	
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Bermuda	
	<i>Lepeophtheirus rotundiventris</i> Bassett-Smith, 1898	<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus alexandrinus</i>)	Castiglione	
	<i>Lepeophtheirus rotundiventris</i> Bassett-Smith, 1898	<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus gigas</i>)		
	<i>Lepeophtheirus</i> sp.	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Philippines	Koesharyani <i>et al.</i> (1999a)
		<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)		
		<i>Epinephelus coioides</i> (Hamilton, 1822)		Koesharyani and Yuasa (2001)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Copepoda	<i>Lepeoptheirus</i> sp.	<i>Epinephelus coioides</i> (Hamilton, 1822)	Philippines	Koesharyani et al. (1999a), (1998)
		<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)		Koesharyani and Yuasa (2001)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		Koesharyani et al. (1999a), (1998)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)		Koesharyani and Yuasa (2001)
				Koesharyani et al. (1999a), (1998)
	<i>Lernaeenicus ramosus</i> Kirtisinghe, 1956	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti (1963a)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus tsirimenara</i>)		
		<i>Epinephelus morrhua</i> (Valenciennes, 1833)	Ceylon	Yamaguti (1963a)
	<i>Lernanthropus chrysophrys</i> Shishido, 1898	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	
	<i>Pennellidae</i> sp. Oken, 1816	<i>Epinephelus coioides</i> (Hamilton, 1822)	Indonesia	Yuniar <i>et al.</i> (2007)
	<i>Pseudolernanthropus angulatus</i> (Kroyer, 1863)	<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Puerto Rico	Steele-Llinas (1982)
	<i>Pseudolernanthropus epinepheli</i> Yamaguti et Yamasu, 1960	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland sea, Japan	Yamaguti (1963a)
	<i>Pseudolernanthropus posteli</i> (Delamare-Deboutteville et Nunes-Ruivo, 1954)	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Senegal	Yamaguti (1963a)
	<i>Sagum flagellatum</i> (Wilson, 1913)	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Puerto Rico	Steele-Llinas (1982)
		<i>Epinephelus guttatus</i> (Linnaeus, 1758)		
		<i>Epinephelus striatus</i> (Bloch, 1792)		
		<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Jamaica	Yamaguti (1963a)

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Copepoda	<i>Thebius</i> sp.	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1996) Chinabut (1998)
	<i>Thysanote epinepheli</i> Yamaguti, 1939	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland sea, Japan	Yamaguti (1963a)
	<i>Tuxophorus caligodes</i> (Wilson, 1908)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Gulf of Mexico, Texas	Pearse (1952)
Digenea	<i>Aephniogenetinae ptochus</i> Nicoll, 1915	<i>Epinephelus</i> sp.	Bermuda	Yamaguti (1958)
	<i>Allonematobothrium epinepheli</i> Yamaguti 1965	<i>Epinephelus quernus</i> Seale, 1901	Hawaii	Yamaguti (1965)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	China	Shen (1990a)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	Coast of Visakhapatnam, Bay of Bengala	Muruges <i>et al.</i> (1992)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	Waltair Coast, Bay of Bengala	Madhavi (1982)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	Xisha Island, China	Gu and Shen (1983a)
	<i>Allonematobothrium ghanense</i> (Fischthal and Thomas, 1968)	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Ghana	Fischthal and Thomas (1968)
	<i>Allonematobothrium xishaense</i> Gu and Shen 1983	<i>Epinephelus tauvina</i> (Forsskål, 1775)	China	Shen (1990a)
			Xisha Island, China	Gu and Shen (1983a)
	<i>Allonematobothrium yucatanense</i> Moravec <i>et al.</i> 1997	<i>Epinephelus morio</i> (Valenciennes, 1828)	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
	<i>Allopodocotyle epinepheli</i> (Yamaguti, 1942)	<i>Epinephelus bruneus</i> Bloch, 1793	Tsushima Islands	Machida <i>et al.</i> (1970)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Japan	Yamaguti (1942)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)	French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)		
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	Heron Island, Australia	Lester and Sewell (1990)

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Digenea	<i>Allopodocotyle epinepheli</i> (Yamaguti, 1942)	<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
	<i>Allopodocotyle plectropomi</i> (Manter, 1963) (as <i>Podocotyle plectropomi</i>)	<i>Plectropomus maculatus</i> (Bloch, 1790)	Fiji Islands	Manter (1963a)
	<i>Allopodocotyle serrani</i> (Yamaguti, 1942)		Malaysia	Leong and Wong (1988)
	<i>Allopodocotyle</i> sp. Pritchard, 1966	<i>Epinephelus tauvina</i> (Forsskål, 1775)	Philippines	Kolandasamy and Shaharom-Harrison (1999)
	<i>Apertile overstreeti</i> Toman, 1992	<i>Epinephelus polyphekadion</i> (Bleeker, 1849)	Seychelles, Indian Ocean	Toman (1992)
	<i>Aphanurus stossichii</i> (Monticelli, 1891)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang (1982b)
	<i>Apododocotyle oscitans</i> (Linton, 1910)	<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Ephinephelus fulva</i>)	West Indies	Dyer <i>et al.</i> (1992)
	<i>Atalosrophion epinepheli</i> MacCallum, 1917	<i>Epinephelus striatus</i> (Bloch, 1792)	New York	Yamaguti (1958)
	<i>Atalostrophion promicrops</i> MacCallum, 1915)	<i>Epinephelus guttatus</i> (Linnaeus, 1758)		MacCallum (1915)
	<i>Barisomum erubescens</i> Linton, 1910	<i>Epinephelus morio</i> (Valenciennes, 1828)	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
	<i>Bianium plicatum</i> (Linton 1928)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang (1982a)
	<i>Bivesicula claviformis</i> Yamaguti, 1934	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti (1938a)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)	French Polynesia	Rigby <i>et al.</i> (1997)
			Malaysa	Fischthal and Kuntz (1965)
			Red Sea	Nagaty (1948)
			Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1994)
			Xisha Island	Shen (1985b)
			Xisha Island, China	Gu and Shen (1983a)

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Digenea	<i>Bivesicula claviformis</i> Yamaguti, 1934	<i>Epinephelus longispinis</i> (Kner, 1864)	Tsushima Islands	Machida <i>et al.</i> (1970)
		<i>Epinephelus merra</i> Bloch, 1793	Fiji Islands	Manter (1961)
			French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	French Polynesia	
			Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1994)
		<i>Epinephelus tauvina</i> (Forsskal, 1775)	Japan	Shimazu and Machida (1995)
	<i>Bivesicula epinepheli</i> Yamaguti, 1938	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland sea, Japan	Yamaguti (1958)
	<i>Bivesicula palauensis</i> Shimazu and Machida, 1995	<i>Epinephelus polyphekadion</i> (Bleeker, 1849) (as <i>Epinephelus microdon</i>)	Palau Islands	Shimazu and Machida (1995)
		<i>Variola louti</i> (Forsskal, 1775)	Japan	Shimazu and Machida (1995)
	<i>Brachyphallus parvus</i> (Manter, 1947)	<i>Epinephelus striatus</i> (Bloch, 1792)	Dry Tortugas, Florida	Yamaguti (1958)
	<i>Brachyphallus parvus</i> (Manter, 1947) (as <i>Lecithochirum parvum</i>)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Epinephelus fasciatus</i> (Forsskal, 1775)	Okinawa, Japan	Dyer <i>et al.</i> (1988)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Dry Tortugas, Florida	Manter, (1947)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)		
	<i>Bucephalus heterotentaculatus</i> Bravo- Hollis and Sogandares Bernal, 1956	<i>Alphistes multiguttatus</i> (Günther, 1867)	Baja California, Mexico	Arai (1963)
		<i>Mycteroperca</i> sp.	Baja California	Yamaguti, (1971)

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Digenea	<i>Bucephalus heterotentaculatus</i> Bravo- Hollis and Sogandares Bernal, 1956	<i>Mycteroperca xenarcha</i> Jordan, 1888	Baja California, Mexico	Arai (1963)
	<i>Cainocreadium epinepheli</i> (Yamaguti, 1934)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea and Pacific coast of Japan	Yamaguti (1939)
			Japan	Yamaguti (1934a)
		<i>Epinephelus areolatus</i> (Forsskål, 1775)	Arabian Gulf	Saoud <i>et al.</i> (1986)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Arabian Gulf	Saoud <i>et al.</i> (1986)
			Japan	Yamaguti (1942)
		<i>Epinephelus merra</i> Bloch, 1793	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)	Tsushima Islands	Machida <i>et al.</i> (1970)
		<i>Epinephelus summana</i> (Forsskål, 1775)	Arabian Gulf	Saoud <i>et al.</i> (1986)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)		
	<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960)	<i>Cephalopholis cruentatus</i> (Lacepede, 1802) (as <i>Ephinephelus cruentatus</i>)	West Indies	Dyer <i>et al.</i> (1992)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Puerto Rico	Dyer <i>et al.</i> (1985)

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Digenea	<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960)	<i>Epinephelus striatus</i> (Bloch, 1792)	West Indies	Dyer <i>et al.</i> (1992)
	<i>Cainocreadium lintoni</i> (Siddiqi and Cable, 1960) (as <i>Hamacreadium lintoni</i>)	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Puerto Rico	Siddiqi and Cable (1960)
		<i>Epinephelus striatus</i> (Bloch, 1792)		
	<i>Cainocreadium longisaccum</i> (Siddiqi et Cable, 1960)	<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Puerto Rico	Bunkey-Williams <i>et al.</i> (1996)
				Dyer <i>et al.</i> (1985)
	<i>Cainocreadium longisaccum</i> (Siddiqi et Cable, 1960) (as <i>Hamacreadium longisaccum</i>)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Puerto Rico	Siddiqi and Cable (1960)
	<i>Cainocreadium serrani</i> Nagaty, 1956	<i>Plectropomus maculatus</i> (Bloch, 1790)	Fiji Islands	Manter (1963a)
	<i>Cardicola</i> sp. (Short, 1952)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand Malaysia	Chinabut (1998) Leong and Wong (1988)
	<i>Coitocaecum glandulosum</i> Yamaguti, 1934	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Toyama Bay, Japan	Yamaguti (1958)
	<i>Coitocaecum gymnophallum</i> Nicoll, 1915		Japan	Yamaguti (1934a)
	<i>Crowcrocaecum epinepheli</i> Wang, 1982		China	Wang (1982a)
	<i>Dactylostomum epinepheli</i> Wang, 1982			
	<i>Deretrema fusillus</i> Linton, 1940	<i>Mycteroperca bonaci</i> (Poey, 1860)	Curacao and Jamaica	Nahhas and Cable (1964)
	<i>Derogenes epinepheli</i>	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang (1982b)
	<i>Didymozoon serrani</i> Monticelli, 1889	<i>Epinephelus marginatus</i> (Lowe, 1834)		Monticelli (1889)
	<i>Dissosaccus laevis</i> (Linton, 1898)	<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Dry Tortugas, Florida	Manter (1931)
	<i>Ectenurus americanus</i> (Manter, 1947)	<i>Epinephelus</i> sp.	Jamaica	Yamaguti, (1971)
	<i>Ectenurus americanus</i> (Manter, 1947)	<i>Epinephelus striatus</i> (Bloch, 1792)	Curacao and Jamaica	Nahhas and Cable (1964)

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Digenea	<i>Ectenurus</i> sp. (Looss, 1907)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
	<i>Ectenurus virgulus</i> Linton, 1910	<i>Epinephelus striatus</i> (Bloch, 1792)	Biscayne Bay, Florida	Overstreet (1969)
	<i>Elytrophallus mexicanus</i> Manter, 1940	<i>Epinephelus labriformis</i> (Jenyns, 1843)	Galapagos Islands	Manter (1940a)
		<i>Epinephelus</i> sp.	Socorro and Clarion Island, Mexico	Yamaguti (1958)
		<i>Mycteroperca</i> sp.	James Island, Galapagos	
		<i>Paranthias furcifer</i> (Valenciennes, 1828)	Galapagos Islands	Manter (1940a)
			Socorro and Clarion Island	Yamaguti (1958)
	<i>Erilepturus hamati</i> (Yamaguti, 1934)	<i>Epinephelus bruneus</i> Bloch, 1793	Tsushima Islands	Ichihara (1974)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Japan	Yamaguti (1934a)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysa	Leong and Wong (1988)
		<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)	Japan	Yamaguti (1940)
	<i>Folliculovarium xishaense</i> Gu and Shen, 1983	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Xisha Island, China	Gu and Shen (1983a)
	<i>Gonapodasmius branchialis</i> (Yamaguti, 1970)	<i>Cephalopholis boenak</i> (Bloch, 1790)	China	Shen (1990a)
			Xisha Island	Shen (1990b)
		<i>Epinephelus latifasciatus</i> (Temminck and Schlegel, 1842)	Bay of Bengala	Muruges and Madhavi (1994)
		<i>Epinephelus quernus</i> Seale, 1901	Hawaii	Yamaguti, (1971)
				Yamaguti (1970)
	<i>Gonapodasmius epinepheli</i> Abdul-Salam, Sreelatha and Farah, 1990	<i>Epinephelus tauvina</i> (Forsskål, 1775)	Arabian Gulf	Abdul-Salam and Steelatha (1992)
				Abdul-Salam <i>et al.</i> (1990)

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Digenea	<i>Gonapodasmius haemuli</i> Pozdnyakov, 1994	<i>Epinephelus quernus</i> Seale, 1901	Pacific Sea	Pozdnyakov (1994)
	<i>Gonapodasmius hainanensis</i>	<i>Triso dermopterus</i> (Temminck and Schlegel, 1842)	China	Gu and Shen (1983b)
				Shen (1990a)
			Xisha Island	Shen (1990b)
	<i>Gonapodasmius pacificus</i> Yamaguti (1938)	<i>Cephalopholis boenak</i> (Bloch, 1790)	Xisha Island, China	Gu and Shen (1983a)
		<i>Epinephelus awoara</i> (Temminck and Schlegel, 1842)	China	Shen (1990a)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)		
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	China	Shen (1990a)
			Xisha Island, China	Gu and Shen (1983a)
	<i>Gonapodasmius pristipomatis</i> (Yamaguti, 1934)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti (1958)
			Inland Sea, Japan	Yamaguti, (1971)
			Japan	Yamaguti (1938b)
	<i>Gonapodasmius reticulum</i> Muruges and Madhavi, 1994	<i>Epinephelus radiatus</i> (Day, 1867)	Bengala	Muruges and Madhavi (1994)
	<i>Gonapodasmius</i> sp. (Justine, 1981)	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Puerto Rico	Bunkley-Williams <i>et al.</i> (1996)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1998) Chinabut (1996)
	<i>Gonapodasmius tomex</i> (Linton, 1907)	<i>Epinephelus striatus</i> (Bloch, 1792)	Bermuda	Yamaguti, (1971)
				Linton (1907)
	<i>Hamacreadium confusum</i> Overstreet, 1969	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Jamaica	Nahhas and Carlson (1994)
	<i>Hamacreadium epinepheli</i> Yamaguti, 1934	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea	Yamaguti, (1971)

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Digenea	<i>Hamacreadium mutabile</i> Linton, 1910	<i>Cephalopholis cruentatus</i> (Lacepede, 1802)	Bermudas	Yamaguti (1971)
		<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Ephinephelus fulva</i>)	West Indies	Dyer <i>et al.</i> (1992)
		<i>Cephalopholis miniata</i> (Forsskål, 1775)	Red Sea and Gulf of Aden	Parukhin (1970)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Red Sea	Ramadan (1983)
		<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Epinephelus labriformis</i> (Jenyns, 1843)	Pacific Coast of Mexico	Lamothe-Argumedo (1969b)
		<i>Epinephelus merra</i> Bloch, 1793	Red Sea	Nagaty (1941)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Gulf of Panama	Sogandares-Bernal (1959)
			West Indies	Dyer <i>et al.</i> (1992)
		<i>Epinephelus summana</i> (Forsskål, 1775)	Red Sea	Ramadan (1983)
		<i>Mycteroperca rosacea</i> (Streets, 1877)	Mexico	Bravo-Hollis and Manter (1957)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Galapagos	Yamaguti (1958)
		<i>Mycteroperca xenarcha</i> Jordan, 1888	Galapagos Islands	Manter (1940a)
	<i>Hamacreadium mutabile</i> Linton, 1910 (as <i>Hamacreadium epinepheli</i> Yamaguti, 1934)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea	Yamaguti (1958)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Pacific coast of Japan	

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Digenea	<i>Hamacreadium mutabile</i> Linton, 1910 (as <i>Hamacreadium epinepheli</i> Yamaguti, 1934)	<i>Epinephelus fasciatus</i> (Forsskål, 1775) (as <i>Epinephelus tsirimenara</i>)	Inland Sea	Yamaguti (1958)
	<i>Hamacreadium</i> sp. Linton 1910	<i>Epinephelus striatus</i> (Bloch, 1792)	West Indies	Dyer <i>et al.</i> (1992)
	<i>Helicometra aposinuata</i> Pritchard, 1966	<i>Epinephelus awoara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang <i>et al.</i> (1992)
	<i>Helicometra borneoensis</i> Fischthal and Kuntz, 1965	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Malaysa	Fischthal and Kuntz (1965)
	<i>Helicometra epinepheli</i> Yamaguti, 1934	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang (1982a)
				Wang <i>et al.</i> (1992)
			Japan	Yamaguti (1934a)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Japan	
		<i>Epinephelus merra</i> Bloch, 1793	Bahama Islands	Sparks (1957)
	<i>Helicometra fasciata</i> (Rudolphi, 1819)	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Red Sea and Gulf of Aden	Parukhin (1970)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
			Southern Seas	Parukhin (1976)
		<i>Epinephelus merra</i> Bloch, 1793	French Polynesia	Rigby <i>et al.</i> (1997)
			Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	French Polynesia	Rigby <i>et al.</i> (1997)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Digenea	<i>Helicometra mirzai</i> Siddiqi and Cable, 1960	<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	West Indies	Dyer <i>et al.</i> (1992)
	<i>Helicometra nasae borneoensis</i> Fischthal et Kuntz, 1965	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	N. Borneo	Yamaguti, (1971)
	<i>Helicometra nasae</i> Nagaty and Abdel-Aal, 1962	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Red Sea	Nagaty and Abdel Aal (1962b)
	<i>Helicometra torta</i> Linton, 1910	<i>Cephalopholis panamensis</i> (Steindachner, 1876)	Chamela Bay, Mexico	Pérez-Ponce de León <i>et al.</i> (1999)
		<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Epinephelus labriformis</i> (Jenyns, 1843)	Ecuador	Yamaguti (1958)
			Galapagos Islands	Manter (1940a)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Dry Tortugas, Florida	Linton (1910)
				Manter (1933)
				Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
			Yucatan, Mexico	Aguirre-Macedo and Bray (1996)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Barrier Reef, Belize	Fischthal (1977)
			Biscayne Bay, Florida	Overstreet (1969)
			Dry Tortugas, Florida	Linton (1910)
				Manter (1930)
				Manter (1933)
				Manter (1947)
			Gulf of Panama	Sogandares-Bernal (1959)
			Puerto Rico	Siddiqi and Cable (1960)
	<i>Helicometrina exacta</i> Linton, 1910	<i>Mycteroperca bonaci</i> (Poey, 1860)	Dry Tortugas, Florida	Manter (1933)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)		Manter (1947)

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Digenea	<i>Helicometrina nimia</i> Linton, 1910	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Bahama Islands	Sparks (1957)
			Gulf of Mexico	Caballero (1990)
			Jamaica	Nahhas and Carlson (1994)
		<i>Epinephelus analogus</i> Gill, 1864	Gulf of Panama	Sogandares-Bernal (1959)
		<i>Epinephelus diacanthus</i> (Valenciennes, 1828)	Karachi Coast, Karachi	Bilqees (1981)
			Pakistan	Zaidi and Khan (1977)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1990)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Mycteroperca rosacea</i> (Streets, 1877)	Baja California, Mexico	Arai (1963)
	<i>Helicometrina qatarensis</i> Saoud <i>et al.</i> 1988	<i>Epinephelus summana</i> (Forsskål, 1775)	Arabian Gulf	Saoud <i>et al.</i> (1988a)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)		
	<i>Hemacreadium torta</i> Linton, 1910	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Florida , Puerto Rico, Bimini	Yamaguti, (1971)
		<i>Epinephelus labriformis</i> (Jenyns, 1843) (as <i>E. lambriformis</i>)	Ecuador	
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Florida, Puerto Rico, Bimini	
		<i>Epinephelus striatus</i> (Bloch, 1792)		
	<i>Hirudinella ventricosa</i> (Pallas, 1774) Baird, 1853	<i>Epinephelus areolatus</i> (Forsskål, 1775)	Southern Seas	Parukhin (1976)
	<i>Hypocreadium myohelicatum</i> Bravo-Hollis and Manter, 1957	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Costa Rica	Pérez-Ponce de Leon <i>et al.</i> (1998)
	<i>Hysterolecithoides epinepheli</i> Yamaguti, 1934	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Indland Sea, Japan	Yamaguti (1934a)
	<i>Indoglomeritrema epinepheli</i> Madhavi and Hanumantha Rao, 1983	<i>Epinephelus tauvina</i> (Forsskål, 1775)	Bay of Bengala	Madhavi and Hanumantha Rao (1983)

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Digenea	<i>Lasiotocus bengalensis</i> Ahmad and Gupta, 1985	<i>Cephalopholis sonnerati</i> (Valenciennes, 1828)	Bay of Bengala, Orissa	Ahmad and Gupta (1985)
	<i>Lasiotocus puriensis</i> Ahmad and Gupta, 1985	<i>Cephalopholis sonnerati</i> (Valenciennes, 1828)		
	<i>Lecithochirium floridense</i> (Manter, 1934)	<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Yucatan Peninsula, Mexico	Aguirre-Macedo and Bray (1996)
			Mexico	Moravec <i>et al.</i> (1997)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Dry Tortugas, Florida	Manter (1934)
		<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)		
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Cuba	Pérez-Vigueras (1958)
	<i>Lecithochirium microstomum</i> Chandler, 1935	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Dry Tortugas, Florida	Manter (1947)
			Gulf of Mexico	Bullock <i>et al.</i> (1992)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Biscayne Bay, Florida	
		<i>Mycteroperca rosacea</i> (Streets, 1877)	Pacific Coast of Mexico	Lamothe-Argumedo (1966)
		<i>Paranthias furcifer</i> (Valenciennes, 1828)	Galapagos Islands	Manter (1940a)
	<i>Lecithochirium monticelli</i> (Linton, 1898)	<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Bermuda	Linton (1907)
	<i>Lecithochirium musculus</i> (Looss, 1907) Nasir and Diaz, 1971	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Ghana	Fischthal and Thomas (1972)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Curacao and Jamaica	Nahhas and Cable (1964)

