Aspects of the biology of Trypanorhynch tapeworms and investigations on their use as biological tags

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ASPECTS OF THE BIOLOGY OF TRYPANORHYNCH TAPEWORMS AND INVESTIGATIONS ON THEIR USE AS BIOLOGICAL TAGS

Submitted by
RACHEL MARGARET BATES, B.Sc.
to The Open University as a thesis for the degree of
DOCTOR OF PHILOSOPHY
in the Faculty of Science

Declaration

I certify that all material in this thesis which is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

Author's number: M 702104-6
Date of submission: 8 December 1987
Date of award: 9 March 1988
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Poor quality text in the original thesis.
ABSTRACT

Four hundred papers published in refereed papers during the years 1935-1985 were researched for information on the biology of trypanorhynchs, and a publishable host-parasite list was compiled for this period as a complement to the only previous monograph (published forty-five years ago) on all known members of the order Trypanorhyncha (Platyhelminthes: Cestoda). The theoretical information gained from this initial exercise was then used in carrying out original research on trypanorhynchs found in over 1,000 elasmobranch and teleost fish. This led to a choice of three research topics for more detailed investigations: (i) taxonomic studies on four little-known species and the application of this information to fisheries biology, (ii) life-cycle studies on Grillotia erinaceus (van Beneden, 1858) and (iii) the use of Grillotia smaragdina (Wagener, 1854) Dollfus, 1946 as a biological tag for commercially important teleosts. A pre-requisite of this last problem was the need to review critically all information on the use of parasites as population indicators. Thus a further 100 papers published in primary journals were researched.

The work concludes with a discussion of the above and also brief comments on the need for further research on tapeworms of the order Trypanorhyncha as an aid to our understanding of other basic contemporary problems in parasitology, relating to host-specificity, ecology and phylogeny.
ACKNOWLEDGEMENTS

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ASPECTS OF THE BIOLOGY OF TRYPanorhynch TAPEWORMS AND INVESTIGATIONS ON THEIR USE AS BIOLOGICAL TAGS

PART 1
INTRODUCTION AND MATERIALS AND METHODS
Introduction

Less than 200 species are known for the order Trypanorhyncha (Platyhelminthes: Cestoda). With one notable exception, they are highly characteristic tapeworms in having four eversible hooked tentacles. Adult trypanorhynchs mature only in the spiral valve intestine of elasmobranchs. Larval stages have been recorded from many sites in a variety of hosts, predominantly crustaceans, molluscs and teleosts.

During the last thirty years, trypanorhynchs have been recognised as important in fisheries research for two main reasons. First, they occur in very large numbers in the flesh of edible fish and, for this reason, large consignments of fish intended for the food markets are often rejected at a considerable economic loss (Rae, 1958; Overstreet, 1978). Secondly, it was discovered in the 1960s that they have great potential use as biological tags in determining the spawning grounds, stocks and movements of commercially important food fish (Sindermann, 1957). It is surprising, therefore, that they remain a sadly neglected group of worm parasites. This neglect is immediately apparent from the literature, as no comprehensive review exists after the early studies of Vaullegeard (1899), Linton (1890, 1897a, 1897b) Pintner (1880, 1893, 1896, 1903, 1913, 1931), Southwell (1929, 1930) and Dollfus (1929, 1930, 1942).

When this work commenced in 1983, there were about five known researchers of the group world-wide. All seemed to agree that the taxonomy of the group was in a state of confusion and that schemes of
identification and classification then in use were all arbitrary. No complete life-cycle is known for the trypanorhynchs and yet fishery biologists and helminthologists are unanimous in suggesting the need for more research on the taxonomy of the group and on life-cycles. Such information is thought to be of basic importance in understanding the biology of the group as a whole, including such aspects as host-specificity, ecology and phylogeny.