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Digenea	<i>Lecithochirium musculus</i> (Looss, 1907) Nasir and Diaz, 1971	<i>Epinephelus striatus</i> (Bloch, 1792)	Biscayne Bay, Florida	Overstreet (1969)
	<i>Lecithochirium neopacificum</i> Velasquez, 1962	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand Malaysia	Chinabut (1998) Leong and Wong (1988)
	<i>Lecithochirium oridense</i>	<i>Epinephelus morio</i> (Valenciennes, 1828)	Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
	<i>Lecithochirium</i> sp. Lühe, 1901	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
	<i>Lecithocladium aegyptensis</i> Fischthal and Kuntz, 1963	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Mediterranea Coast, Israel	Fischthal (1980)
		<i>Epinephelus marginatus</i> (Lowe, 1834)		
	<i>Lecithophyllum intermedium</i> (Manter, 1934)	<i>Alphestes multiguttatus</i> (Günther, 1867)	Baja California, Mexico	Arai (1963)
	<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996	<i>Cephalopholis miniata</i> (Forsskål, 1775)	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)
		<i>Epinephelus cyanopodus</i> (Richardson, 1846)		
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)		
		<i>Epinephelus merra</i> Bloch, 1793		
		<i>Epinephelus ongus</i> (Bloch, 1790)		
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)		
	<i>Lepidapedoides angustus</i> Bray, Cribb and Barker, 1996 (as <i>Lepidapedoides kerapus</i>)	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Epinephelus merra</i> Bloch, 1793	French Polynesia	Rigby <i>et al.</i> (1997)
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	French Polynesia	Rigby <i>et al.</i> (1997)
	<i>Lepidapedoides dollfusi</i> (Durio and Manter, 1968)	<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1996)

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Digenea	<i>Lepidapedoides epinepheli</i> (Bravo Hollis and Manter, 1957)	<i>Epinephelus analogus</i> Gill, 1864	Mexico	Bravo-Hollis and Manter (1957)
	<i>Lepidapedoides levenseni</i> (Linton, 1907)	<i>Epinephelus areolatus</i> (Forsskål, 1775)		Parukhin (1976)
		<i>Epinephelus guttatus</i> (Linnaeus, 1758) (as <i>Epinephelus maculosus</i>)	Bermuda	Linton (1907)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Dry Tortugas, Florida	Linton (1910)
				Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Bermuda	Linton (1907)
			Colombia	Vélez (1978)
			Dry Tortugas, Florida	Linton (1910)
	<i>Lepidapedoides nicolli</i> (Manter, 1934)	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Atlantic coast of Africa	Gaevskaya and Aljoshkina (1983)
			Ghana	Fischthal and Thomas (1970a)
		<i>Epinephelus albomarginatus</i> Boulenger, 1903	South Africa	Bray (1985)
		<i>Epinephelus analogus</i> Gill, 1864	California, United State of America	Winter (1960)
		<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Dry Tortugas, Florida	Manter (1934)
				Manter (1947)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Venezuela	Nasir and Gomez (1977)
		<i>Mycteroperca olfax</i> (Jeny, 1843)	Galapagos Islands	Manter (1940a)
		<i>Mycteroperca xenarcha</i> Jordan, 1888		

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Digenea	<i>Lepidapedoides nicolli</i> (Manter, 1934) (as <i>Lepidapedon nicolli</i>)	<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Florida	Yamaguti (1958)
	<i>Lepidapedoides oaxacensis</i> (Lamothe-Argumedo, 1969)	<i>Epinephelus labriformis</i> (Jenyns, 1843)	Pacific Coast of Mexico	Lamothe-Argumedo (1969a)
	<i>Lepidapedoides parepinepheli</i> (Sogandares-Bernal, 1959)	<i>Mycteroperca tigris</i> (Valenciennes, 1833)	Gulf of Panama	Sogandares-Bernal (1959)
	<i>Lepidapedoides querni</i> Yamaguti 1970	<i>Epinephelus quernus</i> Seale, 1901	Hawaii	Yamaguti (1970)
	<i>Lepidapedoides trachinoti</i> (Hanson, 1950) (as <i>Lepidapedon trachinoti</i>)	<i>Epinephelus morio</i> (Valenciennes, 1828)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Curacao and Jamaica	Nahhas and Cable (1964)
	<i>Lepidapedon elongatum</i> Lebour, 1908	<i>Alphestes multiguttatus</i> (Günther, 1867)	North Pacific Sea, Panama	Caballero <i>et al.</i> (1955)
	<i>Lepidapedon levenseni</i> (Linton, 1900)	<i>Epinephelus morio</i> (Valenciennes, 1828)	Tortugas, Florida	Manter (1947)
	<i>Lepocreadium hancocki</i> (Manter, 1940)	<i>Mycteroperca olfax</i> (Jeny, 1843)	Florida	Yamaguti (1958)
	<i>Lobatozoum bilobatum</i> Hyman, 1963	<i>Epinephelus mystacinus</i> (Poey, 1852)	Bahama Islands	Hyman (1963)
	<i>Maccalozoum epinepheli</i> MacCallum, 1917	<i>Epinephelus striatus</i> (Bloch, 1792)		MacCallum (1917)
	<i>Mitotrema anthostomatum</i> Manter, 1963	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1996)
		<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)	Southern Great Barrier Ref., Australian	Cribb <i>et al.</i> (1996)
		<i>Plectropomus maculatus</i> (Bloch, 1790)	Fiji Islands	Manter (1963b)
	<i>Monascus filiformis</i> (Rudolphi, 1819)	<i>Epinephelus areolatus</i> (Forsskål, 1775)		Parukhin (1976)
	<i>Multitestis pyriformis</i> Manter, 1963	<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Australian	Bray and Cribb (1998)
	<i>Myzoxenus lachnolaimi</i> Manter, 1947	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	West Indies	Dyer <i>et al.</i> (1992)

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Digenea	<i>Neidhartiinae coronata</i> Durio et Manter, 1968	<i>Epinephelus</i> sp.	New Caledonia	Yamaguti, (1971)
	<i>Neolepidapedoides epinepheli</i> (Siddiqi and Cable, 1960)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Puerto Rico	Siddiqi and Cable (1960)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Puerto Rico	Dyer <i>et al.</i> (1985)
				Siddiqi and Cable (1960)
	<i>Neolepidapedoides macrum</i> (Overstreet, 1969)	<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Biscayne Bay, Florida	Overstreet (1969)
	<i>Neolepidapedon epinepheli</i> Siddiqi and Cable, 1960	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Puerto Rico	Siddiqi and Cable (1960)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Puerto Rico	
		<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Puerto Rico	
	<i>Neolepidapedon mycteropercae</i> Siddiqi and Cable, 1960	<i>Mycteroperca bonaci</i> (Poey, 1860)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Mycteroperca</i> sp.	Puerto Rico	Siddiqi and Cable (1960)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Curacao and Jamaica	Nahhas and Cable (1964)
	<i>Neoprosorhynchus purius</i> Dayal, 1948	<i>Epinephelus lanceolatus</i> (Bloch, 1790)	India	Chauhan (1953)
				Dayal (1948)
			Puri, India	Yamaguti (1958)
	<i>Opechona levinseni</i> (Linton, 1907)	<i>Epinephelus guttatus</i> (Linnaeus, 1758) (as <i>Epinephelus maculosus</i>)	Bermuda	Linton (1907)
	<i>Opechona levinseni</i> (Linton, 1907)	<i>Epinephelus striatus</i> (Bloch, 1792)	Bermuda	Yamaguti (1958)
	<i>Opechona orientalis</i> (Layman, 1930)	<i>Paranthias furcifer</i> (Valenciennes, 1828)	Mexico	
	<i>Opechona</i> sp. Looss, 1907	<i>Mycteroperca tigris</i> (Valenciennes, 1833)	West Indies	Dyer <i>et al.</i> (1992)

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Digenea	<i>Opecoeloides glandulosa</i> (Yamaguti, 1934)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Pacific coast of Japan, Toyama Bay, Sea of Japan	Yamaguti, (1971)
	<i>Opecoeloides vitellus</i> (Linton, 1900)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Jamaica	Nahhas and Cable (1964)
				Yamaguti, (1971)
			Puerto Rico	Yamaguti, (1971)
	<i>Opecoelus lobatus</i> Ozaki, 1925	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti (1934a)
				Yamaguti (1940)
	<i>Opecoelus mexicanus</i> Manter, 1940	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Gulf of Mexico	Nikolaeva and Parukhin (1968)
		<i>Cephalopholis miniata</i> (Forsskal, 1775)	Red Sea and Gulf of Aden	Parukhin (1970)
		<i>Cephalopholis urodeta</i> (Forster, 1801)	Naha, Okinawa	Yamaguti (1942)
		<i>Cephalopholis urodeta</i> (Forster, 1801) (as <i>Cephalopholis urodelus</i>)		Yamaguti (1958)
		<i>Paranthias furcifer</i> (Valenciennes, 1828)	Galapagos Islands	Manter (1940a)
			Mexico	Manter (1940a)
				Yamaguti (1958)
	<i>Opecoelus sphaericus</i> Ozaki, 1925	<i>Epinephelus merra</i> Bloch, 1793	Okinawa, Japan	Dyer <i>et al.</i> (1988)
	<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	<i>Cephalopholis miniata</i> (Forsskal, 1775)	Red Sea	Nagaty and Abdel Aal (1962a)
		<i>Epinephelus merra</i> Bloch, 1793	New Caledonia	Durio and Manter (1968b)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray and Cribb (1989)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Digenea	<i>Pacificreadium serrani</i> (Nagaty and Abdel-Aal, 1962)	<i>Plectropomus maculatus</i> (Bloch, 1790)	New Caledonia	Durio and Manter (1968b)
		<i>Variola louti</i> (Forsskål, 1775)	Red Sea	Ramadan (1983)
	<i>Paracryptogonimus americanus</i> Manter, 1940	<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Barrier Reef, Belice	Fischthal (1977)
	<i>Paraprosorhynchus jupe</i> Kohn, 1967	<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Brazil	Kohn (1967)
	<i>Pearsonellum corventum</i> Overstreet and Køie, 1989	<i>Epinephelus merra</i> Bloch, 1793	Great barrier reef, Australia	Overstreet and Køie (1989)
			Heron Island, Australia	Lester and Sewell (1990)
		<i>Epinephelus ongus</i> (Bloch, 1790)	Great barrier reef, Australia	Overstreet and Køie (1989)
			Heron Island, Australia	Lester and Sewell (1990)
		<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	Great barrier reef, Australia	Overstreet and Køie (1989)
			Heron Island, Australia	Lester and Sewell (1990)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Australia	Overstreet and Thulin (1989)
			Heron Island, Australia	Lester and Sewell (1990)
	<i>Pearsonellum</i> sp. (Overstreet)	<i>Epinephelus</i> sp.	Philippines	Si Si (1999)
	<i>Peracreadium mycteropercae</i> (Sogandares-Bernal, 1959)	<i>Mycteroperca interstitialis</i> (Poey, 1860) (as <i>Mycteroperca foliata</i>)	B.W.I.	Yamaguti, (1971)
	<i>Peracreadium mycteropercae</i> (Sogandares-Bernal, 1959)	<i>Mycteroperca interstitialis</i> (Poey, 1860)	Gulf of Panama	Sogandares-Bernal (1959)
	<i>Phyllodistomum mamaevi</i> Parukhin, 1976	<i>Cephalopholis miniata</i> (Forsskål, 1775)	Red Sea and Gulf of Aden	Parukhin (1970)
			Southern Seas	Parukhin (1976)
	<i>Phyllodistomum marinae</i> Bravo-Hollis and Manter, 1957	<i>Mycteroperca rosacea</i> (Streets, 1877)	Mexico	Bravo-Hollis and Manter (1957)

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Digenea	<i>Phyllodistomum unicum</i> Odhner, 1902	<i>Epinephelus tauvina</i> (Forsskål, 1775)	Egypt	Odhner (1910)
			Red Sea	Yamaguti (1958)
	<i>Plagioporus epinepheli</i> Shen, 1985	<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Xisha Island	Shen (1985a)
	<i>Plagioporus oligolecithosus</i>	<i>Epinephelus awoara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang <i>et al.</i> (1992)
	<i>Plerurus digitatus</i> (Looss, 1899)	<i>Plectropomus leopardus</i> (Lacepède, 1802)	Heron Island, Australia	Lester and Sewell (1990)
			Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1993a)
		<i>Variola louti</i> (Forsskål, 1775)	French Polynesia	Rigby <i>et al.</i> (1997)
			Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1993a)
	<i>Podocotyle epinepheli</i> Yamaguti, 1942	<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Naha, Okinawa Island	Yamaguti (1958)
	<i>Podocotyle temensis</i> Fischthal et Tomas, 1970	<i>Epinephelus goreensis</i> (Valenciennes, 1830)	Ghana	Fischthal and Thomas (1970b)
		<i>Epinephelus goreensis</i> (Valenciennes, 1830)	Tema, Ghana	Yamaguti, (1971)
	<i>Postporus epinepheli</i> (Manter, 1947)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Barrier Reef, belice	Fischthal (1977)
			Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Digenea	<i>Postporus epinepheli</i> (Manter, 1947)	<i>Epinephelus striatus</i> (Bloch, 1792)	Curacao and Jamaica	Nahhas and Cable (1964)
			Puerto Rico	Siddiqi and Cable (1960)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Dry Tortugas, Florida	Manter (1947)
	<i>Postporus mycteropercae</i> (Manter, 1947)	<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Florida	Yamaguti (1958)
	<i>Proctoeces maculates</i> (Looss, 1901)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland sea, Japan	Yamaguti (1934a)
	<i>Proctotrematoides diacanthi</i>	<i>Epinephelus diacanthus</i> (Valenciennes, 1828)	Karachi Coast, Karachi, Pakistan	Bilqees (1981)
			Pakistan	Zaidi and Khan (1977)
	<i>Prodistomum orientalis</i> (Layman, 1930)	<i>Paranthias furcifer</i> (Valenciennes, 1828)	Galapagos Islands	Manter (1940a)
	<i>Prosogonotrema bilabiatum</i> Perez Viguera, 1940	<i>Epinephelus areolatus</i> (Forsskal, 1775)	Southern Seas	Parukhin (1976)
	<i>Prosorhynchus atlanticum</i> Manter, 1940	<i>Mycteroperca bonaci</i> (Poey, 1860)	Florida	Yamaguti (1958)
		<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)		
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)		
		<i>Mycteroperca bonaci</i> (Poey, 1860)		Yamaguti, (1971)
		<i>Mycteroperca</i> sp.	Puerto Rico	Siddiqi and Cable (1960)
		<i>Mycteroperca tigris</i> (Valenciennes, 1833)	West Indies	Dyer <i>et al.</i> (1992)
	<i>Prosorhynchus caudovatum</i> Manter, 1940	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Mediterranea Coast, Israel	Fischthal (1980)
		<i>Epinephelus andersoni</i> Boulenger, 1903	South Africa	Bray (1984)

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Digenea	<i>Prosorhynchus caudovatum</i> Manter, 1940	<i>Epinephelus goreensis</i> (Valenciennes, 1830)	Ghana	Fischthal and Thomas (1968)
				Yamaguti, (1971)
		<i>Epinephelus</i> sp.	Suez	Yamaguti, (1971)
			Suez, Egypt	Yamaguti (1958)
	<i>Prosorhynchus chorinemi</i> Yamaguti, 1952	<i>Epinephelus areolatus</i> (Forsskål, 1775)		Parukhin (1976)
	<i>Prosorhynchus crucibulum</i> (Rudolphi, 1819)	<i>Variola louti</i> (Forsskål, 1775)	Red Sea	Nagaty (1937)
	<i>Prosorhynchus epinepheli</i> Yamaguti, 1939	<i>Epinephelus aeneus</i> (E. Geoffroy Saint-Hilaire, 1817)	Senegal	Vassiliadès (1982)
		<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti (1939)
				Yamaguti, (1971)
		<i>Epinephelus areolatus</i> (Forsskål, 1775)	India	Hafeezullah and Siddiqi (1970)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Arabian Gulf	Saoud <i>et al.</i> (1988b)
			India	Hafeezullah and Siddiqi (1970)
		<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Xisha Island, China	Gu and Shen (1983a)
		<i>Epinephelus diacanthus</i> (Valenciennes, 1828)	India	Hafeezullah and Siddiqi (1970)
		<i>Epinephelus merra</i> Bloch, 1793	New Caledonia	Durio and Manter (1968a)
		<i>Epinephelus quernus</i> Seale, 1901	Hawaii	Yamaguti (1970)
		<i>Epinephelus</i> sp.		Yamaguti, (1971)
		<i>Epinephelus undulosus</i> (Quoy and Gaimard, 1824)	India	Hafeezullah and Siddiqi (1970)

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Digenea	<i>Proisorhynchus freitasi</i> Negaty, 1937	<i>Epinephelus</i> sp.	Australia	Yamaguti, (1971)
		<i>Plectropomus maculatus</i> (Bloch, 1790)	New Caledonia	Durio and Manter (1968a)
		<i>Plectropomus</i> sp.	Australia	Yamaguti, (1971)
	<i>Proisorhynchus gonoderus</i> Manter, 1940	<i>Epinephelus analogus</i> Gill, 1864	Gulf of Panama	Sogandares-Bernal (1959)
			Panama Pacific	Yamaguti, (1971)
	<i>Proisorhynchus macintoshi</i> (Velásquez, 1959)	<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Philippines	Yamaguti, (1971)
	<i>Proisorhynchus macintoshi</i> (Velásquez, 1959) (as <i>Proisorhynchus mcintoshi</i>)	<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Philippine	Velasquez (1959)
				Velasquez (1966)
				Velasquez (1975)
	<i>Proisorhynchus maternus</i> Bray and Justine, 2006	<i>Epinephelus malabaricus</i>	New Caledonia	Bray and Justine, 2006
	<i>Proisorhynchus ozakii</i> Manter 1934	<i>Epinephelus analogus</i> Gill, 1864	Gulf of Panama	Sogandares-Bernal (1959)
			Panama Pacific	Yamaguti, (1971)
		<i>Epinephelus areolatus</i> (Forsskål, 1775)	Red Sea and Gulf of Aden	Parukhin (1970)
		<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Dry Tortugas, Florida	Manter (1934)
				Manter (1940b)
				Manter (1947)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Mycteroperca olfax</i> (Jeny, 1843)	Galapagos Islands	Manter (1940a)
			Pacific coast of Mexico	Yamaguti (1958)
		<i>Mycteroperca</i> sp.	Curacao	Yamaguti, (1971)
		<i>Mycteroperca xenarcha</i> Jordan, 1888	Galapagos Islands	Manter (1940a)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Digenea	<i>Prosorhynchus ozakii</i> Manter 1934	<i>Mycteroperca xenarcha</i> Jordan, 1888	Pacific coast of Mexico	Yamaguti (1958)
	<i>Prosorhynchus pacificum</i> Manter 1940	<i>Epinephelus analogus</i> Gill, 1864	California, United State of America	Winter (1960)
			Sinaloa, Mexico	Yamaguti, (1971)
		<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Biscayne Bay, Florida	Overstreet (1969)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	India	Hafeezullah and Siddiqi (1970)
			Malaysa	Leong and Wong (1988)
			Malaysia Thailand	Leong and Wong (1988) Chinabut (1998)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	Waltair Coast, Bay of Bengala	Madhavi (1974)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Apalachee Bay, Gulf of Mexico	Nahhas and Short (1965)
			Barrier Reef, Belice	Fischthal (1977)
			Biscayne Bay, Florida	Overstreet (1969)
			Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1940b)
		<i>Mycteroperca interstitialis</i> (Poey, 1860)	Brasil	Amato (1982)
			Colombia	Vélez (1978)
			Curacao and Jamaica	Nahhas and Cable (1964)
		<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Biscayne Bay, Florida	Overstreet (1969)
			Brasil	Amato (1982)

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Digenea	<i>Prosorhynchus pacificum</i> Manter 1940	<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Dry Tortugas, Florida	Manter (1940b)
				Manter (1947)
		<i>Mycteroperca olfax</i> (Jeny, 1843)	Galapagos Islands	Manter (1940a)
		<i>Mycteroperca</i> sp.	Galapagos	Yamaguti, (1971)
		<i>Mycteroperca tigris</i> (Valenciennes, 1833)	West Indies	Dyer <i>et al.</i> (1992)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Barrier Reef, Belice	Fischthal (1977)
			Belize	Fischthal (1978)
			Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1940b)
				Manter (1947)
			Gulf of Panama	Sogandares-Bernal (1959)
		<i>Mycteroperca xenarcha</i> Jordan, 1888	Galapagos Islands	Manter (1940a)
				Yamaguti (1958)
	<i>Prosorhynchus platycephali</i> (Yamaguti, 1934)	<i>Variola albimarginata</i> Baissac, 1952	Okinawa, Japan	Dyer <i>et al.</i> (1988)
		<i>Variola louti</i> (Forsskål, 1775)		Hasegawa <i>et al.</i> (1991)
	<i>Prosorhynchus promicropsi</i> Manter, 1940	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Curacao and Jamaica	Nahhas and Cable (1964)
			Dry Tortugas, Florida	Manter (1940b)

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Digenea	<i>Prosorhynchus promicropsi</i> Manter, 1940	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Dry Tortugas, Florida	Manter (1947)
			Gulf of Mexico	Bullock <i>et al.</i> (1992)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Curacao	Yamaguti, (1971)
	<i>Prosorhynchus serrani</i> Durio and Manter, 1968	<i>Variola louti</i> (Forsskål, 1775)	New Caledonia	Durio and Manter (1968a)
	<i>Prosorhynchus</i> sp. (Odhner, 1905)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
		<i>Epinephelus</i> sp.	Philippines	Si Si (1999)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)		Kolandasamy and Shaharom-Harrison (1999)
	<i>Prosorhynchus thapari</i> Manter, 1953	<i>Plectropomus maculatus</i> (Bloch, 1790)	Fiji Islands	Manter (1953)
	<i>Prosorhynchus thapari</i> Manter, 1953		Sourtern seas	Parukhin (1976)
	<i>Pseudometadena celebesensis</i> Yamaguti, 1952	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysa	Leong and Wong (1988)
	<i>Pseudopecoelina xishaense</i> Gu and Shen, 1983	<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Xisha Island, China	Gu and Shen (1983a)
	<i>Pseudopecoeloides</i> sp. (Yamaguti, 1940)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1998) Chinabut (1996)
	<i>Pseudopecoelus elongates</i>	<i>Plectropomus leopardus</i> (Lacepède, 1802)	Xisha Island	Shen (1990b)
	<i>Pseudopecoelus epinepheli</i> Wang, 1982	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Fujian, China	Wang (1982a)
	<i>Pseudoplagioporus brevivitellus</i> Siddiqi and Cable, 1960	<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Ephinephelus fulva</i>)	Mona Island, Puerto Rico	Dyer <i>et al.</i> (1992)
	<i>Pseudoplagioporus interruptus</i> Durio and Manter, 1968	<i>Epinephelus merra</i> Bloch, 1793	New Caledonia	Durio and Manter (1968b)
	<i>Pseudoplagioporus manteri</i>	<i>Epinephelus summana</i> (Forsskål, 1775)	Red Sea	Saoud and Ramadan (1984)
	<i>Pseudoprosorhynchus hainanensis</i>	<i>Plectropomus leopardus</i> (Lacepède, 1802)	Xisha Island	Shen (1990b)

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Digenea	<i>Retractomonorchis gibsoni</i> Ahmad, 1991	<i>Cephalopholis sonnerati</i> (Valenciennes, 1828)	Arabian Sea, Off Bombay Coast, India	Ahmad (1991)
	<i>Retractomonorchis madhavae</i>			Ahmad (1984b)
	<i>Retractomonorchis nahhasi</i>			Ahmad (1984a)
	<i>Rhipidocotyle angusticollis</i> Chandler, 1941	<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Red Sea	Shalaby and Hassanine (1996)
	<i>Rhipidocotyle clavivesiculatum</i> Shen, 1990	<i>Plectropomus leopardus</i> (Lacepède, 1802)	China	Ku and Shen (1975)
			Hainan Island	Shen (1990b)
			Xisha Island	
	<i>Sclerodistomum diodontis</i> Yamaguti, 1942	<i>Epinephelus striatus</i> (Bloch, 1792)	Colombia	Vélez (1978)
	<i>Stephanostomum casum</i> (Linton, 1910)	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Jamaica	Nahhas and Carlson (1994)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Dry Tortugas, Florida	Linton (1910)
		<i>Mycteroperca interstitialis</i> (Poey, 1860)	Colombia	Vélez (1978)
	<i>Stephanostomum dentatum</i> (Linton, 1901)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Dry Tortugas, Florida	Manter (1947)
			Tortugas, Florida	
		<i>Epinephelus areolatus</i> (Forsskål, 1775)	Red Sea and Gulf of Aden	Parukhin (1970)
			Southern Seas	Parukhin (1976)
		<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Puerto Rico	Dyer <i>et al.</i> (1998)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Dry Tortugas, Florida	Manter (1947)
			Yucatan Peninsula, Mexico	Moravec <i>et al.</i> (1997)

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Digenea	<i>Stephanostomum dentalum</i> (Linton, 1901)	<i>Epinephelus morio</i> (Valenciennes, 1828)	Yucatan, Mexico	Aguirre-Macedo and Bray (1996)
		<i>Epinephelus</i> sp.	Florida	Yamaguti (1958)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Curacao and Jamaica	Nahhas and Cable (1964)
			Puerto Rico	Siddiqi and Cable (1960)
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Jamaica	Nahhas and Cable (1964)
		<i>Mycteroperca interstitialis</i> (Poey, 1860)	Puerto Rico	Dyer <i>et al.</i> (1985)
		<i>Mycteroperca venenosa</i> (Linnaeus, 1758)	Dry Tortugas, Florida	Manter (1947)
			Florida	Yamaguti (1958)
			Gulf of Panama	Sogandares-Bernal (1959)
	<i>Stephanostomum microstephanum</i> Manter, 1934	<i>Alphestes afer</i> (Bloch, 1793)	Puerto Rico	Dyer <i>et al.</i> (1986)
		<i>Epinephelus mystacinus</i> (Poey, 1852)	Cuba	Pérez-Vigueras (1955)
		<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Bahama Islands	Sparks (1957)
			Dry Tortugas, Florida	Manter (1934)
				Manter (1947)
		<i>Mycteroperca olfax</i> (Jeny, 1843)	Galapagos Islands	Manter (1940a)
			Japan	Yamaguti (1958)
	<i>Stephanostomum nagaty</i> Saoud <i>et al.</i> 1988	<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Arabian Gulf	Saoud <i>et al.</i> (1988a)
	<i>Stephanostomum nagaty</i> Saoud <i>et al.</i> 1988	<i>Epinephelus tauvina</i> (Forsskål, 1775)	Arabian Gulf	Saoud <i>et al.</i> (1988a)

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Digenea	<i>Stephanostomum pagrosomi</i> (Yamaguti, 1939)	<i>Epinephelus striatus</i> (Bloch, 1792)		Yamaguti (1971)
	<i>Stephanostomum promicropsi</i> Manter, 1947	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Dry Tortugas, Florida	Manter (1947)
			Florida	Hutton and Sogandares-Bernal (1960)
				Sogandares-Bernal and Hutton (1959)
			Gulf of Mexico	Bullock <i>et al.</i> (1992)
	<i>Stephanostomum</i> sp. (Looss, 1899)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
	<i>Telorhynchus arripidis</i> Crowcroft, 1947		Red Sea	Shalaby and Hassanine (1996)
	<i>Thulinia microrchis</i> (Yamaguti, 1934)	<i>Plectropomus leopardus</i> (Lacepède, 1802)	Southern Great Barrier Ref., Australian	Bray <i>et al.</i> (1993b)
	<i>Tormopsolus orientalis</i> Yamaguti, 1934	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti (1958)
			Japan	Yamaguti (1939)
	<i>Tubulovesicula angusticauda</i> (Nicoll, 1915)	<i>Epinephelus merra</i> Bloch, 1793	N. Queensland	Yamaguti, (1971)
	<i>Tubulovesicula angusticauda</i> (Nicoll, 1915)	<i>Epinephelus merra</i> Bloch, 1793	South Vietnam	King (1964)
	<i>Tubulovesicula magnacetabulum</i> Yamaguti, 1939	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti (1958)
		<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti (1939)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Okinawa, Japan	Dyer <i>et al.</i> (1988)
	<i>Uteroversiculurus hamati</i> (Yamaguti, 1934)	<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)	Inland Sea, Japan	Yamaguti (1958)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)	Japan	Yamaguti (1958)
	<i>Vesicocoelium solenophagum</i>	<i>Epinephelus longispinis</i> (Kner, 1864)	Jiulong river, Fujian, China	Tang and Xu (1979)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Hirudinae	Not Identified	<i>Epinephelus coioides</i> (Hamilton, 1822)	Australia	Cruz-Lacierda et al. (1999)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
		<i>Epinephelus</i> sp.	Dhaka, Bangladesh	Somga <i>et al.</i> (2001)
	<i>Trachelobdella lubrica</i> (Grube, 1840)	<i>Cephalopholis cruentatus</i> (Lacepede, 1802) (as <i>Epinephelus cruentatus</i>)	Bahamas	Williams <i>et al.</i> (1994)
		<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Puerto Rico	Williams (1982) Williams <i>et al.</i> (1994)
		<i>Epinephelus striatus</i> (Bloch, 1792)		Williams (1982)
	<i>Trachelobdella</i> sp. (Diesing, 1850)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Dry Tortugas, Florida	Pearse (1934)
Isopoda	<i>Alcirona</i> sp.	<i>Epinephelus striatus</i> (Bloch, 1792)	Puerto Rico	Williams and Bunkley-Williams 1977
		<i>Mycteroperca tigris</i> (as <i>Epinephelus tigris</i>)		
	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	<i>Cephalopholis cruentatus</i> (Lacepede, 1802)	St. John, U.S. Virgin Islands	Williams and Williams (1981)
			Dominican Republic	
			Bahamas	
		<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Epinephelus fulvus</i>)	Puerto Rico	
			Mona Island, Puerto Rico	
			St. John, U.S. Virgin Islands	
			St. Thomas, U.S. Virgin Islands	
			St. Croix, U.S. Virgin Islands	
			Dominican Republic	

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Isopoda	<i>Anilocra haemuli</i> (Williams and Williams, 1981)	<i>Cephalopholis fulva</i> (Linnaeus, 1758) (as <i>Epinephelus fulvus</i>)	Bahama Islands	Williams and Williams (1981)
			Guadalupe	
		<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Puerto Rico	
			St. John, U.S. Virgin Islands	
			St. Thomas, U.S. Virgin Islands	
			Anegada, British Virgin Islands	
		<i>Mycteroperca bonaci</i> (Poey, 1860)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
		<i>Mycteroperca rubra</i> (Bloch, 1793)		
		<i>Paranthias furcifer</i> (Valenciennes, 1828)	Desecheo, Puerto Rico	Williams and Williams (1981)
			Mona Island, Puerto Rico	
			Dominican Republic	
			Colombia	
	<i>Cymothoa oestrum</i> (Linnaeus, 1793)	<i>Cephalopholis fulva</i> (Linnaeus, 1758)	Bermuda Aquarium	Williams <i>et al.</i> (1994)
	<i>Excorallana costata</i> (Lemos de Castro, 1960)	<i>Mycteroperca bonaci</i> (Poey, 1860)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
	<i>Excorallana tricornis</i> (Hansen, 1890)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Gulf of Mexico, Texas	Pearse (1952)
	<i>Gnathia</i> sp.	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1996)

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Isopoda	<i>Gnathia</i> sp.	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1998) Chinabut (1996)
		<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
	<i>Nerocila acuminata</i> (Schioedte and Meinert, 1881)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Gulf of Mexico, Texas	Pearse (1952)
	<i>Rocinela signata</i> (Schioedte and Meinert, 1879)			
	<i>Rocinela</i> sp.	<i>Epinephelus flavolimbatus</i> Poey, 1865	Venezuela	Bunkley-Williams <i>et al.</i> (2006)
	<i>Tridentella virginiana</i> (Richardson, 1905)	<i>Mycteroperca bonaci</i> (Poey, 1860)	Colombia	Bunkley-Williams <i>et al.</i> (1999)
Monogenea	<i>Allobedenenia convoluta</i> (Yamaguti, 1937)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti, (1963b)
	<i>Ancyrocephalus manilensis</i> Tubangui, 1931	<i>Anyperodon leucogrammicus</i> (Valenciennes, 1828)	Malaysia	Lim, (1998)
			Manila	Yamaguti (1963b)
	<i>Ancyrocephalus</i> sp.	<i>Epinephelus</i> sp.	Vietnam	Thi Hoa and Van Ut (2007)
	<i>Benedenia epinepheli</i> (Yamaguti, 1937)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti, (1963b)
			Japan	Ogawa <i>et al.</i> (1995b)
		<i>Epinephelus bruneus</i> Bloch, 1793 (as <i>Epinephelus moara</i>)		Jithendran <i>et al.</i> (2005)
		<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)		
		<i>Epinephelus tauvina</i> (Forsskål, 1775)		
	<i>Benedenia jaliscana</i> Bravo-Hollis, 1951	<i>Epinephelus labriformis</i> (Jenyns, 1843)	Japan	Yamaguti, (1963b)
			Puerto Vallarta, Jalisco, Mexico	
	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Benedenia lutjani</i> (Whittington and Kearn, 1993)	<i>Epinephelus amblycephalus</i> (Bleeker, 1857)	Thailand	Leong (2001)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		
		<i>Epinephelus coioides</i> (Hamilton, 1822)		
		<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)		
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)		
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		
		<i>Plectropomus leopardus</i> (Lacepède, 1802)		
	<i>Benedenia malaboni</i> (Velasquez, 1982)	<i>Epinephelus undulosus</i> (Quoy and Gaimard, 1824)	Malaya	Lim (1998)
	<i>Benedenia</i> sp. (Diesing, 1858)	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
		<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus albaricus</i> (Bloch)		Koesharyani <i>et al.</i> (1999b)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		Hamid (2001)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		Leong (2001)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		Hamid (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822)		Leong (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822) (as <i>Epinephelus suillus</i>)		Leong (2001)
		<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)	Malaysia Thailand	Lim (1998) Leong (2001)
			Thailand	Hamid (2001)
				Leong (2001)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Benedenia</i> sp. (Diesing, 1858)	<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Thailand	Leong (2001)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Philippines Thailand	Koesharyani et al. (1999a, 1998) Chinabut (1998) Leong Tak Seng (2001)
		<i>Epinephelus polyphekadion</i> (Bleeker, 1849)	Philippines	Koesharyani and Yuasa (2001)
		<i>Epinephelus</i> sp.		Si Si (1999)
		<i>Epinephelus tauvina</i> (Forsskål, 1775)	Kuwait	Al-Marzouq and Al-Rifae (1994)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Thailand	Leong (2001)
	<i>Benedenia</i> sp. (Diesing, 1858) (as <i>Tareenia</i> sp.)	<i>Epinephelus</i> sp.	Philippines	Si Si (1999)
	<i>Cycloplectanum beverleyburtonae</i> (Oliver, 1984)	<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus guaza</i>)	Mediterranean Sea, Gulf of Lion	Oliver (1984)
	<i>Cycloplectanum epinepheli</i> (Yamaguti 1938)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1996) Chinabut (1998)
	<i>Dactylogyrus</i> sp. Diesing, 1850	<i>Epinephelus coioides</i> (Hamilton, 1822)	Australia	Cruz-Lacierda <i>et al.</i> (1999)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Ruangpan and Rungsichai (1993) Danayadol (1999)
	<i>Diplectanum epinepheli</i> Yamaguti, 1938	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti, (1963b)
	<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999	<i>Plectropomus leopardus</i> (Lacepède, 1802)	Thailand	Leong (2001)
		<i>Cromileptes altivelis</i> (Valenciennes, 1828)		
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		

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Monogenea	<i>Diplectanum grouperi</i> Leong, Wong, Woo e Foo, 1999	<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822)		
		<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)		
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)		
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		
	<i>Diplectanum melanesiense</i> Laird, 1958	<i>Epinephelus merra</i> Bloch, 1793	Japan	Yamaguti, (1963b)
			New Hebrides	Yamaguti, (1963b)
	<i>Diplectanum mycteropercae</i>	<i>Mycteroperca tigris</i> (Valenciennes, 1833)	Brazil	Vinicius (2004)
	<i>Diplectanum parvus</i> Justine, 2007	<i>Cephalopholis urodeta</i> (Forster, 1801)	New Caledonia	Justine (2007)
	<i>Diplectanum penangi</i> Liang and Leong, 1991	<i>Epinephelus albaricus</i> (Bloch)	Thailand	Hamid (2001)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus coioides</i> (Hamilton, 1822) (as <i>Epinephelus suillus</i>)		
	<i>Diplectanum</i> sp. (Diesing, 1858)	<i>Epinephelus</i> sp.	Philippines	Si Si (1999)
	<i>Encotyllabe spari</i> (Yamaguti, 1934)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Japan	Yamaguti, (1963b)
	<i>Gyrodactylus</i> sp. Nordmann, 1832	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand	Chinabut (1996) Chinabut (1998)
	<i>Haliotrema epinepheli</i> Young, 1968	<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Red Sea	Paperna (1972)
		<i>Epinephelus fasciatus</i> (Forsskål, 1775)		
		<i>Epinephelus merra</i> Bloch, 1793		

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Haliotrema</i> sp. Johnston and Tiegs, 1922	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Philippines	Koesharyani et al. (1999a), (1998)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		Koesharyani and Yuasa (2001)
	<i>Hemitagia galapagensis</i> (Meserve, 1938)	<i>Paranthias furcifer</i> (Valenciennes, 1828)	Galapagos Islands	Yamaguti, (1963b)
	<i>Megacotyloides</i> sp.	<i>Epinephelus</i> sp.	Philippines	Si Si (1999)
	<i>Megalocotyle hexacantha</i> (Parona and Perugia 1889)	<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus guaza</i>)	Mediterranean	Yamaguti, (1963b)
	<i>Megalocotyloides convolute</i>	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		
		<i>Epinephelus coioides</i> (Hamilton, 1822)		
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)		
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)		
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		
		<i>Plectropomus leopardus</i> (Lacepède, 1802)		
	<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)	<i>Cromileptes altivelis</i> (Valenciennes, 1828)		
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		

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Monogenea	<i>Megalocotyloides epinepheli</i> (Bychowsky and Nagibina, 1976)	<i>Epinephelus coioides</i> (Hamilton, 1822)	Malaysia Thailand	Lim, (1998) Leong (2001)
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)	Thailand	Leong (2001)
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Thailand	Leong (2001)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia Thailand	Leong and Wong (1988, 1990) Leong 2001
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Thailand	Leong (2001)
	<i>Metabenedeniella hoplognathi</i> (Yamaguti, 1942)	<i>Epinephelus septemfasciatus</i> (Thunberg, 1793)	Japan	Yamaguti, (1963b)
	<i>Microcotyle mouwoi</i> Ishii et Sawada, 1938	<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		
	<i>Microcotyle pomacanthi</i> MacCallum, 1915	<i>Epinephelus flavolimbatus</i> Poey, 1865	N.Y. Aquarium	Yamaguti, (1963b)
	<i>Microcotyle sebastisci</i> Yamaguti, 1958	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea, Sagami Bay, Japan	Yamaguti, (1963b)
	<i>Neobenedenia adenea</i> (Meserve, 1938)	<i>Mycteroperca rosacea</i> (Streets, 1877) (as <i>Mycteroperca pardalis</i>)	Gulf of California	Yamaguti, (1963b)
		<i>Mycteroperca</i> sp.	Socorro Isl., Mexico (Pacific)	Yamaguti, (1963b)
	<i>Neobenedenia girellae</i> (Hargis, 1955)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Ogawa <i>et al.</i> (1995a)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Thailand	Leong (2001)
		<i>Epinephelus bontoides</i> (Bleeker, 1855)	Philippines	Koesharyani <i>et al.</i> (1999a), (1998)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822)	Thailand Philippines	Leong (2001) Koesharyani <i>et al.</i> (1999a, 1998)
		<i>Epinephelus cyanopodus</i> (Richardson, 1846)	Japan	Ogawa <i>et al.</i> (1995b)

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Monogenea	<i>Neobenedenia girellae</i> (Hargis, 1955)	<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)	Thailand	Leong (2001)
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)		
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand Philippines	Leong (2001) Koesharyani and Yuasa (2001) Koesharyani <i>et al.</i> (1999a, 1998)
		<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)	Thailand	Leong (2001)
		<i>Epinephelus</i> sp.	Philippines	Si Si (1999)
		<i>Mycteroperca rosacea</i> (Streets, 1877) (as <i>Mycteroperca pardalis</i>)	Gulf of California	Yamaguti, (1963b)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Thailand Philippines	Leong (2001) Koesharyani <i>et al.</i> (1999a, 1998)
	<i>Neobenedenia isabellae</i> (Meserve, 1938)	<i>Mycteroperca olfax</i> (Jeny, 1843)	Pacific Coast, Mexico	Meserve, 1938
	<i>Neobenedenia melleni</i> (MacCallum, 1927) <i>Neobenedenia melleni</i> (MacCallum, 1927) <i>Neobenedenia melleni</i> (MacCallum, 1927) <i>Neobenedenia melleni</i> (MacCallum, 1927) <i>Neobenedenia melleni</i> (MacCallum, 1927)	<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Bahamas	Mueller <i>et al.</i> (1994)
		<i>Epinephelus morio</i> (Valenciennes, 1828)	Gulf of Mexico	Bullard <i>et al.</i> (2000)
		<i>Epinephelus striatus</i> (Bloch, 1792)	Bahamas	Mueller <i>et al.</i> (1994)
		<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)		
		<i>Mycteroperca rosacea</i> (Streets, 1877)		
	<i>Neobenedenia melleni</i> (MacCallum, 1927) (as <i>Benedenia girellae</i>)	<i>Mycteroperca rosacea</i> (Streets, 1877) (as <i>Mycteroperca pardalis</i>)	Gulf of California off La Paz, Mexico	Bravo-Hollis, 1957
		<i>Epinephelus striatus</i> (Bloch, 1792)	Caribbean Sea off Bimini, British West Indies	Nigrelli (1947)

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Monogenea	<i>Neobenedenia melleni</i> (MacCallum, 1927)	<i>Epinephelus morio</i> (Valenciennes, 1828)	Bahamas	Mueller <i>et al.</i> (1994) Bullard <i>et al.</i> 2000
	<i>Neobenedenia paragueraensis</i> Dyer <i>et al.</i> 1992	<i>Epinephelus guttatus</i> (Linnaeus, 1758)	Puerto Rico	Dyer <i>et al.</i> (1992)
	<i>Neobenedenia</i> sp. (Yamaguti, 1963)	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		
		<i>Epinephelus coioides</i> (Hamilton, 1822)	Thailand China Southeast Asia	Leong (2001) Zhang (2001) Lim, (1998)
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)	Thailand China	Leong (2001) Zhang (2001)
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Thailand	Leong (2001)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		
		<i>Plectropomus leopardus</i> (Lacepède, 1802)		
	<i>Pseudolamellodiscus epinepheli</i> (Yamaguti, 1958)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti, (1963b)
	<i>Pseudorhabdosynochus americanum</i> (Price, 1937)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Brazil	Vinicius (2004)
	<i>Pseudorhabdosynochus</i> <i>beverleyburtonae</i> (Oliver, 1984)	<i>Epinephelus marginatus</i> (Lowe, 1834)		Portes (2000)
	<i>Pseudorhabdosynochus bocquetiae</i> (Oliver and Paperna, 1984)	<i>Epinephelus adscensionis</i> (Osbeck, 1765)		Vinicius (2004)
	<i>Pseudorhabdosynochus bouaini</i> Neifar and Euzet, 2007	<i>Epinephelus costae</i> (Steindachner, 1878)	Gulf of Gabès, Tunisia	Neifar and Euzet (2007)
	<i>Pseudorhabdosynochus capurroi</i> Vidal-Martinez e Mendoza-Franco, 1998	<i>Mycteroperca bonaci</i> (Poey, 1860)	Mexico Brazil	Flores Crespo, Flores Crespo (2003) Vinicius (2004)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Pseudorhabdosynochus coioidesis</i> Bu, Leong, Wong, Woo e Foo, 1999	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		
		<i>Epinephelus coioides</i> (Hamilton, 1822)		
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)		
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)		
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		
		<i>Plectropomus leopardus</i> (Lacepède, 1802)		
	<i>Pseudorhabdosynochus dolicolpos</i> Neifar and Euzet, 2007	<i>Epinephelus costae</i> (Steindachner, 1878)	Gulf of Gabès, Tunisia	Neifar and Euzet (2007)
	<i>Pseudorhabdosynochus enitsuji</i> Neifar and Euzet, 2007	<i>Epinephelus costae</i> (Steindachner, 1878)		
	<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Inland Sea of Japan	Yamaguti, (1963b)
		<i>Epinephelus albaricus</i> (Bloch)	Thailand	Hamid (2001)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		Leong (2001)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		Hamid (2001) Leong (2001)
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		Leong (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822)	Malaysia Thailand China	Lim (1998) Leong (2001) Zhang (2001)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	<i>Epinephelus coioides</i> (Hamilton, 1822)	Indonesia	Rückert (2006)
		<i>Epinephelus coioides</i> (Hamilton, 1822) (as <i>Epinephelus suillus</i>)	Thailand	Hamid (2001)
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)	Thailand Indonesia	Leong (2001) Rückert (2006)
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)	Thailand	Leong (2001)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988, 1990)
			Malaysia Thailand	Lim (1998) Leong (2001) Chinabut (1998) Leong and Wong (1988, 1990)
		<i>Plectropomus leopardus</i> (Lacepède, 1802)	Thailand	Leong (2001)
	<i>Pseudorhabdosynochus kritskyi</i> Dyer et al. 1995	<i>Mycteroperca microlepis</i> (Goode and Bean, 1880)	Gulf of Mexico	Dyer et al. (1995)
	<i>Pseudorhabdosynochus lanteuensis</i>	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Thailand	Leong (2001)
		<i>Epinephelus amblycephalus</i> (Bleeker, 1857)		
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)		
		<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)		
		<i>Epinephelus coioides</i> (Hamilton, 1822)		
		<i>Epinephelus fuscoguttatus</i> (Forsskal, 1775)		
		<i>Epinephelus lanceolatus</i> (Bloch, 1790)		
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Pseudorhabdosynochus lanteuensis</i>	<i>Plectropomus leopardus</i> (Lacepède, 1802)	Thailand	Leong (2001)
	<i>Pseudorhabdosynochus latesi</i> Tripathi, 1955	<i>Epinephelus albaricus</i> (Bloch)	Thailand	Hamid (2001)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Thailand	Hamid (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822) (as <i>Epinephelus suillus</i>)	Thailand	Hamid (2001)
	<i>Pseudorhabdosynochus monaensis</i> Dyer 1994	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	Mona Island, Puerto Rico	Dyer <i>et al.</i> (1994)
	<i>Pseudorhabdosynochus monosquamodiscusi</i> (Balasuriya and Leong, 1995)	<i>Epinephelus albaricus</i> (Bloch)	Thailand	Hamid (2001)
		<i>Epinephelus bleekeri</i> (Vaillant, 1877)	Thailand	Hamid (2001)
		<i>Epinephelus coioides</i> (Hamilton, 1822) (as <i>Epinephelus suillus</i>)	Thailand	Hamid (2001)
	<i>Pseudorhabdosynochus sinediscus</i> Neifar and Euzet, 2007	<i>Epinephelus costae</i> (Steindachner, 1878)	Gulf of Gabès, Tunisia	Neifar and Euzet (2007)
	<i>Pseudorhabdosynochus sosia</i> Neifar and Euzet, 2007			
	<i>Pseudorhabdosynochus</i> sp. Yamaguti, 1958	<i>Cromileptes altivelis</i> (Valenciennes, 1828)	Philippines	Koesharyani <i>et al.</i> (1999a)
		<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)		Koesharyani and Yuasa (2001)
		<i>Epinephelus</i> sp.		Si Si (1999)
	<i>Pseudorhabdosynochus sulamericanus</i> Santos et al. 2000	<i>Epinephelus niveatus</i> (Valenciennes, 1828)	Brazil	Portes (2000) Vinicius (2004)
	<i>Pseudorhabdosynochus yucatanenses</i> Vidal-Martinez et al. 1997	<i>Epinephelus morio</i> (Valenciennes, 1828)	Mexico	Flores Crespo and Flores Crespo (2003) Vidal Martinez and Poulin (2003) Vinicius (2004)
			Brazil	