For reasons given above, the primary aims of my chosen research topic were four-fold: (1) to produce and publish a host-parasite checklist for the years 1935-1985; (2) to investigate the taxonomy of selected representatives from the three main groups of the Trypanorhyncha, including a study of the unique tentacle-less species Aporhynchus norvegicus (Olssen, 1866) Nybelin, 1918; (3) to gain some insight into life-cycle aspects of the group; and (4) to gain theoretical and practical experience in the use of trypanorhynchs as biological tags.

My long-term objective was to attract far more attention to this intriguing group of tapeworms from both the applied and academic aspects of their biology, including their origin, evolution and success as a group of invertebrates.

Materials and Methods

Fish and tapeworms required for this project were collected by me during a three week research cruise on the F.R.V. "Explorer" in the North Sea (20 May - 9 June 1983) and three weeks on the "Kay B.B." in
Cardigan Bay in August 1984 and September 1985. The material obtained was supplemented by further expeditions to collect off Mevagissey in Cornwall, Tromsø in Northern Norway and Passamaquoddy Bay in New Brunswick. Additional specimens of fish and tapeworms were obtained, details of all sources of material are given in Tables 1 - 3.

Whenever possible living fish were obtained, killed by a blow to the head and examined immediately for parasites. This forestalled autolysis within the gut damaging the parasites, and prevented the build-up of mucus in elasmobranch intestines, which tends to obscure small specimens.

The length (and also the greatest width across the wings in rays) and weight of all fish were recorded, when feasible, and otoliths of teleosts taken for ageing. The problems of measuring the age of elasmobranchs are well known (Holden, 1974), but it was assumed that although the weight and length of elasmobranch specimens are not directly proportional to age, the measurements might give an indication of the relative age of individuals belonging to the same sex and species, and caught in the same season in the same area.

The examination of the elasmobranchs was initially focussed on the oesophagus, the cardiac and pyloric stomachs, duodenum, spiral valve, intestine, rectum and rectal gland. Because no adult trypanorhynchs have been recorded from any site other than the stomach, spiral valve and rectal gland (see Section 1), effort was later concentrated on these areas.
The spiral valves were opened as described by McVicar (1979), first by cutting longitudinally along the line of the blood vessels on the ventral surface. Each tier of the spiral valve was then cut transversely. This causes each tier to appear as a flap which can be examined on both sides under a Wild dissecting microscope at a magnification of X6-X12. The number and position of parasites were recorded and the trypanorhynchids identified. Only trypanorhynchids with scoleces were included in the totals. Notes were taken of stomach contents.

Teleosts were sexed and measured to the nearest centimetre from the tip of the snout to the fork in the tail, and an incision made to expose the body cavity and contents. The lumen and outside surfaces of the entire digestive tract were examined under a dissecting microscope at a magnification of X6-X12. The gut contents were also searched, and the contents identified. In any further examination of the fish particular attention was given to the eyes, gonads and musculature.

On a number of occasions fresh fish were not immediately available to me. When collected on my behalf teleost fish were deep frozen as whole specimens whilst with elasmobranchs their digestive tracts only were sent. Each elasmobranch gut was ligatured anterior to the cardiac stomach and posterior to the rectal gland, injected with as much 4% formaldehyde as they would hold, excised and stored in 4% formaldehyde with all relevant host information. Dissection of preserved spiral valves began with making an incision in the anterior portion, and extending the cut posteriorly and spirally. This resulted in an easily
examined single band of tissue whose upper and lower surfaces corresponded with anterior and posterior facing surfaces of the spiral valve (Williams, 1961).

The position of trypanorhynch in the intestine was noted during dissection but treated with caution as migration of the parasites along the gut could have taken place after the death of the host unless it had been fixed immediately (Crompton, 1973).

The tentacles of adult trypanorhynch from freshly caught elasmobranchs were everted wherever possible. Usually coverslip pressure was enough to achieve this. It was preferred to the traditional method of addition of freshwater to achieve tentacle eversion because this method results also in the relaxation and death of the parasites, and this renders them unsuitable for S.E.M. work.