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Monogenea	<i>Tareenia</i> sp.	<i>Epinephelus</i> sp.	Myanmar	Si Si (1999)
	<i>Tetrancistrum sigani</i> Goto et kikuchi, 1917	<i>Epinephelus chlorostigma</i> (Valenciennes, 1828)	Japan	Yamaguti, (1963b)
	<i>Trochopus pseudomarginatus</i> Bravo-Hollis, 1958	<i>Epinephelus analogus</i> Gill, 1864	Puerto Vallarta, Mexico	
		<i>Epinephelus labriformis</i> (Jenyns, 1843)		
Nematoda	<i>Camallanus</i> sp. Railliet et Henry, 1915	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)
	<i>Contracaecum epinepheli</i> Yamaguti, 1941	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti, (1961)
	<i>Contracaecum</i> sp. (Railliet and Henry, 1912)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
	<i>Cucullanus stossichi</i> Barreto, 1922	<i>Mycteroperca</i> sp.	Italy	Yamaguti, (1961)
	<i>Echinocephalus</i> sp. (Rüppell, 1830)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Malaysia	Leong and Wong (1988)
	<i>Heterotyphlum eurycheilum</i> (<i>Podisus fretus</i> Olsen, 1916)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)	Gulf of Mexico	Olsen (1952)
	<i>Hysterothylacium</i> sp. (Ward and Magath, 1917)	<i>Epinephelus itajara</i> (Lichtenstein, 1822)		
		<i>Epinephelus cyanopodus</i> (Richardson, 1846) (as <i>Epinephelus hoedtii</i>)	Okinawa, Japan	Hasegawa <i>et al.</i> 1991
	<i>Philometra jordanoi</i> (López-Neyra, 1951)	<i>Epinephelus marginatus</i> (Lowe, 1834) (as <i>Epinephelus gigas</i>)	Spain	Yamaguti, (1961)
	<i>Philometra lateolabracis</i> (Yamaguti, 1935)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	
	<i>Philometra margolisi</i> (Moravec, Vidal-Martínez et Aguirre-Macedo, 1995)	<i>Epinephelus morio</i> (Valenciennes, 1828)	South eastern Mexico	Vidal Martinez and Poulin (2003)
	<i>Philometra pinnicola</i> (Yamaguti, 1935)	<i>Epinephelus akaara</i> (Temminck and Schlegel, 1842)	Japan	Yamaguti, (1961)

Group of Parasite	Species of Parasite	Species of Grouper	Reported from	Reference
Nematoda	<i>Philometra salgadoi</i> (Moravec, Vidal-Martínez et Aguirre-Macedo, 1995)	<i>Epinephelus morio</i> (Valenciennes, 1828)	South eastern Mexico	Vidal Martinez and Poulin (2003)
	<i>Pseudoterranova</i> sp. Larva anisakiasis		Mexico	Laffon –Leal <i>et al.</i> (2000)
	<i>Raphidascaris anchoviellae</i> Chandler, 1935	<i>Epinephelus</i> sp.	Galveston Bay	Yamaguti, (1961)
		<i>Mycteroperca</i> sp.		
	<i>Raphidascaris</i> sp. (larva)	<i>Epinephelus malabaricus</i> (Bloch and Schneider, 1801)	Thailand Malaysia	Chinabut (1998) Leong and Wong (1990)
	<i>Spirocamallanus istiblenni</i> Nobel, 1966	<i>Cephalopholis argus</i> Bloch and Schneider, 1801	French Polynesia	Lo <i>et al.</i> (1998)

Table 5. Specimens of groupers examined in this study

Host	Collection number	Infected with parasites	T.L. (mm)	S.L. (mm)	Weight (kg)	Geographic Locality	Angler or Fisheries
<i>Alphesthes afer</i>	060130-1	-	274	228	0.35	Juana Dias	Pescaderia
	831026-1	-	230	185	n/a	Medusa Dock	EHW
	MH-1	+	n/a	n/a	n/a	n/a	EHW
<i>Cephalopholis cruentata</i>	040211-2	+	n/a	n/a	n/a	Lajas	Villa Pesquera
	051209-4	+	273	221	0.35	Desecheo	Fred Lenz
	051209-7	-	241	193	0.2	Desecheo	Fred Lenz
	051209-8	-	240	217	0.25	Desecheo	Fred Lenz
	060210-1	+	236	n/a	0.2	Desecheo	Fred Lenz
	060217-1	+	199	n/a	0.15	Rincon	Fred Lenz
	060227-1	+	228	n/a	0.2	Desecheo	Fred Lenz
	060322-1	+	261	204	0.33	Guayama	Pescaderia
	060405-2	-	241	199	0.25	Desecheo	Fred Lenz
	060405-3	+	n/a	n/a	n/a	Desecheo	Fred Lenz
	131-20	-	167	131	n/a	Lajas	n/a
	750122-2	-	264	n/a	n/a	Parguera, Lajas	n/a
	750129-5	-	140	n/a	n/a	Caballo Blanco, Parguera, Lajas	Eduardo Ortiz
	840810-gl-eo	+	200	n/a	1.36	Port Praslin, St. Lucia	n/a
	Molson-2	-	210	n/a	n/a	Parguera, Lajas	n/a
<i>Cephalopholis fulva</i>	040211-11	-	199	159	0.15	Lajas	Villa Pesquera
	040211-13	-	263	207	0.212	Lajas	Villa Pesquera
	040216-1	+	274	235	0.2	Lajas	Villa Pesquera
	050830-1	-	223	184	0.15	Cabo Rojo	Lab Pesquero
	050909-1	+	154	143	0.8	Cabo Rojo	Lab Pesquero
	050916-1	+	231	n/a	0.713	Cabo Rojo	Lab Pesquero
	060202-1	+	221	178	0.15	Desecheo	Fred Lenz
	060222-1	+	200	n/a	0.15	Cabo Rojo	Lab Pesquero
	060330-1	+	241	179	0.15	Desecheo	Fred Lenz

Host	Collection number	Infected with parasites	T.L. (mm)	S.L. (mm)	Weight (kg)	Geographic Locality	Angler or Fisheries
<i>Cephalopholis fulva</i>	060330-2	+	211	173	0.15	Desecheo	Fred Lenz
	060330-3	-	174	142	0.1	Desecheo	Fred Lenz
	060330-4	-	186	151	0.1	Desecheo	Fred Lenz
	060915-1	+	200	n/a	0.15	Luquillo	Pescaderia Pavon
	223-1	-	218	183	n/a	n/a	n/a
	850326-1	+	590	480	n/a	Crash boat, Aguadilla	Yvonne Sadovy
	850416-1	+	71	57	0.00625	Crash boat, Aguadilla	Yvonne Sadovy
<i>Dermatolepis inermis</i>	425	-	285	230	n/a	Barbados	EHW and LBW
	071227-1	-	418	351	n/a	Guayama	Pescador Recreativo
<i>Epinephelus adscensionis</i>	051209-1	+	379	464	1.9	Desecheo	Fred Lenz
	051209-3	+	338	264	0.65	Desecheo	Fred Lenz
	051209-6	-	332	263	0.65	Desecheo	Fred Lenz
	060108-1	+	464	379	1.9	Desecheo	Fred Lenz
	060108-1A	+	N/a	n/a	n/a	n/a	n/a
	16XII1905	+	1	n/a	n/a	n/a	n/a
<i>Epinephelus guttatus</i>	2	-	190	150	0.096	San Cristobal	EHW
	030917-2	+	327	296	0.35	Ponce	Villa Pesquera de Ponce
	031105-1	+	403	331	n/a	Lajas	Villa Pesquera
	031105-2	+	276	220	0.162	Mayaguez	Pescaderia del Manie
	031130-3	+	276	230	0.181	Lajas	Villa Pesquera
	031203-1	+	213	183	0.2	Mayaguez	Pescaderia del Manie
	040211-1	+	363	303	0.376	Mayaguez	Pescaderia del Manie
	040211-12	-	411	N/a	n/a	Mayaguez	Pescaderia del Manie
	040211-2	-	314	260	0.3	Mayaguez	Pescaderia del Manie
	040211-3	-	372	297	0.368	Mayaguez	Pescaderia del Manie
	040211-4	-	288	241	0.211	Mayaguez	Pescaderia del Manie
	040211-5	-	247	200	0.243	Mayaguez	Pescaderia del Manie
	040211-6	-	345	293	0.373	Mayaguez	Pescaderia del Manie

Host	Collection number	Infected with parasites	T.L. (mm)	S.L. (mm)	Weight (kg)	Geographic Locality	Angler or Fisheries
<i>Epinephelus guttatus</i>	040211-7	-	389	311	0.377	Lajas	Villa Pesquera
	040211-8	-	311	248	0.298	Lajas	Villa Pesquera
	040211-9	-	276	229	0.251	Lajas	Villa Pesquera
	040216-2	-	430	352	n/a	Lajas	Villa Pesquera
	040217-3	+	n/a	N/a	n/a	Lajas	Villa Pesquera
	040217-4	-	n/a	N/a	n/a	Lajas	Villa Pesquera
	040217-5	-	n/a	N/a	n/a	Lajas	Villa Pesquera
	040707-1	+	278	229	0.188	Lajas	Villa Pesquera
	050601-1	+	280	232	0.166	Cabo Rojo	Lab Pesquero
	050601-2	+	356	296	0.35	Cabo Rojo	Lab Pesquero
	050601-3	-	343	291	0.3	Cabo Rojo	Lab Pesquero
	050819-1	+	237	189	n/a	Mayaguez	Pescaderia Paola
	050822-1	+	287	229	n/a	Mayaguez	Pescaderia Paola
	050829-1	+	n/a	N/a	n/a	Cabo Rojo	Lab Pesquero
	050916-2	-	394	N/a	0.97	Cabo Rojo	Lab Pesquero
	050919-1	+	276	243	268g	Cabo Rojo	Lab Pesquero
	050919-2	-	319		447g	Cabo Rojo	Lab Pesquero
	051209-5	+	264	210	0.3	Desecheo	Fred Lenz
	060327-1	+	378	302	0.7	Desecheo	Fred Lenz
	060327-2	-	297	252	0.3	Desecheo	Fred Lenz
	060405-2	+	194	152	0.15	Mayaguez	Pescaderia Paola
	060406-1	+	342	267	0.55	Mayaguez	Pescaderia Paola
	060420-1	+	231	180	0.1	Desecheo	Fred Lenz
	060914-1	+	243	187	0.15	Desecheo	Fred Lenz
	060918-1	+	201	163	0.1	Desecheo	Fred Lenz
	420-1	+		362	n/a	n/a	N/a
	750414-1	-	368	n/a	n/a	Mona Island	Sardinera
	840227-LP-Eg	+	n/a	n/a	n/a	n/a	N/a

Host	Collection number	Infected with parasites	T.L. (mm)	S.L. (mm)	Weight (kg)	Geographic Locality	Angler or Fisheries
<i>Epinephelus guttatus</i>	850201LPE g	+	311	257	0.474	Lajas	Pescaderia Hernandez
	MI-13	+	368	n/a	n/a	Sardinera, Mona Island	
	Xio	+	197	161	0.1	Mayaguez	Pescaderia Paola
<i>Epinephelus itajara</i>	181-1	+	1319	n/a	38.55	Media Luna	
<i>Epinephelus morio</i>	061221-1	+	421	n/a	n/a	Aguadilla	Rampa at Aguadilla Ice
	RG-1	+	N/a	n/a	n/a	n/a	n/a
<i>Epinephelus mystacinus</i>	061221-2	-	397	n/a	1.55	Aguadilla	Rampa at Aguadilla Ice
	527-1	+	609	n/a	n/a	n/a	n/a
	527-2	+	671	n/a	n/a	n/a	n/a
	527-3	+	762	n/a	n/a	n/a	n/a
	527-4	+	914	n/a	n/a	n/a	n/a
<i>Epinephelus niveatus</i>	060401-1	-	173	127	0.15	Mayaguez	Pescador Recreativo
<i>Epinephelus striatus</i>	5	+	381	n/a	n/a	Lajas	La Parguera
	16	+	n/a	n/a	n/a	N/a	
	421	+	291	237	n/a	Lajas	La Parguera
	850215-LP-ES	+	485	410	1.8	Media Luna	n/a
	8CB	+	520	430	6.5lb	n/a	n/a
	MI-200	+	281	n/a	n/a	Bahamas	n/a
	MI-919	+	n/a	n/a	n/a	n/a	n/a
<i>Mycteroperca bonaci</i>	860418	+	n/a	n/a	1.75	n/a	n/a
	051209-2	+	631	506	4.1	Desecheo	Fred Lenz
<i>Mycteroperca interstitialis</i>	060405-1	+	451	369	1.15	Desecheo	Fred Lenz
<i>Mycteroperca tigris</i>	060226-1	+	520	432	2.4	Desecheo	Fred Lenz
	060914-1	+	521	420	2.2	Desecheo	Fred Lenz
	061003-1	+	337	270	1.2	Desecheo	Fred Lenz
	061127-1	+	337	263	0.6	Desecheo	Fred Lenz
	061201-2	+	n/a	n/a	n/a	Desecheo	Fred Lenz
	070407-1	+	413	333	1.4	Desecheo	Fred Lenz

Host	Collection number	Infected with parasites	T.L. (mm)	S.L. (mm)	Weight (kg)	Geographic Locality	Angler or Fisheries
<i>Mycteroperca tigris</i>	20-1	-	372	n/a	n/a	Mona Island	Sardinera
	T-1	-	n/a	n/a	n/a	Desecheo	Fred Lenz
<i>Mycteroperca venenosa</i>	060128-1	+	820	655	13.6	Rincon	Fred Lenz
	061013-1	+	773	632	11	Desecheo	Fred Lenz
	750415-10	+	n/a	n/a	n/a	n/a	n/a
<i>Paranthias furcifer</i>	830821-1	+	n/a	n/a	n/a	Bermuda	n/a

Legend

+ = Positive for parasites

- = Negative for parasites

T. L. = Fish Total Length

S. L. = Fish Standard Length

n/a = Data not available

Table 6. Number and location of digeneans found in groupers examined in the present study

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Allomegasolena allenuata</i>	<i>Mycteroperca venenosa</i>	061013-1	2	Stomach
<i>Brachyphallus parvus</i>	<i>Epinephelus guttatus</i>	050829-1	2	Stomach
	<i>Mycteroperca bonaci</i>	051209-2	1	Stomach
<i>Cainocreadium lintoni</i>	<i>Cephalopholis fulva</i>	060330-2	2	Pyloric caeca
	<i>Epinephelus striatus</i>	16	1	Pyloric caeca
	<i>Mycteroperca tigris</i>	060226-1	12	Stomach
		061003-1	5	Stomach
		070407-1	1	Pyloric caeca
	<i>Mycteroperca venenosa</i>	061013-1	8	Pyloric caeca
<i>Cainocreadium longisaccum</i>	<i>Epinephelus adscensionis</i>	051209-1	1	Intestine
	<i>Epinephelus guttatus</i>	050822-1	2	Stomach
<i>Cainocreadium</i> sp.	<i>Mycteroperca tigris</i>	060226-1	2	Pyloric caeca
<i>Didymocystis</i> sp.	<i>Mycteroperca venenosa</i>	060128-1	11	Gills
<i>Gonapodamsius</i> cf <i>tomex</i>	<i>Cephalopholis fulva</i>	061013-1	7	Gills
		850326-1	3	Right Pectoral fin
		850416-1	4	Left Pectoral fin
<i>Helicometra</i> cf <i>nimia</i>	<i>Cephalopholis cruentata</i>	060322-1	2	Pyloric caeca
<i>Helicometra torta</i>	<i>Epinephelus adscensionis</i>	060108-1	5	Pyloric caeca
		060108-1B	1	Gills
<i>Lecithochirium microstomum</i>	<i>Cephalopholis fulva</i>	060915-1	2	Stomach
	<i>Mycteroperca bonaci</i>	051209-2	3	Intestine
<i>Lecithochirium</i> sp.	<i>Mycteroperca bonaci</i>	051209-2	1	Stomach
<i>Lepidapedon trachinoti</i>	<i>Epinephelus morio</i>	061221-1	1	Intestine
<i>Lepocreadium trulla</i>	<i>Epinephelus guttatus</i>	060405-2	3	Stomach
<i>Leurodera decora</i>	<i>Epinephelus guttatus</i>	040217-3	2	Stomach
<i>Neolepidapedon mycteropercae</i>	<i>Cephalopholis cruentata</i>	060405-3	2	Stomach
<i>Pachycreadium crassigulum</i>	<i>Mycteroperca tigris</i>	060226-1	1	Intestine

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Rhipidocotyle adbaculum</i>	<i>Mycteroperca bonaci</i>	051209-2	20	Stomach / Pyloric caeca
	<i>Mycteroperca tigris</i>	060226-1	12	Stomach
	<i>Mycteroperca venenosa</i>	060128-1	7	Intestine
		061013-1	1	Pyloric caeca
<i>Schikhalotrema</i> sp.	<i>Cephalopholis cruentata</i>	060210-1	1	Stomach
<i>Stephanostomum dentalum</i>	<i>Epinephelus guttatus</i>	031105-1	5	Intestine
		031105-2	1	Intestine
		040211-1	3	Intestine
<i>Stephanostomum imparispine</i>	<i>Mycteroperca bonaci</i>	051209-2	4	Intestine
<i>Stephanostomum</i> sp.	<i>Epinephelus guttatus</i>	031105-1	2	Pyloric caeca
Unidentified <i>Didymozoa</i>	<i>Mycteroperca bonaci</i>	051209-2	1	Operculus

Table 7. Number and location of Monogenea found in groupers examined in the present study

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Cemocotylella</i> sp	<i>Epinephelus guttatus</i>	060406-1	3	Right Gills
<i>Diplectanum epinepheli</i>	<i>Cephalopholis cruentata</i>	051209-4	5	Gills
		060227-1	1	Gills
	<i>Epinephelus adscensionis</i>	060108-1B	4	Gills
<i>Haliotrema longihamus</i>	<i>Epinephelus guttatus</i>	031105-1	2	Gills
<i>Neobenedenia paragueraensis</i>	<i>Mycteroperca interstitialis</i>	060405-1	1	Gills
<i>Pseudorhabdosynochus kritskyi</i>	<i>Cephalopholis fulva</i>	040216-1	2	Gills
	<i>Epinephelus guttatus</i>	031130-3	6	Gills
		040211-1	2	Gills
		040707-1	2	Gills
		050822-1	7	Gills
		051209-5	1	Gills
		060406-1	47	Left Gills
		060420-1	10	Gills
		060914-1	7	Gills
	<i>Mycteroperca bonaci</i>	051209-2	14	Gills
	<i>Mycteroperca tigris</i>	060226-1	7	Gills
	<i>Mycteroperca venenosa</i>	060128-1	124	Gills
		061013-1	22	Gills
<i>Pseudorhabdosynochus monaensis</i>	<i>Epinephelus adscensionis</i>	060108-1	2	Gills
	<i>Epinephelus guttatus</i>	050919-1	2	Gills

Table 8. Number and location of Cestoidea found in groupers examined in the present study

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Callitetrarhynchus gracilis</i>	<i>Alphestes afer</i>	MH-1	1	Stomach tissue
<i>Nybelinia</i> sp.	<i>Cephalopholis fulva</i>	060330-1	3	Stomach
<i>Scolex pleuronectis</i> sp. 1	<i>Cephalopholis fulva</i>	060330-2	3	Pyloric caeca
	<i>Epinephelus guttatus</i>	060405-2	7	Pyloric caeca
		060406-1	25	Pyloric caeca
	<i>Mycteroperca bonaci</i>	051209-2	20	Stomach
	<i>Mycteroperca tigris</i>	070407-1	9	Stomach
<i>Scolex pleuronectis</i> sp. 2	<i>Mycteroperca tigris</i>	060226-1	15	Stomach
	<i>Mycteroperca venenosa</i>	060128-1	250	Stomach
<i>Scolex pleuronectis</i> sp. 3	<i>Epinephelus guttatus</i>	050819-1	5	Pyloric caeca
	<i>Mycteroperca venenosa</i>	061013-1	7	Pyloric caeca

Table 9. Number and location of Nematoda found in groupers examined in the present study

Species	Host	Collection	Number found	Site in host
<i>Anisakis simplex</i>	<i>Epinephelus adscensionis</i>	060108-1A	3	Intestine tissue
	<i>Epinephelus guttatus</i>	030917-2	13	Intestine tissue
		031105-1	4	Intestine
		040211-1	1	Intestine tissue
		060405-2	4	Intestine
		060420-1	22	Stomach tissue
	<i>Mycteroperca bonaci</i>	051209-2	31	Fats
	<i>Mycteroperca tigris</i>	060914-1	4	Stomach tissue
		061003-1	4	Intestine
		061201-2	9	Intestine
	<i>Mycteroperca venenosa</i>	060128-1	100	Fats
		061013-1	11	Stomach tissue
<i>Contraccaecum</i> sp.	<i>Epinephelus striatus</i>	5	3	Muscle
<i>Cucullanus</i> sp.	<i>Mycteroperca venenosa</i>	750415-10	1	Preoperculus
<i>Hysterothylacium</i> sp.	<i>Epinephelus guttatus</i>	031130-3	1	Gills
		050601-2	1	Stomach tissue
<i>Terranova</i> sp.	<i>Epinephelus guttatus</i>	060405-2	1	Stomach

Table 10. Number and location of Leech found in groupers examined in the present study

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Trachelobdella lubrica</i>	<i>Epinephelus guttatus</i>	420-1	1	
		850201LPEg	1	

Table 11. Number and location of Copepoda found in groupers examined in the present study

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Caligus irritans</i>	<i>Cephalopholis fulva</i>	060202-1	1	Skin
	<i>Epinephelus guttatus</i>	031105-2	5	Skin
Copepod 1	<i>Cephalopholis cruentata</i>	051209-4	1	Gills
	<i>Epinephelus adscensionis</i>	051209-3	1	Gills
Copepod 2	<i>Mycteroperca venenosa</i>	061013-1	1	Skin
Copepod 3	<i>Mycteroperca tigris</i>	061127-1	1	Skin
<i>Hatschekia insolita</i>	<i>Cephalopholis fulva</i>	050916-1	2	Gills
	<i>Epinephelus adscensionis</i>	051209-1	2	Gills
	<i>Epinephelus guttatus</i>	031203-1	5	Gills
		040211-1	2	Gills
		050601-1	7	Gills
		060406-1	3	Left Gills
		840227-LP-Eg	3	Gills
<i>Hatschekia</i> sp.	<i>Cephalopholis cruentata</i>	040211-2	1	Gills
		051209-4	2	Gills
<i>Hatschekia</i> sp. 2	<i>Mycteroperca venenosa</i>	061013-1	1	Gills
<i>Lepeophtheirus bermudensis</i>	<i>Mycteroperca bonaci</i>	051209-2	2	Skin
	<i>Mycteroperca venenosa</i>	060128-1	22	Gills
		061013-1	17	Gills and Operculo
<i>Lepeophtheirus dissimulatus</i>	<i>Epinephelus guttatus</i>	060327-1	3	Gills
		060327-1	2	Skin
		060420-1	5	Gills
		060918-1	2	Skin
	<i>Epinephelus morio</i>	061221-1	2	Operculus
		RG-1	2	Skin

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Lepeophtheirus dissimulatus</i>	<i>Mycteroperca tigris</i>	060226-1	4	Gills
	<i>Mycteroperca venenosa</i>	061013-1	11	Gills
	<i>Cephalopholis fulva</i>	040216-1	1	Gills

Table 12. Number and location of Isopods found in groupers examined in the present study

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Anilocra haemuli</i>	<i>Epinephelus adscensionis</i>	16XII1905	2	Eye
<i>Cymothoa oestrum</i>	<i>Cephalopholis cruentata</i>	840810-gl-eo	1	Eye
	<i>Mycteroperca bonaci</i>	860418	1	Gills
<i>Excorallana cf costata</i>	<i>Epinephelus itajara</i>	181-1	7	Nostrums
	<i>Epinephelus mystacinus</i>	527-1	2	Nostrums
		527-2	2	Nostrums
		527-4	2	Nostrums
	<i>Epinephelus striatus</i>	850215-LP-ES	1	
		8CB	1	
	<i>Mycteroperca tigris</i>	060226-1	1	Gills
	<i>Mycteroperca venenosa</i>	060128-1	1	Nostrums
<i>Excorallana sp</i>	<i>Mycteroperca tigris</i>	061003-1	1	Skin
<i>Excorallana tricornis</i>	<i>Epinephelus guttatus</i>	MI-13	1	Underfin
	<i>Epinephelus striatus</i>	MI-200	3	Eye
		MI-919	10	Right Orbit
	<i>Mycteroperca venenosa</i>	061013-1	2	Nostrums
<i>Gnathia sp.</i>	<i>Cephalopholis cruentata</i>	060217-1	3	Gills
		060227-1	3	Gills
	<i>Cephalopholis fulva</i>	050909-1	1	Gills
		050916-1	1	Gills
		060222-1	2	Skin
	<i>Epinephelus guttatus</i>	031105-1	3	Gills
		031105-2	2	Gills
		031203-1	2	Gills
		040707-1	1	Gills
		060406-1	13	Right Gills
	<i>Epinephelus itajara</i>	181-1	4	Gills
	<i>Epinephelus striatus</i>	421	1	Gills
	<i>Mycteroperca bonaci</i>	051209-2	81	Gills
	<i>Mycteroperca interstitialis</i>	060405-1	3	Gills
	<i>Mycteroperca tigris</i>	060226-1	1	Nostrums
		070407-1	2	Gills
	<i>Mycteroperca venenosa</i>	060128-1	28	Gills
		061013-1	6	Gills

Species	Host	Collection Number	Number of parasites found	Infection Site
<i>Nerocila</i> sp.	<i>Paranthias furcifer</i>	830821-1	1	Caudal Fin
<i>Rocinella signata</i>	<i>Epinephelus itajara</i>	181-1	1	Gill Arc
<i>Tridentella virginiana</i>	<i>Epinephelus mystacinus</i>	527-3	1	
	<i>Mycteroperca bonaci</i>	051209-2	4	Nostrums

Table 13. Percent Infection of Species of Groupers

Host	Number of Individuals studied	Number of Fish with at least one parasite infection	Percent infected
<i>Alphesthes afer</i>	3	1	33.3
<i>Cephalopholis cruentata</i>	15	8	53.3
<i>Cephalopholis fulva</i>	16	10	62.5
<i>Dermatolepis inermis</i>	2	0	0
<i>Epinephelus adscensionis</i>	6	5	83.3
<i>Epinephelus guttatus</i>	44	26	59.1
<i>Epinephelus itajara</i>	1	1	100
<i>Epinephelus morio</i>	2	2	100
<i>Epinephelus mystacinus</i>	5	4	80
<i>Epinephelus niveatus</i>	1	0	0
<i>Epinephelus striatus</i>	7	7	100
<i>Mycteroperca bonaci</i>	2	2	100
<i>Mycteroperca interstitialis</i>	1	1	100
<i>Mycteroperca tigris</i>	8	6	75
<i>Mycteroperca venenosa</i>	3	3	100
<i>Paranthias furcifer</i>	1	1	100
Total	116	77	66.4 %

Table 14. Groupers examined and positive for Digenea, Monogenea and Cestoidea and range of parasites numbers per positive host.

Host	Number examined	Digenea			Monogenea			Cestoidea		
		# Inf.	TP	Range /Host	# Inf.	TP	Range /Host	# Inf.	TP	Range /Host
<i>Alphestes afer</i>	3	0	-	-	0	-	-	1	1	1
<i>Cephalopholis cruentata</i>	15	3	5	1 - 2	2	6	1 - 5	0	-	-
<i>Cephalopholis fulva</i>	16	4	11	2 - 4	1	2	2	2	6	3
<i>Dermatolepis inermis</i>	2	0	-	-	0	-	-	0	-	-
<i>Epinephelus adscensionis</i>	6	3	7	1 - 5	2	6	2 - 4	0	-	-
<i>Epinephelus guttatus</i>	44	7	20	1 - 5	10	89	1-47	3	37	7-25
<i>Epinephelus itajara</i>	1	0	-	-	0	-	-	0	-	-
<i>Epinephelus morio</i>	2	1	1	1	0	-	-	0	-	-
<i>Epinephelus mystacinus</i>	5	0	-	-	0	-	-	0	-	-
<i>Epinephelus niveatus</i>	1	0	-	-	0	-	-	0	-	-
<i>Epinephelus striatus</i>	7	1	1	1	0	-	-	0	-	-
<i>Mycteroperca bonaci</i>	2	1	30	30	1	14	14	1	20	20
<i>Mycteroperca interstitialis</i>	1	0	-	-	1	1	1	0	-	-
<i>Mycteroperca tigris</i>	8	3	33	1 - 12	1	7	7	2	24	9-15
<i>Mycteroperca venenosa</i>	3	3	36	1 - 11	2	146	73	2	257	7-250
<i>Paranthias furcifer</i>	1	0	-	-	0	-	22-124	0	-	-

Legend

Inf. = Number of fish with positive infection of this group of parasite.

TP = Total number of parasites of this group found

Range = Minimum and maximum number of parasites of this group found on a single infected fish.

Table 15. Groupers examined and positive for Nematode, Copepod and Leech and range of parasites numbers per positive host.

Host	Number examined	Nematoda			Copepod			Leech		
		# Inf.	TP	Range /Host	# Inf.	TP	Range /Host	# Inf.	TP	Range/ Host
<i>Alphestes afer</i>	3	0	-	-	0	-	-	0	-	-
<i>Cephalopholis cruentata</i>	15	0	-	-	2	4	1-1	0	-	-
<i>Cephalopholis fulva</i>	16	0	-	-	3	4	1-2	0	-	-
<i>Dermatolepis inermis</i>	2	0	-	-	0	-	-	0	-	-
<i>Epinephelus adscensionis</i>	6	1	3	3	2	3	01-2	0	-	-
<i>Epinephelus guttatus</i>	44	7	47	1-22	38	10	01-7	2	2	1
<i>Epinephelus itajara</i>	1	0	-	-	0	-	-	0	-	-
<i>Epinephelus morio</i>	2	0	-	-	2	4	2	0	-	-
<i>Epinephelus mystacinus</i>	5	0	-	-	0	-	-	0	-	-
<i>Epinephelus niveatus</i>	1	0	-	-	0	-	-	0	-	-
<i>Epinephelus striatus</i>	7	1	3	3	0	-	-	0	-	-
<i>Mycteroperca bonaci</i>	2	1	31	31	1	2	2	0	-	-
<i>Mycteroperca interstitialis</i>	1	0	-	-	0	-	-	0	-	-
<i>Mycteroperca tigris</i>	8	3	17	4-9	2	5	1 – 4	0	-	-
<i>Mycteroperca venenosa</i>	3	3	11 2	1-100	2	52	1-22	0	-	-
<i>Paranthias furcifer</i>	1	0	-	-	0	-	-	0	-	-

Legend

Inf. = Number of fish with positive infection of this group of parasite.

TP = Total number of parasites of this group found

Range = Minimum and maximum number of parasites of this group found on a single infected fish.

Table 16. Groupers examined and positive for Isopod and range of parasites numbers per positive host.

Host	Number examined	Isopoda		
		# Inf.	TP	Range /Host
<i>Alphestes afer</i>	3	0	-	-
<i>Cephalopholis cruentata</i>	15	3	7	1 – 3
<i>Cephalopholis fulva</i>	16	3	4	1 - 2
<i>Dermatolepis inermis</i>	2	0	-	-
<i>Epinephelus adscensionis</i>	6	1	2	2
<i>Epinephelus guttatus</i>	44	6	22	1 - 13
<i>Epinephelus itajara</i>	1	1	12	12
<i>Epinephelus morio</i>	2	0	-	-
<i>Epinephelus mystacinus</i>	5	4	7	1 - 2
<i>Epinephelus niveatus</i>	1	0	-	-
<i>Epinephelus striatus</i>	7	5	16	1 - 10
<i>Mycteroperca bonaci</i>	2	2	86	1 - 85
<i>Mycteroperca interstitialis</i>	1	1	3	3
<i>Mycteroperca tigris</i>	8	3	5	1 – 2
<i>Mycteroperca venenosa</i>	3	2	37	1 - 29
<i>Paranthias furcifer</i>	1	1	1	1

Legend

NFE = Number of fishes examined for Isopods parasites

NFI = Number of fish with positive infection on this group of parasite.

NP = Number of parasites found on this group of parasite

P (%) = Percent of Infection.

Range = Minimos and maximous number of parasites found on this group of parasite on infected fish.

Table 17. Metazoan parasites of groupers by host reported in the present study

Host	Collection Number	Group of Parasite	Species	Number of parasites	Infection Site
<i>Alphestes afer</i>	MH-1	Cestoda	<i>Callitetrarhynchus gracilis</i>	1	Stomach tissue
<i>Cephalopholis cruentata</i>	040211-2	Copepoda	<i>Hatschekia</i> sp.	1	Gills
	051209-4	Copepoda	Copepod 1	1	Gills
			<i>Hatschekia</i> sp.	2	Gills
		Monogenea	<i>Diplectanum epinepheli</i>	5	Gills
	060210-1	Digenea	<i>Schikhobalotrema</i> sp	1	Stomach
	060217-1	Isopoda	<i>Gnathia</i> sp.	3	Gills
		Monogenea	<i>Diplectanum epinepheli</i>	1	Gills
	060322-1	Digenea	<i>Helicometra cf nimia</i>	2	Pyloric caeca
	060405-3	Digenea	<i>Neolepidapedon mycteropercae</i>	2	Stomach
	840810-gl-eo	Isopoda	<i>Cymonothoa</i>	1	Eye
<i>Cephalopholis fulva</i>	040216-1	Copepoda	<i>Lepeophtheirus dissimulatus</i>	1	Gills
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	2	Gills
	050909-1	Isopoda	<i>Gnathia</i> sp.	1	Gills
	050916-1	Copepoda	<i>Hatschekia insolita</i>	2	Gills
		Isopoda	<i>Gnathia</i> sp.	1	Gills
	060202-1	Copepoda	<i>Caligus irritans</i>	1	Skin
	060222-1	Isopoda	<i>Gnathia</i> sp.	2	Skin
	060330-1	Cestoda	<i>Nybelinia</i> sp.	3	Stomach
	060330-2	Cestoda	<i>Scolex pleuronectis</i> sp. 1	3	Pyloric caeca
		Digenea	<i>Cainocreadium lintoni</i>	2	Pyloric caeca
	060915-1	Digenea	<i>Lecithochirium microstomum</i>	2	Stomach
	850326-1	Digenea	<i>Gonapodamsius cf tomex</i>	3	Right Pectoral fin
	850416-1	Digenea	<i>Gonapodamsius cf tomex</i>	4	Left Pectoral fin
<i>Epinephelus adscensionis</i>	051209-1	Copepoda	<i>Hatschekia insolita</i>	2	Gills
		Digenea	<i>Cainocreadium longisaccum</i>	1	Intestine
	051209-3	Copepoda	Copepod 1	1	Gills

Host	Collection Number	Group of Parasite	Species	Number of parasites	Infection Site
<i>Epinephelus adscensionis</i>	060108-1	Digenea	<i>Helicometra torta</i>	5	Pyloric caeca
		Monogenea	<i>Pseudorhabdosynochus monaensis</i>	2	Gills
	060108-1A	Nematoda	<i>Anisakis simplex</i>	3	Intestine tissue
	060108-1B	Digenea	<i>Helicometra torta</i>	1	Gills
		Monogenea	<i>Diplectanum epinepheli</i>	4	Gills
	16XII1905	Isopoda	<i>Anilocra haemuli</i>	2	Eye
<i>Epinephelus guttatus</i>	030917-2	Nematoda	<i>Anisakis simplex</i>	13	Intestine tissue
	031105-1	Digenea	<i>Stephanostomum dentalum</i>	5	Intestine
			<i>Stephanostomum</i> sp.	2	Pyloric caeca
		Isopoda	<i>Gnathia</i> sp.	3	Gills
		Monogenea	<i>Haliotrema longihamus</i>	2	Gills
		Nematoda	<i>Anisakis simplex</i>	4	Intestine
	031105-2	Copepoda	<i>Caligus irritans</i>	5	Skin
		Digenea	<i>Stephanostomum dentalum</i>	1	Intestine
			<i>Gnathia</i> sp.	2	Gills
	031130-3	Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	6	Gills
		Nematoda	<i>Hysterothylacium</i> sp.	1	Gills
			<i>Hatschekia insolita</i>	5	Gills
	031203-1	Copepoda	<i>Gnathia</i> sp.	2	Gills
	040211-1	Copepoda	<i>Hatschekia insolita</i>	2	Gills
		Digenea	<i>Stephanostomum dentalum</i>	3	Intestine
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	2	Gills
		Nematoda	<i>Anisakis simplex</i>	1	Intestine tissue
	040217-3	Digenea	<i>Leurodera decora</i>	2	Stomach
	040707-1	Isopoda	<i>Gnathia</i> sp.	1	Gills
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	2	Gills
	050601-1	Copepoda	<i>Hatschekia insolita</i>	7	Gills
	050601-2	Nematoda	<i>Hysterothylacium</i> sp.	1	Stomach tissue
	050819-1	Cestoda	<i>Scolex pleuronectis</i> sp. 3	5	Pyloric caeca
	050822-1	Digenea	<i>Cainocreadium longisaccum</i>	2	Stomach
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	7	Gills
	050829-1	Digenea	<i>Brachyphallus parvus</i>	2	Stomach
	050919-1	Monogenea	<i>Pseudorhabdosynochus monaensis</i>	2	Gills

Host	Collection Number	Group of Parasite	Species	Number of parasites	Infection Site
<i>Epinephelus guttatus</i>	051209-5	Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	1	Gills
	060327-1	Copepoda	<i>Lepeophtheirus dissimulatus</i>	3	Gills
				2	Skin
	060405-2	Cestoda	<i>Scolex pleuronectis</i> sp.1	7	Pyloric caeca
		Digenea	<i>Lepocreadium trulla</i>	3	Stomach
		Nematoda	<i>Anisakis simplex</i>	4	Intestine
			<i>Terranova sp</i>	1	Stomach
	060406-1	Cestoda	<i>Scolex pleuronectis</i> sp. 1	25	Pyloric caeca
		Copepoda	<i>Hatschekia insolita</i>	3	Left Gills
		Isopoda	<i>Gnathia</i> sp.	13	Right Gills
		Monogenea	<i>Cemocotylella</i> sp.	3	Right Gills
			<i>Pseudorhabdosynochus kritskyi</i>	47	Left Gills
	060420-1	Copepoda	<i>Lepeophtheirus dissimulatus</i>	5	Gills
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	10	Gills
		Nematoda	<i>Anisakis simplex</i>	22	Stomach tissue
	060914-1	Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	7	Gills
	060918-1	Copepoda	<i>Lepeophtheirus dissimulatus</i>	2	Skin
	420-1	Hirudinea	<i>Trachelobdella lubrica</i>	1	
	840227-LP-Eg	Copepoda	<i>Hatschekia insolita</i>	3	Gills
	850201LPEg	Hirudinea	<i>Trachelobdella lubrica</i>	1	
	MI-13	Isopoda	<i>Excorallana tricornis</i>	1	Underfin
<i>Epinephelus itajara</i>	181-1	Isopoda	<i>Excorallana ct costata</i>	7	Nostrums
			<i>Gnathia</i> sp.	4	Gills
			<i>Rocinella signata</i>	1	Gill Arc
<i>Epinephelus morio</i>	061221-1	Copepoda	<i>Lepeophtheirus dissimulatus</i>	2	Operculus
		Digenea	<i>Lepidapedon trachinoti</i>	1	Intestine
	RG-1	Copepoda	<i>Lepeophtheirus dissimulatus</i>	2	Skin
<i>Epinephelus mystacinus</i>	527-1	Isopoda	<i>Excorallana ct costata</i>	2	Nostrums
	527-2		<i>Excorallana ct costata</i>	2	Nostrums
	527-3		<i>Tridentella virginiana</i>	1	
	527-4		<i>Excorallana ct costata</i>	2	Nostrums
<i>Epinephelus striatus</i>	16	Digenea	<i>Cainocreadium lintoni</i>	1	Pyloric caeca
	421	Isopoda	<i>Gnathia</i> sp.	1	Gills
	5	Nematoda	<i>Contraccaecum</i>	3	Muscle

Host	Collection Number	Group of Parasite	Species	Number of parasites	Infection Site
<i>Epinephelus striatus</i>	850215-LP-ES	Isopoda	<i>Excorallana ct costata</i>	1	
	8CB	Isopoda	<i>Excorallana ct costata</i>	1	
	MI-200	Isopoda	<i>Excorallana tricornis</i>	3	Eye
	MI-919	Isopoda	<i>Excorallana tricornis</i>	10	Right Orbit
<i>Mycteroperca bonaci</i>	051209-2	Cestoda	<i>Scolex pleuronectis</i> sp. 1	20	Stomach
		Copepoda	<i>Lepeophtheirus bermudensis</i>	2	Skin
		Digenea	<i>Brachyphallus parvus</i>	1	Stomach
			<i>Lecithochirium microstomum</i>	3	Intestine
			<i>Lecithochirium</i> sp.	1	Stomach
			<i>Rhipidocotyle adbaculum</i>	20	Stomach / Pyloric caeca
			<i>Stephanostomum imparispine</i>	4	Intestine
			<i>Unknow Didymozoa</i>	1	Operculus
			<i>Gnathia</i> sp.	81	Gills
			<i>Tridentella virginiana</i>	4	Nostrums
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	14	Gills
		Nematoda	<i>Anisakis simplex</i>	31	Fats
	860418	Isopoda	<i>Cymonotha oestrum</i>	1	Gills
<i>Mycteroperca interstitialis</i>	060405-1	Isopoda	<i>Gnathia</i> sp.	3	Gills
		Monogenea	<i>Neobenedenia pargueraensis</i>	1	Gills
<i>Mycteroperca tigris</i>	060226-1	Cestoda	<i>Scolex pleuronectis</i> sp. 2	15	Stomach
		Copepoda	<i>Lepeophtheirus dissimulatus</i>	4	Gills
		Digenea	<i>Cainocreadium lintoni</i>	12	Stomach
			<i>Cainocreadium</i> sp.	2	Pyloric caeca
			<i>Pachycreadium crassigulum</i>	1	Intestine
			<i>Rhipidocotyle adbaculum</i>	12	Stomach
		Isopoda	<i>Excorallana</i> sp. 1	1	Gills
			<i>Gnathia</i> sp.	1	Nostrums
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	7	Gills
	060914-1	Nematoda	<i>Anisakis simplex</i>	4	Stomach tissue
	061003-1	Digenea	<i>Cainocreadium lintoni</i>	5	Stomach
		Isopoda	<i>Excorallana</i> sp. 2	1	Skin
		Nematoda	<i>Anisakis simplex</i>	4	Intestine
	061127-1	Copepoda	Copepod 3	1	Skin
	061201-2	Nematoda	<i>Anisakis simplex</i>	9	Intestine
	070407-1	Cestoda	<i>Scolex pleuronectis</i> sp.1	9	Stomach
		Digenea	<i>Cainocreadium lintoni</i>	1	Pyloric caeca

Host	Collection Number	Group of Parasite	Species	Number of parasites	Infection Site
<i>Mycteroperca tigris</i>	070407-1	Isopoda	<i>Gnathia</i> sp.	2	Gills
<i>Mycteroperca venenosa</i>	060128-1	Cestoda	<i>Scolex pleuronectis</i> sp. 2	250	Stomach
		Copepoda	<i>Lepeophtheirus bermudensis</i>	22	Gills
		Digenea	<i>Didymocystis</i> sp.	11	Gills
			<i>Rhipidocotyle adbaculum</i>	7	Intestine
		Isopoda	<i>Excorallana ct costata</i>	1	Nostrums
			<i>Gnathia</i> sp.	28	Gills
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	124	Gills
		Nematoda	<i>Anisakis simplex</i>	100	Fats
<i>Mycteroperca venenosa</i>	061013-1	Cestoda	<i>Scolex pleuronectis</i> sp. 3	7	Pyloric caeca
		Copepoda	Copepod 2	1	Skin
			<i>Lepeophtheirus bermudensis</i>	17	Gills and Operculo
			<i>Lepeophtheirus dissimulatus</i>	11	Gills
			<i>Hatschekia</i> sp. 2	1	Gills
		Digenea	<i>Allomegasolena allenuata</i>	2	Stomach
			<i>Cainocreadium lintoni</i>	8	Pyloric caeca
			<i>Didymocystis</i> sp.	7	Gills
			<i>Rhipidocotyle adbaculum</i>	1	Pyloric caeca
		Isopoda	<i>Excorallana tricornis</i>	2	Nostrums
			<i>Gnathia</i> sp.	6	Gills
		Monogenea	<i>Pseudorhabdosynochus kritskyi</i>	22	Gills
		Nematoda	<i>Anisakis simplex</i>	11	Stomach tissue
	750415-10	Nematoda	<i>Cucullanus</i> sp.	1	Preoperculus
<i>Paranthias furcifer</i>	830821-1	Isopoda	<i>Nerocila</i> sp.	1	Caudal Fin

Table 18. Metazoan parasites of groupers by parasite species reported on the present study