The measurements of cysts containing larval trypanorhynch were taken, and the plerocerci then dissected out. Tentacle eversion was again achieved by coverslip pressure. In frozen samples containing robust specimens (e.g. Hepatoxylon sp.) or species with tentacles of moderate width (e.g. Grillotia erinaceus), tentacle extrusion could still be accomplished by applying moderate pressure, but not in small, delicate specimens, e.g. Grillotia smaris-gora.

Representative specimens of adults and plerocerci were taken from various hosts and measurements were taken of each part of the scolex considered to be of taxonomic importance as described by Schmidt.
(1986), e.g. the lengths and widths of the pars bothridialis, pars post-bulbosa and pars vaginalis.

Trypanorhynchs prepared for S.E.M. study were dehydrated through a graded series of ethanol and dried in a Samdri-780 Critical Point Drier using CO$_2$. They were then sputter coated with gold in an argon atmosphere in an Emscope SC500 and examined using a Jeol JSM-T100 scanning electron microscope operated at 15 KV.

Whole mounts were stained with Ehrlich's haematoxylin and eosin, or Gower's carmine and Fast Red salt B (Johri and Smyth, 1956). Serial sections of both parasites and host gut were cut at 8-12 µm and stained with Ehrlich's haematoxylin and eosin. All parasites were entered into the collections maintained by the National Museum of Wales, Cathays Park, Cardiff.

*Grillotia erinaceus* from *Raja erinaceus* caught in Passamaquoddy Bay, New Brunswick was chosen for training in the understanding of life-cycle work largely because Dr. L. Jarecka, an internationally recognised expert on tapeworm life-cycles, was based at the University of New Brunswick, Canada. Gravid worms were stimulated to release eggs by placing them in fresh seawater. The eggs were maintained in aerated seawater at 15-19°C before being presented to locally collected copepods. Development was observed using both dissecting and compound microscopes.
### Table 1: Original records of fish examined for trypanorhynch

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<td>Pleuronectidae</td>
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* New host record
+ New distribution record
Table 2: **Original records of trypanorhynchs found in fish**

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<tr>
<th>Homeoacanths</th>
<th>Hepatoxylidae</th>
<th>Hepatoxyxon trichiuri (Holten, 1802)</th>
<th>post-larva</th>
<th>Pollachius virens</th>
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<td>Nybelinia sp.</td>
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<td>Clupea harengus</td>
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<table>
<thead>
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<th>Grillotia erinaceus (van Beneden, 1858)</th>
<th>plerocercus</th>
<th>Anarhichas lupus</th>
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<td>Boops boops</td>
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<td>Eutrigma gurnardus</td>
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<td>Raja brachyura spiral valve</td>
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<td>R. naevis spiral valve</td>
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<td>Grillotia smaris-gora (Wagener, 1854), Dollfus, 1946</td>
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<td>Pagellus bogaraveo</td>
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<td>Dollfus, 1946</td>
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<td>Merlangius merlangus</td>
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### Table 3: Additional trypanorhynchs examined from collections