Group of Parasite	Parasite Species	Host Species	# Hosts Infected	TP	Range/host
Cestoda	<i>Callitetrarhynchus gracilis</i>	<i>Alphestes afer</i>	1	1	1
	<i>Nybelinia</i> sp.	<i>Cephalopholis fulva</i>	1	3	3
	<i>Scolex pleuronectis</i> sp. 1	<i>Cephalopholis fulva</i>	1	3	3
		<i>Epinephelus guttatus</i>	2	32	7-25
		<i>Mycteroperca bonaci</i>	1	20	20
		<i>Mycteroperca tigris</i>	1	9	9
	<i>Scolex pleuronectis</i> sp. 2	<i>Mycteroperca tigris</i>	1	15	15
		<i>Mycteroperca venenosa</i>	1	250	250
	<i>Scolex pleuronectis</i> sp. 3	<i>Epinephelus guttatus</i>	1	5	5
		<i>Mycteroperca venenosa</i>	1	7	7
Copepoda	<i>Caligus irritans</i>	<i>Cephalopholis fulva</i>	1	1	1
		<i>Epinephelus guttatus</i>	1	5	5
	Copepod 1	<i>Cephalopholis cruentata</i>	1	1	1
		<i>Epinephelus adscensionis</i>	1	1	1
	Copepod 2	<i>Mycteroperca venenosa</i>	1	1	1
	Copepod 3	<i>Mycteroperca tigris</i>	1	1	1
	<i>Hatschekia insolita</i>	<i>Cephalopholis fulva</i>	1	2	2
		<i>Epinephelus adscensionis</i>	1	2	2
		<i>Epinephelus guttatus</i>	5	20	2-7
	<i>Hatschekia</i> sp.	<i>Cephalopholis cruentata</i>	2	3	1-2
	<i>Hatschekia</i> sp. 2	<i>Mycteroperca venenosa</i>	1	1	1
	<i>Lepeophtheirus bermudensis</i>	<i>Mycteroperca bonaci</i>	1	2	2
		<i>Mycteroperca venenosa</i>	2	39	17-22
	<i>Lepeophtheirus dissimulatus</i>	<i>Cephalopholis fulva</i>	1	1	1
		<i>Epinephelus guttatus</i>	3	12	2-5
		<i>Epinephelus morio</i>	2	4	2
		<i>Mycteroperca tigris</i>	1	4	4
		<i>Mycteroperca venenosa</i>	1	11	11
Digenea	<i>Allomegasolena allenuata</i>	<i>Mycteroperca venenosa</i>	1	2	2
	<i>Brachyphallus parvus</i>	<i>Epinephelus guttatus</i>	1	2	2
		<i>Mycteroperca bonaci</i>	1	1	1
		<i>Mycteroperca venenosa</i>	1	1	1
	<i>Cainocreadium lintoni</i>	<i>Cephalopholis fulva</i>	1	2	2
		<i>Epinephelus striatus</i>	1	1	1
		<i>Mycteroperca tigris</i>	3	18	1-12
		<i>Mycteroperca venenosa</i>	1	8	8
		<i>Mycteroperca venenosa</i>	1	8	8
	<i>Cainocreadium longisaccum</i>	<i>Epinephelus adscensionis</i>	1	1	1
		<i>Epinephelus guttatus</i>	1	2	2
	<i>Cainocreadium</i> sp.	<i>Mycteroperca tigris</i>	1	2	2

Group of Parasite	Parasite Species	Host Species	# Hosts Infected	TP	Range/host
Digenea	<i>Didymocystis</i> sp.	<i>Mycteroperca venenosa</i>	2	18	7-11
	<i>Gonapodamsius</i> cf <i>tomex</i>	<i>Cephalopholis fulva</i>	1	7	3-4
	<i>Helicometra</i> cf <i>nimia</i>	<i>Cephalopholis cruentata</i>	1	2	2
	<i>Helicometra torta</i>	<i>Epinephelus adscensionis</i>	2	6	1-5
	<i>Lecithochirium microstomum</i>	<i>Cephalopholis fulva</i>	1	2	2
		<i>Mycteroperca bonaci</i>	1	3	3
	<i>Lecithochirium</i> sp.	<i>Mycteroperca bonaci</i>	1	1	1
	<i>Lepidapedon trachinoti</i>	<i>Epinephelus morio</i>	1	1	1
	<i>Lepocreadium trulla</i>	<i>Epinephelus guttatus</i>	1	3	3
	<i>Leurodera decora</i>	<i>Epinephelus guttatus</i>	1	2	2
	<i>Neolepidapedon mycteropercae</i>	<i>Cephalopholis cruentata</i>	1	2	2
	<i>Pachycreadium crassigulum</i>	<i>Mycteroperca tigris</i>	1	1	1
	<i>Rhipidocotyle adbaculum</i>	<i>Mycteroperca bonaci</i>	1	20	20
		<i>Mycteroperca tigris</i>	1	12	12
		<i>Mycteroperca venenosa</i>	2	8	1-7
	<i>Schikhobalotrema</i> sp.	<i>Cephalopholis cruentata</i>	1	1	1
	<i>Stephanostomum dentalum</i>	<i>Epinephelus guttatus</i>	3	9	1-5
	<i>Stephanostomum imparispine</i>	<i>Mycteroperca bonaci</i>	1	4	4
	<i>Stephanostomum</i> sp.	<i>Epinephelus guttatus</i>	1	2	2
	Unidentified <i>Didymozoa</i>	<i>Mycteroperca bonaci</i>	1	1	1
Hirudinea	<i>Trachelobdella lubrica</i>	<i>Epinephelus guttatus</i>	2	2	1
Isopoda	<i>Anilocra haemuli</i>	<i>Epinephelus adscensionis</i>	1	2	2
	<i>Cymonothoa oestrum</i>	<i>Cephalopholis cruentata</i>	1	1	1
		<i>Mycteroperca bonaci</i>	1	1	1
	<i>Excorallana</i> cf <i>costata</i>	<i>Epinephelus itajara</i>	1	7	7
		<i>Epinephelus mystacinus</i>	1	2	2
			2	4	2
		<i>Epinephelus striatus</i>	2	2	1
		<i>Mycteroperca tigris</i>	1	1	1
		<i>Mycteroperca venenosa</i>	1	1	1
		<i>Mycteroperca tigris</i>	1	1	1
	<i>Excorallana</i> sp.	<i>Mycteroperca tigris</i>	1	1	1
	<i>Excorallana tricornis</i>	<i>Epinephelus guttatus</i>	1	1	1
		<i>Epinephelus striatus</i>	2	13	3-10
		<i>Mycteroperca venenosa</i>	1	2	2
	<i>Gnathia</i> sp.	<i>Cephalopholis cruentata</i>	2	6	3
		<i>Cephalopholis fulva</i>	3	4	1-2
		<i>Epinephelus guttatus</i>	5	21	1-13
		<i>Epinephelus itajara</i>	1	4	4
		<i>Epinephelus striatus</i>	1	1	1
		<i>Mycteroperca bonaci</i>	1	81	81
		<i>Mycteroperca interstitialis</i>	1	3	3
		<i>Mycteroperca tigris</i>	2	3	1-2
		<i>Mycteroperca venenosa</i>	2	34	6-28

Group of Parasite	Parasite Species	Host Species	# Hosts Infected	TP	Range/host
Isopoda	<i>Nerocila</i> sp.	<i>Paranthias furcifer</i>	1	1	1
	<i>Rocinella signata</i>	<i>Epinephelus itajara</i>	1	1	1
	<i>Tridentella virginiana</i>	<i>Epinephelus mystacinus</i>	1	1	1
		<i>Mycteroperca bonaci</i>	1	4	4
Monogenea	<i>Cemocotylella</i> sp.	<i>Epinephelus guttatus</i>	1	1	1
	<i>Diplectanum epinepheli</i>	<i>Cephalopholis cruentata</i>	2	6	1-5
		<i>Epinephelus adscensionis</i>	1	4	4
	<i>Haliotrema longihamus</i>	<i>Epinephelus guttatus</i>	1	2	2
	<i>Neobenedenia pargueraensis</i>	<i>Mycteroperca interstitialis</i>	1	1	1
	<i>Pseudorhabdosynochus kritskyi</i>	<i>Cephalopholis fulva</i>	1	2	2
		<i>Epinephelus guttatus</i>	8	82	1-47
		<i>Mycteroperca bonaci</i>	1	14	14
		<i>Mycteroperca tigris</i>	1	7	7
		<i>Mycteroperca venenosa</i>	2	146	22-124
	<i>Pseudorhabdosynochus monaensis</i>	<i>Epinephelus adscensionis</i>	1	2	2
		<i>Epinephelus guttatus</i>	1	2	2
Nematoda	<i>Anisakis simplex</i>	<i>Epinephelus adscensionis</i>	1	3	3
		<i>Epinephelus guttatus</i>	2	44	1-22
		<i>Mycteroperca bonaci</i>	1	31	1
		<i>Mycteroperca tigris</i>	3	17	4-9
		<i>Mycteroperca venenosa</i>	2	111	11-111
	<i>Contraccaecum</i>	<i>Epinephelus striatus</i>	1	3	3
	<i>Cucullanus</i> sp.	<i>Mycteroperca venenosa</i>	1	1	1
	<i>Hysterothylacium</i> sp.	<i>Epinephelus guttatus</i>	2	2	1
	<i>Terranova</i> sp.	<i>Epinephelus guttatus</i>	1	1	1

Legend

TP = Total number of parasites found.

Range = Minimum and maximum number of parasites of this species found on a single infected fish.

Analysis of Reported Parasites

According to previous studies, around 314 species of parasites have been reported from groupers worldwide (Table 19). Of these, 34.7% were reported in the Western Atlantic despite the fact that there are more species of groupers the Indopacific. Of the 109 species of parasites reported in the Western Atlantic, 24 species have been reported previously from Puerto Rico. In the present study 54 species of parasites were found which represents an increase of 56% in comparison with previous reports. Also, of the 54 species reported in the present study, 27 or 50% are new host records.

Digeneans are the most reported group of parasites worldwide and many species of digeneans were also found in the present study. Many of these digenea have affinities for other groups of fishes and the low number found on each host suggests that many of those species could be accidental parasites from prey fishes eaten by the groupers (which are piscivores). This is true also for the digenea reported from groupers worldwide and can account for the large number of species found in groupers generally. This idea is substantiated by Cribb *et al.* (2002) who reported that 90% of grouper host-parasite combinations have only been reported once or twice.

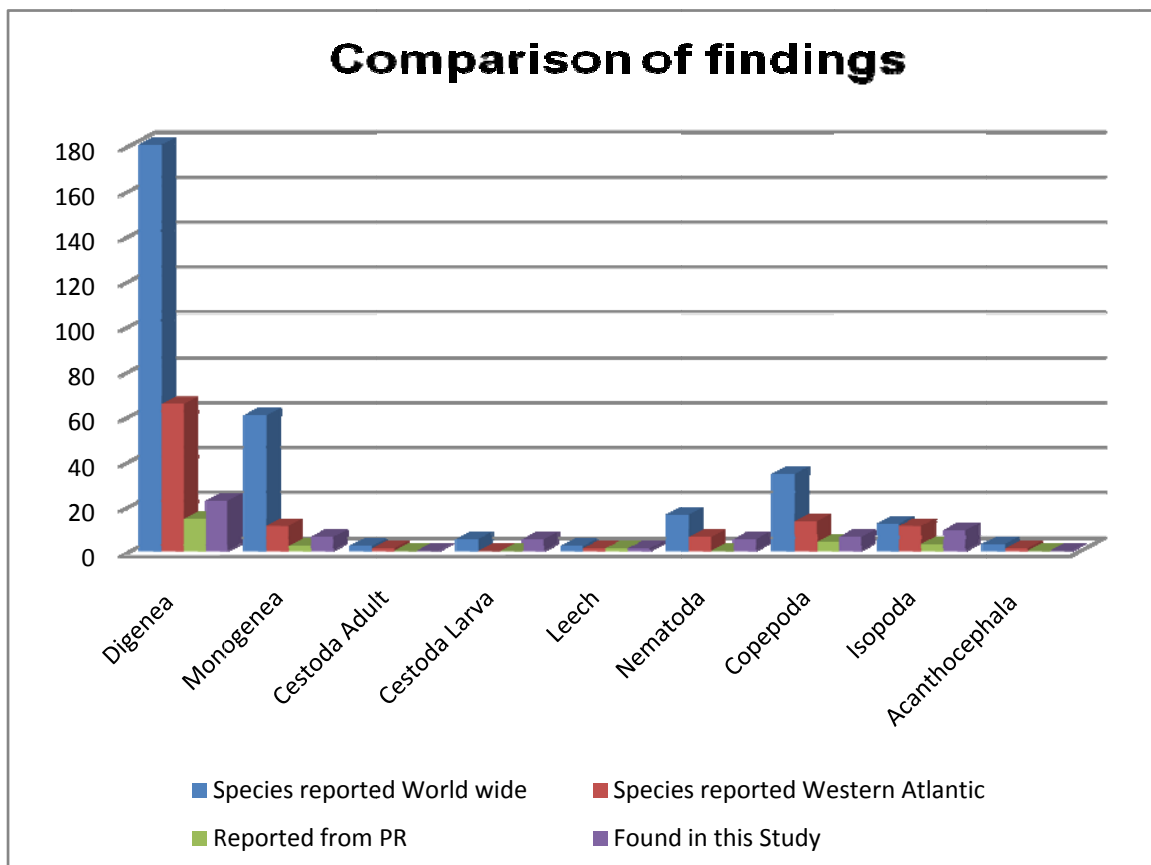
The next most diverse group of parasites is the monogeneans. Known to be fairly host specific, it would be expected for there to be many species of monogeneans as we see represented in the species reported worldwide. However, when only the Western Atlantic monogenean group is viewed, the diversity decreases dramatically from 60 worldwide to 11 in the Western Atlantic. Data suggests that the Monogenea are more important and diverse in the areas outside the Western Atlantic because more studies have been conducted with Monogenea

as target. On the Western Atlantic only three genera of monogenea have been reported on groupers, *Diplectanum*, *Neobenedenia* and *Pseudorhabdosynochus*. In Puerto Rico only the genus, *Neobenedenia* and *Pseudorhabdosynochus* have been reported on groupers. Also, the change of host of monogenea species like *Pseudorhabdosynochus kritskyi* and *P. monaensis*, highly specific to their hosts, from one groupers species to another, could be indicative of host switching possibly due to the decreasing population of its original host species.

The analysis of the other parasites shows that the copepods are fairly consistent in their representation between the geographical areas. Few acanthocephalans are found in groupers. Cestode larvae have been reported in groupers but not adults. There is essentially only one leech found in groupers.

Table 19 Comparison of findings

Parasite Group	Species reported World wide	Species reported Western Atlantic	Reported from PR	Found in this Study	New records
Digenea	180	65	14	22	10
Monogenea	60	11	2	6	2
Cestoda Adult	2	1	0	0	0
Cestoda Larva	5	0	0	5	5
Leech	2	1	1	1	0
Nematoda	16	6	0	5	5
Copepoda	34	13	4	6	4
Isopoda	10	11	3	9	1
Acanthocephala	3	1	0	0	0
	312	109	24	54	27



Conclusions

The main purpose of this study was to determine the diversity of parasites associated with groupers in Puerto Rico. A total of 54 species of parasites from 116 specimens of 16 species and 6 genera of groupers were collected. (Table 17). A total of 26 new host records and eight new species of parasites are reported in the present study.

From the species of groupers examined I identified 22 species of digenea from in 16 genera and nine families including, 13 new host records and four new species. High number of *Cainocreadium lintoni* infection in *Mycteroperca tigris* may indicate a preference for this host (Table 6). *Stephanostomum dentalum* was not found in *Epinephelus guttatus* in early studies, but occurred in this host in this study and another recent one, could represent a host shift due to the rarity of its previous grouper hosts.

Monogenea from six species of five different genera were collected (Table 7). . A new species is proposed from the genus *Cemocotylella*. In this study, nine new host records and one new host family are reported. *Halitrema longihamus* previously has only been found on snappers, but was collected from *Epinephelus guttatus*.

A total of five species in three genera of cestoda were reported (Table 8). All the Cestoidea collected were larval stages indicating a common use of groupers as intermediate hosts. *Tetraphyllidae* worm from the class Cestoidea shows a high abundance (Table 8). A distinctive new species requires description.

A total of six species of nematodes from six genera and two families were collected (Table 9). *Anisakis simplex* has a high intensity in *Mycteroperca venenosa* (Table 9). Four of the genera collected can be hazardous to humans.

In the present study, a total of six species from three genera and three families of copepods were collected (Table 11 and 18). Two new host records and a new species are reported. *Lepeophtheirus dissimulatus* has a preference for groupers as its host. *Lepeophtheirus bermudensis*, was reported for the first time in groupers. In this study two new species of *Hatschekia* has been reported. (Table 11).

A total of nine species in seven genera of Isopoda were collected (Table 12 and 18). *Excorallana tricornis* from *Mycteroperca venenosa*, was a new host record. *Gnathia* spp. were present on nine species of groupers. *Gnathia* spp. are more abundant at night on fishes when day-active cleaners cannot remove them. *Mycteroperca bonaci* and *Mycteroperca venenosa* (Table 12) were collected at night and had more *Gnathias* spp. than the other grouper specimens collected during day.

Only 81 (51%) out of the 159 grouper species known have had parasites reported. More parasites have been reported from Indopacific than from the Atlantic (Table 19), more species of groupers exist in the Indopacific. Also some of these trends could be an artifact of more studies having been conducted in the Indopacific due to their economic importance and more groupers being cultured in that region. Most of the studies conducted in the Indopacific are target to cage culture where the numbers of Monogenea can increase compare with wild fish Western Atlantic.

The present study increased the existing knowledge about the diversity of parasites in groupers from Puerto Rico, Caribbean, and the Western Atlantic.

Recommendations

The initial objective of this study was to assess the abundance of parasite species associated with groupers in Puerto Rico. With the help of Drs. Lucy Bunkley-Williams and Ernest Williams Jr. who provided data from their collection and with the excellent diving work of the angler Fred Lenz only three species of 19 reported for Puerto Rico were missing in this study. A follow up parasitology study should try to find those three species of groupers and include those species where the sample size was too short. Also a seasonal and female and male host relationship should attempted. In this way, we would have a more extensive view of all the parasites that affect groupers. Also a detailed descriptions of all new species of parasite should be prepared.

With the exception of *Epinephelus guttatus* and *Cephalopholis fulva*, which are of high commercial interest, most of the species were very difficult to collect. The fishermen that I visited during this study told me that most of the species reported in Puerto Rico (Table 1) are unknown to them or that they have not seen those species in many years. This information provided by the fishermen is consistent with the data provided by Noemi Peña (Table 2) from Department of Natural Resource. I recommend the need of a follow up study of the aggregation and distribution of all the species of groupers previously reported in Puerto Rico.

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ILLUSTRATIONS OF GROUPER SPECIES REPORTED FROM PUERTO RICO

(PHOTOS BY THE AUTHOR UNLESS NOTED)

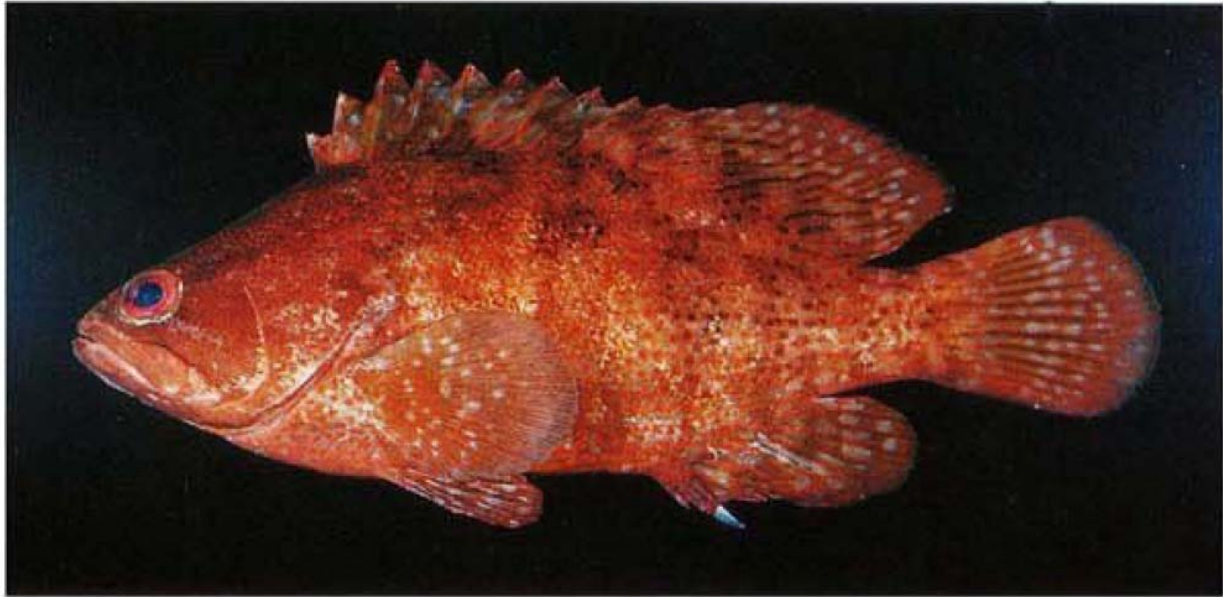


Figure 2. *Alphestes afer* by J. E. Randall



Figure 3. *Cephalopholis cruentata*



Figure 4a. *Cephalopholis fulva* by J. E. Randall 1997



Figure 4b. *Cephalopholis fulva* by J. E. Randall 1997



Figure 4c. *Cephalopholis fulva*



Figure 5a. *Dermatolepis ineris* Juvenile by Keiichi Matsuura (www.fishbase.org)

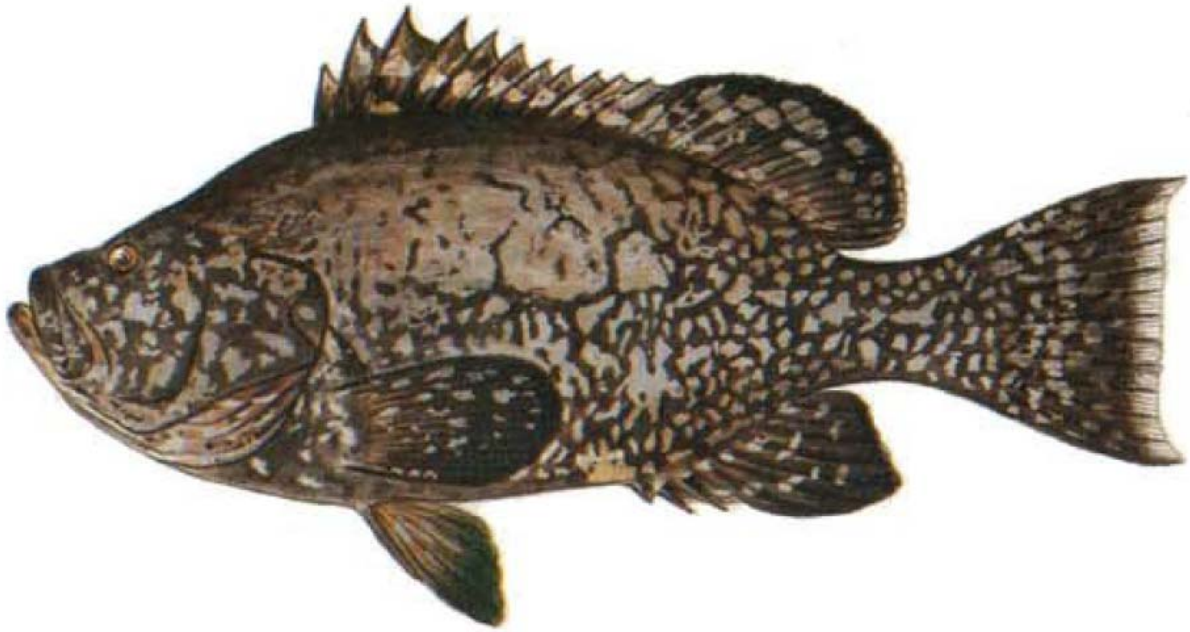


Figure 5b. Adult *Dermatolepis ineris* by P. Lastrico



Figure 6. *Epinephelus adscensionis*



Figure 7. *Epinephelus flavolimbatus* from <http://www.incognitolighttackle.com/images/Yellowedge.JPG>



Figure 8. *Epinephelus guttatus* by Carl Neal, 2004



Figure 9. *Epinephelus itajara* by A Bertoncini Vidamar



Figure 10. *Epinephelus morio* by Aixa Tolentino, 2007



Figure 11. *Epinephelus mystacinus* by Javier Medina, 2008



Figure 12. *Epinephelus nivetus* by Don Flescher www.fishbase.org



Figure 13. *Epinephelus striatus* by J. E. Randall



Figure 14. *Gonioplectrus hispanus* from
<http://www.bromba.com/knowhow/BiometricAnimals.htm>



Figure 15. *Mycteroperca acutirostris* by P. Lastrico



Figure 16. *Mycteroperca bonaci* from
<http://chemistry.csudh.edu/faculty/jim/cozumelaug06small/grouper.jpg>



Figure 17. *Mycteroperca interstitialis*



Figure 18. *Mycteroperca tigris* from http://windom.cybox.com/photos/2005_03/tiger.JPG



Figure 19. *Mycteroperca venenosas*



Figure 20. *Paranthias furcifer* from
http://sanctuaries.noaa.gov/pgallery/pgflower/habitats/creolefish_300.jpg

Plates 1

Figure 21 *Brachyphallus parvus* (Manter, 1947)

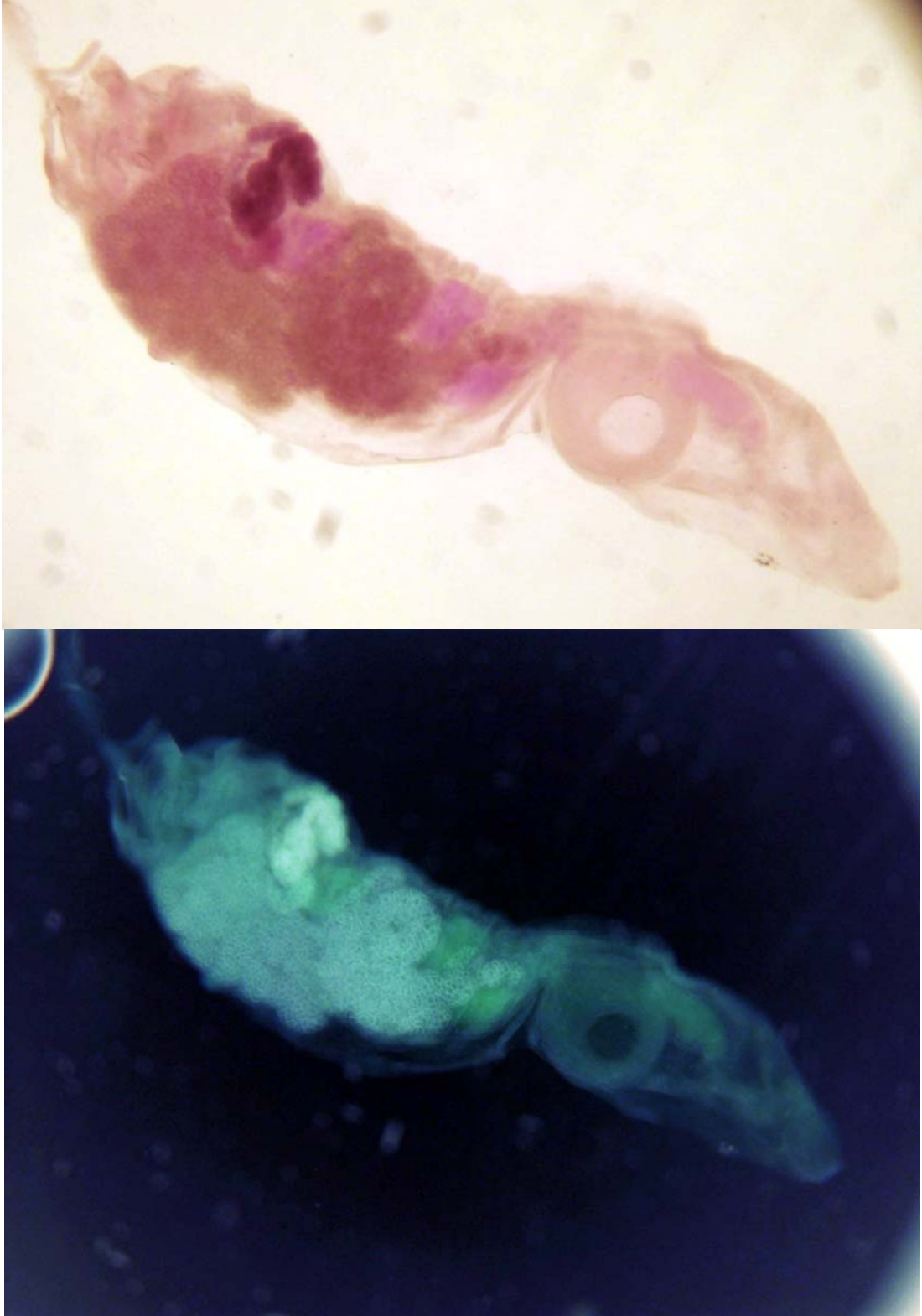


Figure 21

Plates II

Figure 22. *Lecithochirium microstomum* Chandler, 1935

Figure 23. *Lecithochirium* sp.

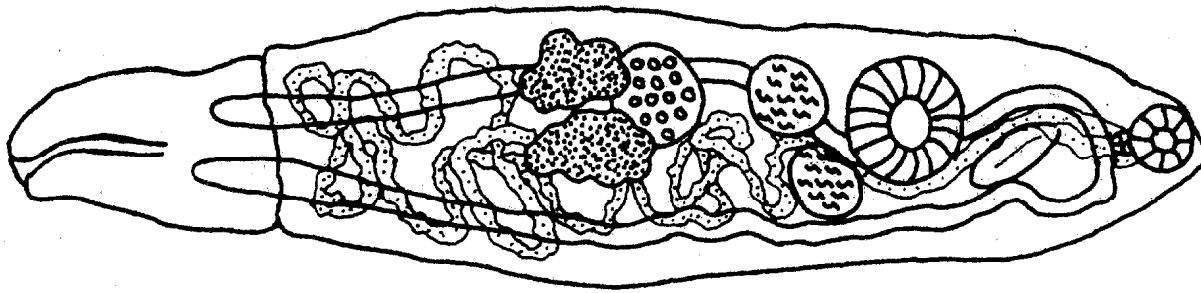


Figure 22

(Willimas and Bunkley-Williams, 1996)

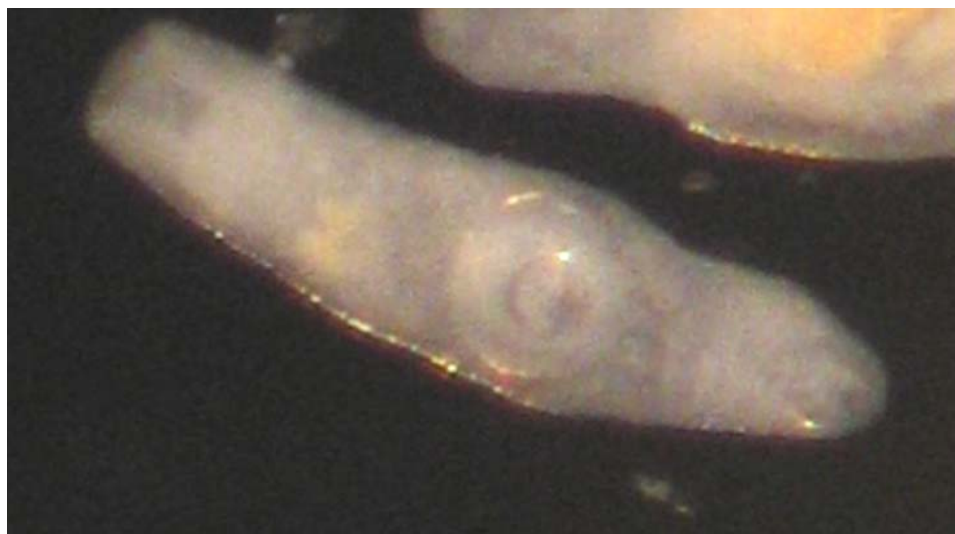


Figure 23.

Plates III

Figure 24. *Leurodera decora* Linton, 1910

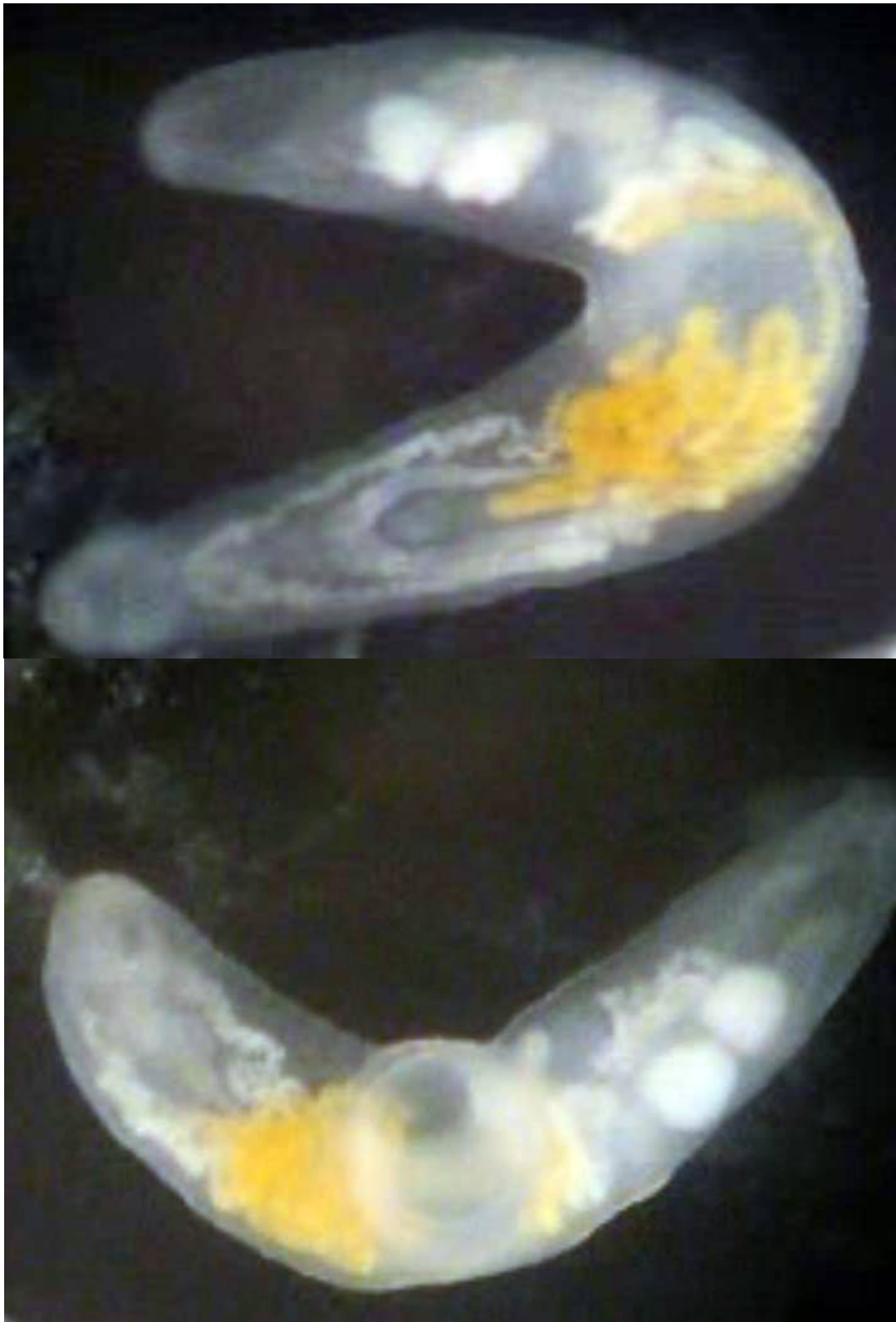


Figure 24.

Plates IV

Figure 25. *Allomegasolena allenuata* Siddiqi and Cable, 1960

Figure 26. *Schikhobalotrema* sp. Skrjabin and Guschanskaja (1955)

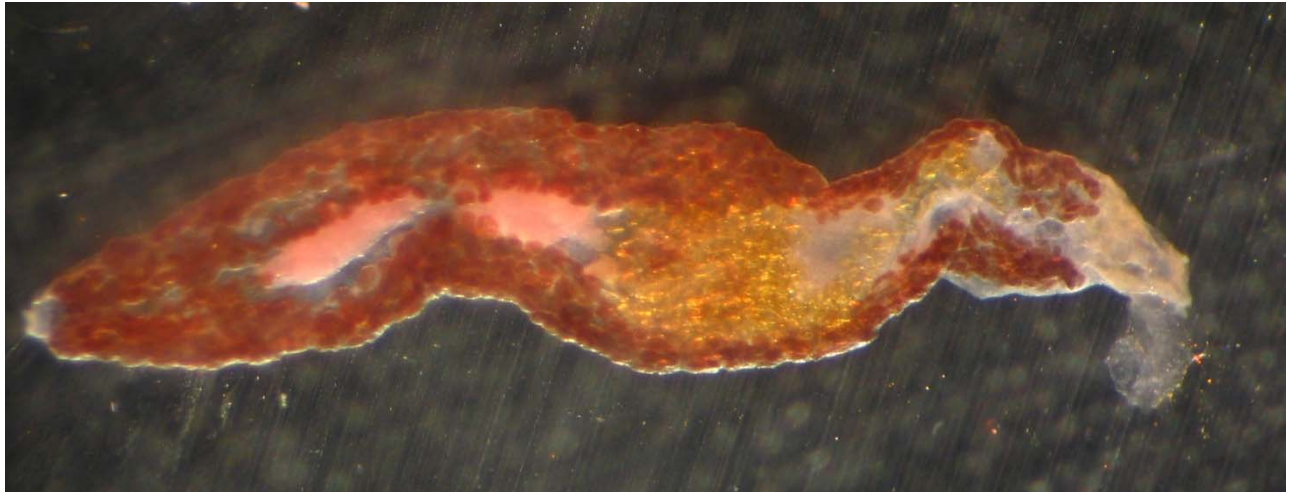


Figure 25

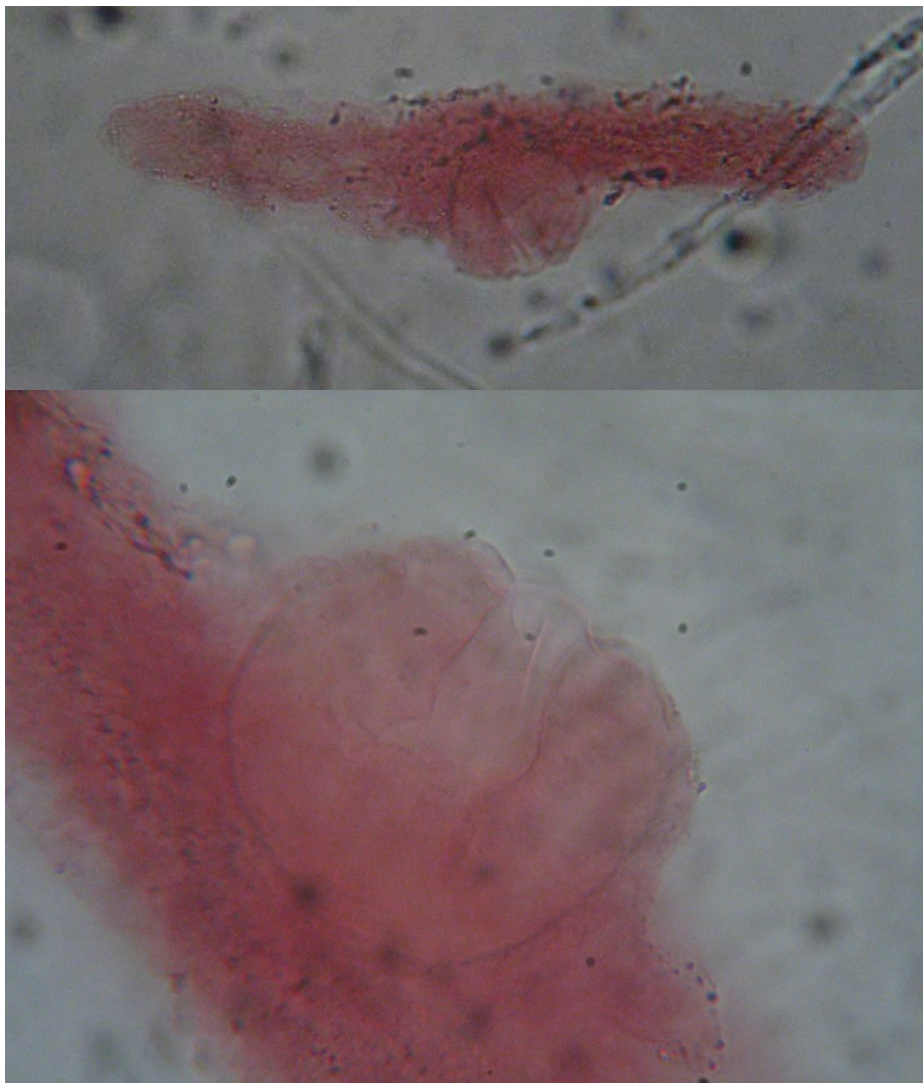


Figure 26.

Plates V

Figure 27. *Lepidapedon trachinoti* Siddiqi and Cable, 1960

Figure 28. *Lepocreadium trulla* (Linton, 1907)

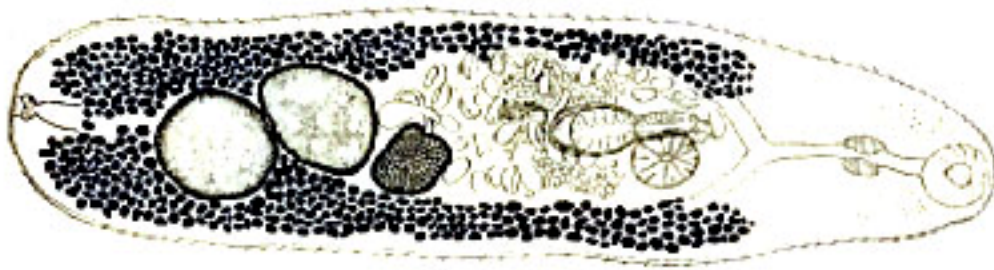


Figure 27.

(Siddiqi and Cable, 1960)



Figure 28

Plates VI

Figure 29. *Neolepidapedoides mycteropercae* (Siddiqui and Cable, 1960)

- a.** Whole worm
- b.** Eggs



Figure 29. a.



Figure 29.b

Plates VII

Figure 30 *Cainocreadium lintoni* Siddiqi and Cable, 1960

Figure 31. *Cainocreadium longisaccum* Siddiqi and Cable, 1960

Figure 32. *Cainocreadium* sp.



Figure 30.



Figure 31.



Figure 32

Plates VIII

Figure 33. *Helicometra torta* Linton 1910



Figure 33.

Plates IX

Figure 34. *Helicometra cf nimia* Linton, 1910

- a. Whole worm
- b. Testes.

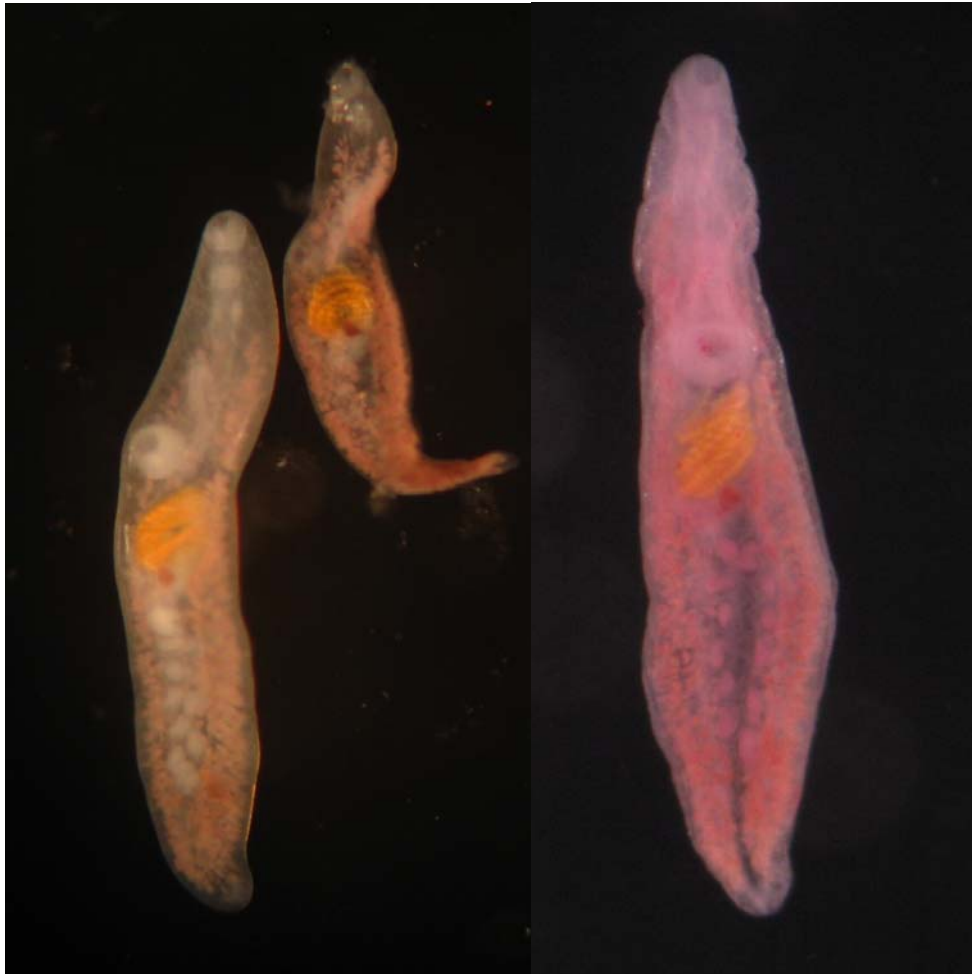


Figure 34 a.



Figure 34 b

Plates X

Figure 35. *Pachycreadium crassigulum* (Linton, 1910)

Figure 36 *Stephanostomum dentalum* (Linton, 1901)



Figure 35.



Figure 36
(Siddiqi and Cable, 1960)

Plates XI

Figure 37. *Stephanostomum imparispine* (Linton, 1905)

Figure 38 *Stephanostomum* sp.



Figure 37.



Figure 38.

Plates XII

Figure 39. *Rhipidocotyle adbaculum*

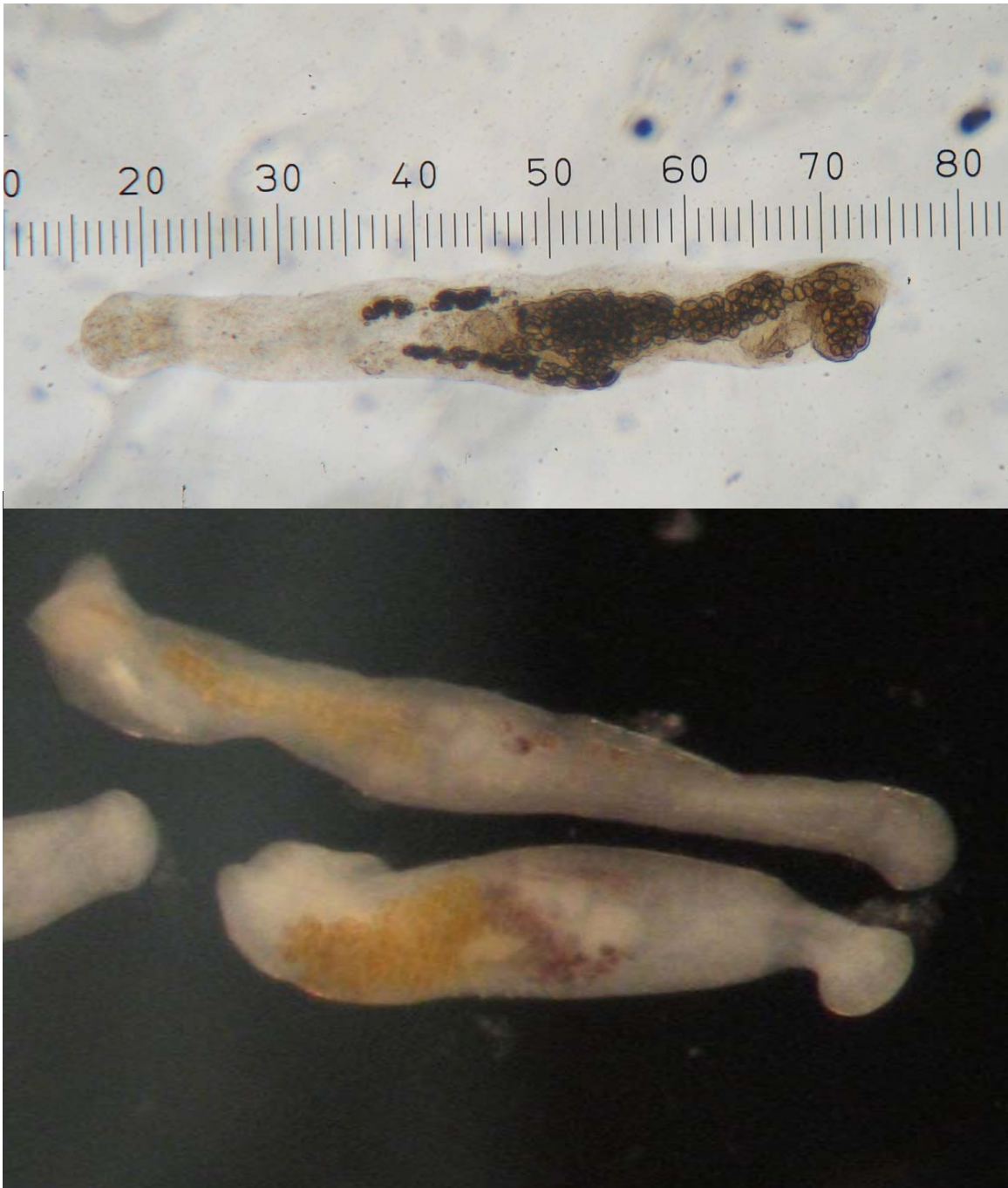


Figure 39.

Plates XIII

Figure 40. *Didymocystis* sp;

Figure 41. Unidentified *Didymozoa*



Figure 40.



Figure 41

Plates XIV

Figure 42. *Diplectanum epinepheli* Yamaguti, 1938

- a.** Head with eye spot.
- b.** Haptor with squamodics

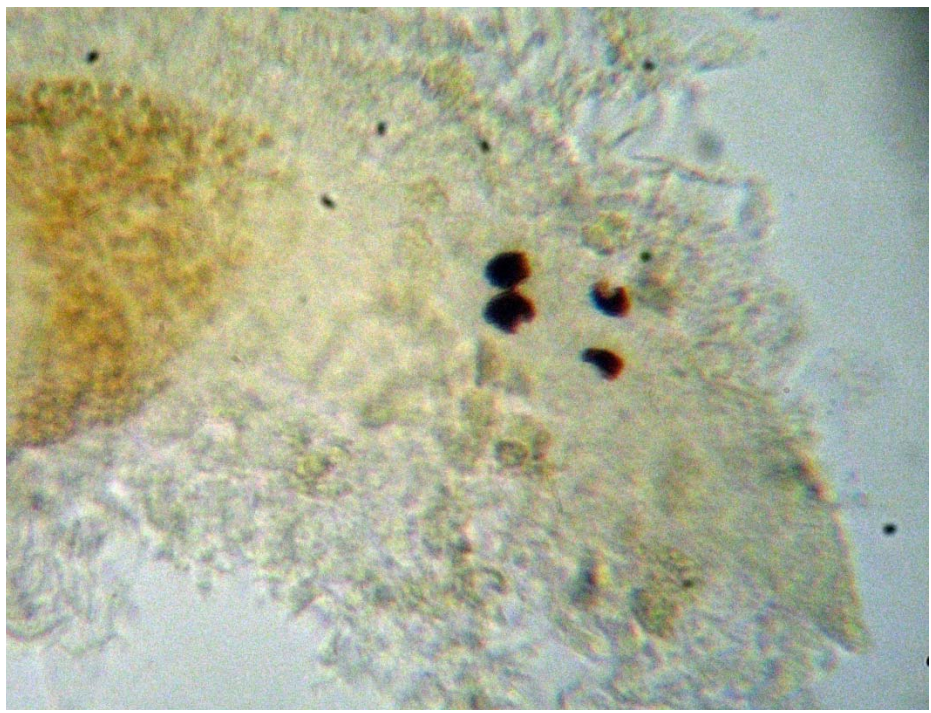


Figure 42 a



Figure 42 b.

Plates XV

Figure 43. *Pseudorhabdosynochus kritskyi* (Dyer *et al.*, 1995)

- a. Whole worm
- b. Copulatory complex
- c. Haptor with squamodics



Figure 43 a.



Figure 43 b



Figure 43 c.

Plates XVI

Figure 44. *Pseudorhabdosynochus monaensis* Dyer *et al.*, 1994

a. Haptor with squamodics

Figure 45. *Neobenedenia paragueraensis* Dyer *et al.*, 1994



Figure 44 a.



Figure 45.

Plates XVII

Figure 46. *Haliotrema longihamus* Zhukov, 1976

- a. Whole worm
- b. Haptor



Figure 46 a

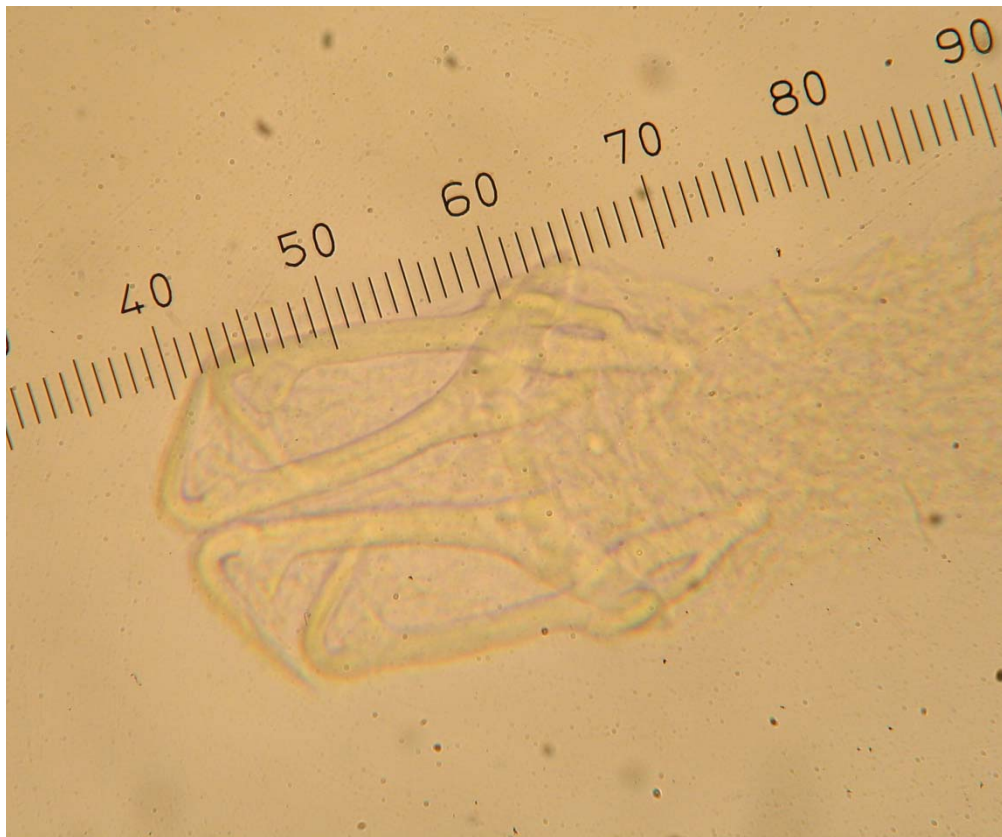


Figure 46 b

Plates XVIII

Figure 47. *Cemocotylella* sp. Whole worm

- a. Whole worm
- b. Head and Copulator complex.



Figure 47 a



Figure 47 b.

Plates XIX

Figure 48. *Scolex pleuronectis* sp. 1

- a. Whole worm alive
- b. Whole worm after fixation.
- c. Scolex



Figure 48 a



Figure 48 b

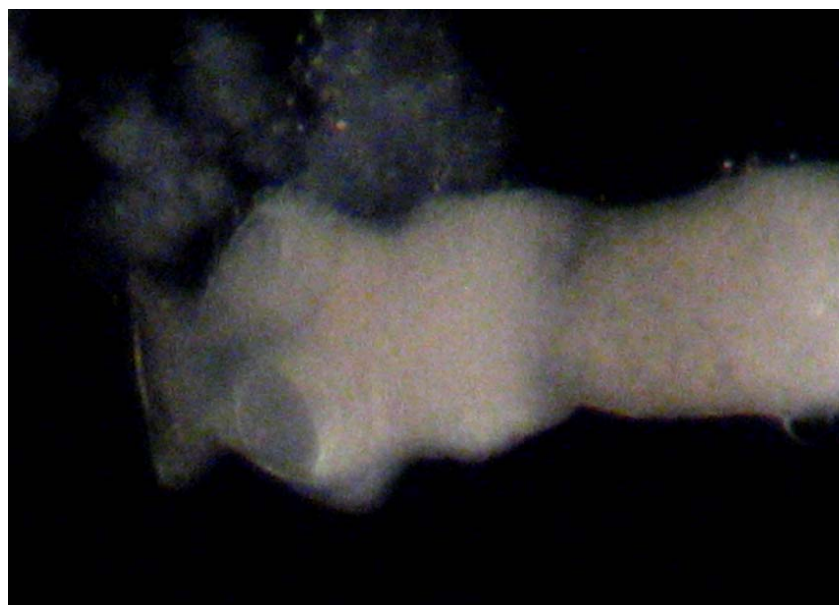


Figure 48 c

Plates XX

Figure 49. *Scolex pleuronectis* sp. 2

- d. Whole worm before stain
- e. Whole worm after stain.



Figure 49 a



Figure 49 b

Plates XXI

Figure 50. *Scolex pleuronectis* sp. 3

Figure 51. *Callitetrarhynchus gracilis* (Rudolphi, 1819)

Figure 52. *Nybelinia* sp.



Figure 50



Figure 51

(From, Ahmet Akmirza 2006)



Figure 52

Plates XXII

Figure 53. *Anisakis simplex*

Figure 54. *Contracoecum* (Railliet and Henry) Esophagum only



Figure 53

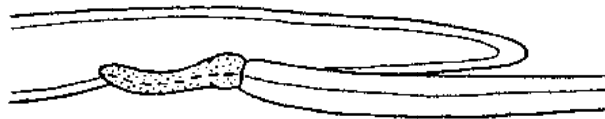


Figure 54

Plates XXIII

Figure 55. *Hysterothylacium* Ward and Magath, 1917

- a. Whole worm
- b. Anterior portion of the worm
- c. Posterior portion of the worm



Figure 55.a.



Figure 55.b.



Figure 55.c.

Plates XXIV

Figure 56. *Terranova* sp.

- a. Whole worm
- b. Anterior portion of the worm
- c. Posterior portion of the worm



Figure 56 a.



Figure 56 b.



Figure 56 c.

Plates XXV

Figure 58. *Trachelobdella lubrica* (Grube, 1840)

Figure 59. *Caligus irritans* Heller, 1868

a. Whole copepod

b. Sternal furca



Figure 58 a.



Figure 58 b.

(↑From Bosques-Rodriguez, 2004↑)



Figure 59 a.



Figure 59 b.

Plates XXVI

Figure 60. *Lepeophtheirus bermudensis* (Heegaard)

- a. Female
- b. Male
- c. Anterior portion of the copepod
- d. Sternal furca



Figure 60 b.

Figure 60 a.

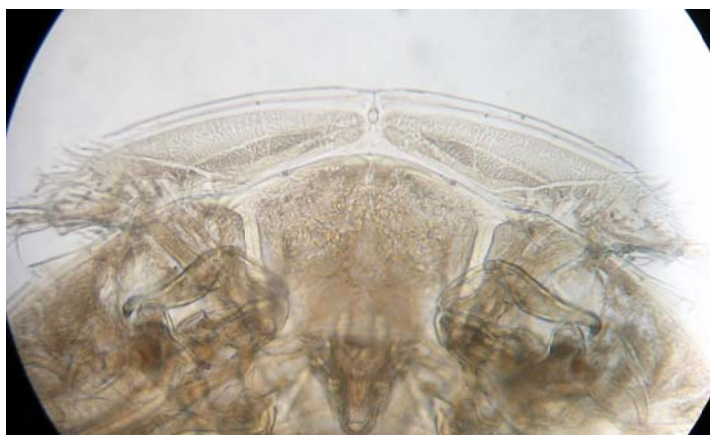


Figure 60 c.

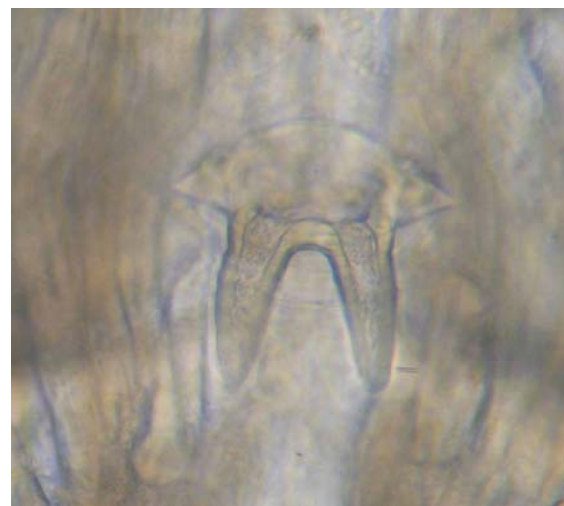


Figure 60 d.

Plates XXVII

Figure 61. *Lepeophtheirus dissimulatus* (Wilson, 1905)

- a. Whole worm
- b. Whole worm under dissection microscope
- b. Sternal furca
- c. Anterior portion of the copepod

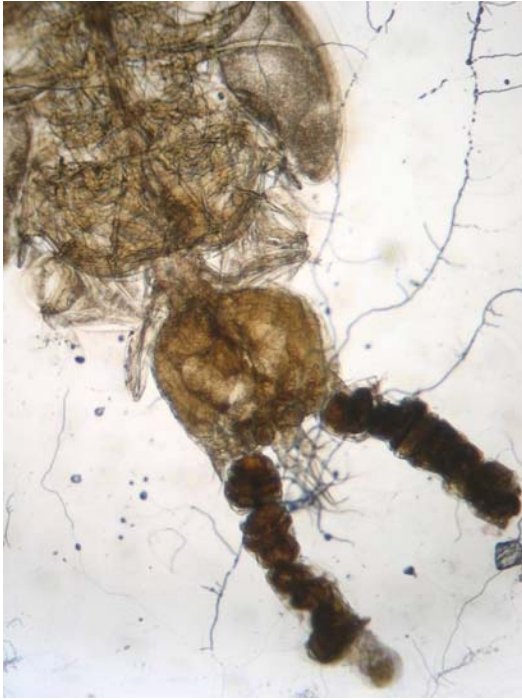


Figure 61 a



Figure 61 b

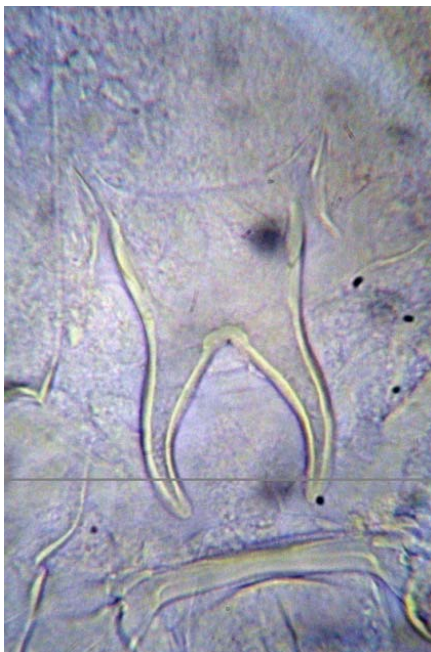


Figure 61 c.



Figure 61 d.

Plates XXVIII

Figure 62. *Hatschekia insolita* Wilson, 1913

- a. Whole worm under dissection microscope
- b. Whole worm on Phase contrast microscope.

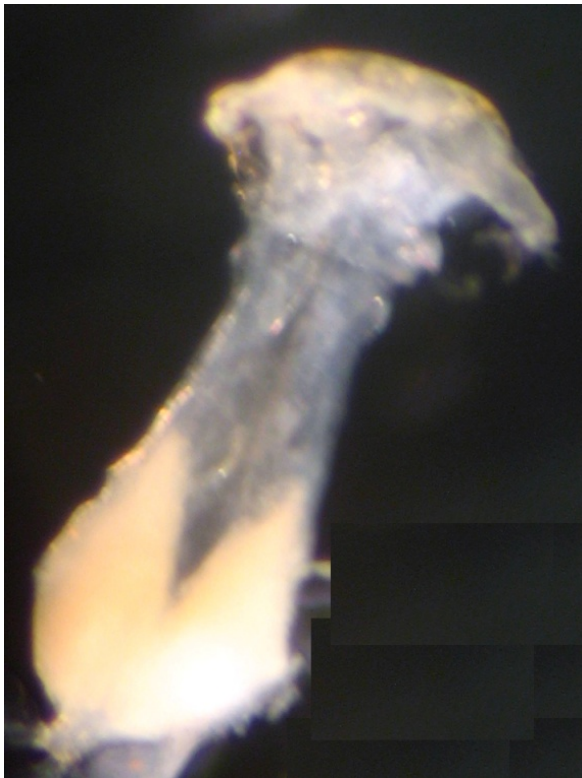


Figure 62a



Figure 62b

Plates XXIX

Figure 63. *Hatschekia* sp.



Figure 63 a.



Figure 63 b.

Plates XXX

Figure 64. *Hatschekia* sp. 2

- a. Whole worm
- b. Anterior portion of the copepod



Figure 64. a.



Figure 64 b.

Plates XXXI

Figure 65. Copepod 1 “Larva stage”

Figure 66. Copepod 2 “Larva stage”

Figure 67. Copepod 3 “Larva stage”



Figure 65.



Figure 66



Figure 67

Plates XXXII

Figure 68. *Rocinella signata* Schiøedte and Meinert, 1879

Figure 69. *Excorallana tricornis* (Hansen, 1890)

- a. Adult
- b. Head
- c. Juvenile



Figure 68. (Bosques-Rodriguez, 2004)



Figure 69.a



Figure 69.b.



Figure 69.c

Plates XXXIII

Figure 70. *Excorallana cf costata* Lemos de Castro, 1960



Figure 70 a.



Figure 70 b.



Figure 70. c.

Plates XXXIV

Figure 71. *Excorallana* sp.



Figure 71. a.



Figure 71. b.



Figure 71. c

Plates XXXV

Figure 72. *Anilocra haemuli* L. B. Williams and E. H. Williams, 1981

a. Female.

b. Male

Figure 73 *Cymonothoa oestrum*

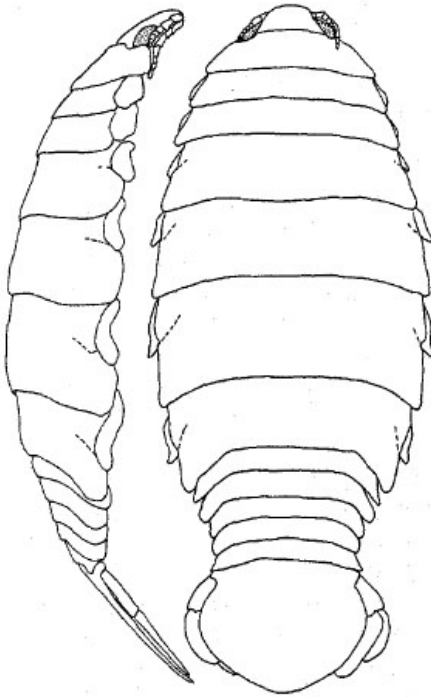


Figure 72 a.



Figure 72 b.

(From Williams and Williams, 1981)

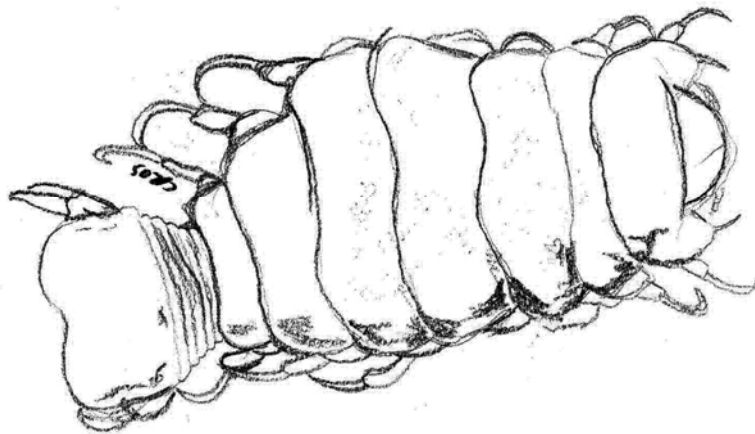


Figure 73

(Draw by Carlos Collazo, 2008)

Plates XXXVI

Figure 72. *Tridentella virginiana* (Richardson, 1900)



Figure 72.

Plates XXXVII

Figure 75. *Gnatia* sp.

- a. Whole worm.
- b.** Whole worm full of blood.
- c. Ghnatia attached to the wills.



Figure 75 a.



Figure 75 b



Figure 75 c.