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<td><strong>Hepatoxylidae</strong></td>
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<td><em>Lamna cornubica</em> (Gmelin)</td>
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<td><strong>Sphyriocephalidae</strong></td>
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<td><em>Scymnorhinus lichia</em> (Bonnaterre)</td>
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<td><strong>Tentaculariidae</strong></td>
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<td><em>N. perideraeus</em></td>
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<td><em>Hexanchus griseus</em> (Gmelin)</td>
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<td><em>Scomberomorus commersoni</em></td>
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<td>Museum National d'Histoire Naturelle</td>
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<td><em>Trygon kuhli</em></td>
<td>Sri Lanka, 1960</td>
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<td><em>Lepturacanthus savala</em></td>
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<td><strong>Heteroacanths</strong></td>
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<td></td>
</tr>
<tr>
<td>Eutetrarhynchidae</td>
<td></td>
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<tr>
<td>Eutetrarhynchus sp.</td>
<td>Dasyatis sp.</td>
<td>Hooghly Estuary, India</td>
</tr>
<tr>
<td>Christianella sp.</td>
<td>blue spotted ray</td>
<td>BM(NH)1968.11.4.6</td>
</tr>
<tr>
<td>Prochristianella</td>
<td>Dasyatis americana</td>
<td>USNM 73827</td>
</tr>
<tr>
<td>monomegacantha,</td>
<td></td>
<td></td>
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<tr>
<td>Kruse, 1959 (adult)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rhynchobothrium</strong></td>
<td>longispine Linton, 1890</td>
<td>USNM 7707, 7718</td>
</tr>
<tr>
<td>Otobothriidae</td>
<td></td>
<td></td>
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<tr>
<td>Otobothrium dipsaccum</td>
<td>Serranus undulosus</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>Linton 1897</td>
<td></td>
<td>BM(NH)1977.11.15.58-60</td>
</tr>
<tr>
<td>O. linstowi</td>
<td>Rhynchobatis</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>Soulltwell, 1912</td>
<td>djeddensis</td>
<td>BM(NH)1977.11.15.29</td>
</tr>
<tr>
<td><strong>Trypanorhynchs of uncertain taxonomic status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oncomegas wageneri</td>
<td>Holothuria leucospilota</td>
<td>Singapore</td>
</tr>
<tr>
<td>(Linton, 1890)</td>
<td></td>
<td>BM(NH)1968.2.14.16-25</td>
</tr>
<tr>
<td>Synbothrium malleum</td>
<td>Pteroplata micrura</td>
<td>BM(NH1977.11.16.25-32</td>
</tr>
<tr>
<td>Tetrarhynchus macrocephalus</td>
<td>Trygon kuhl</td>
<td>Sri Lanka 1910</td>
</tr>
<tr>
<td>Shipley and Hornell, 1906</td>
<td></td>
<td>BM(NH)1977.11.4.32-38</td>
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</table>
SECTION ONE

A CHECKLIST OF THE TRYPAHORCHYNCHA (PLATYHELMINTHES: CESTODA)

OF THE WORLD (1935-1985)
A checklist of the Trypanorhyncha (Platyhelminthes: Cestoda) of the world (1935-1985)

by R M Bates
Summary

The literature over a 50-year period was analysed for records of trypanorhynchs. About 400 papers, mainly taxonomic or brief summaries of survey results, were published during this period. 150 species of trypanorhynchs were recorded from about 500 hosts. The results are presented as parasite-host and host-parasite lists since this information is not readily available to modern researchers of this unique group of tapeworms.
Introduction

In March, 1983, I advisedly began work on the biology of the Trypanorhyncha in view of the increased interest in this unique but sadly neglected group of tapeworms. This neglect was emphasised by the time-consuming and laborious task of searching for the scattered literature, which appeared sporadically in many journals of different disciplines and in various languages.

The dispersed papers included many synonyms and misidentifications, reflecting the chaotic state of the Order's taxonomy, including many highly controversial aspects of classification and major difficulties in identifying genera and species. Such information, however, is of increased importance since it is now thought that trypanorhynchcs can be used as biological tags for fish of economic importance.

Apart from Southwell's (1930) historical review of the Trypanorhyncha and Dollfus' (1942) monograph, there has been no attempt to bring together all papers on the Trypanorhyncha in one publication. Since over 400 relevant papers have been published since 1935, it was considered advisable to collate and publish the information in the checklist as a basis for future work on the group.

Collection of the host-parasite records began with the aid of a Dialog search of the Commonwealth Agricultural Bureaux Abstracts Database for the period 1972-1982, carried out by the CAB International Institute of Parasitology. Abstracts from papers published during the years 1935-1971 and from 1983 onwards were obtained by scanning the Helminthological Abstracts published for those years. Further references were traced from the bibliographies of original papers, and from the Host-Parasite catalogue at the British Museum (Natural History) in London.

This checklist is largely based on original papers published in primary journals, in order to avoid the duplication of information in standard texts, e.g. Wardle and Mcleod (1952), Yamaguti (1959), and checklists, e.g. Love and Moser (1983). The checklist is divided into two parts, the first containing a list of parasite species, arranged alphabetically within families, together with their stage of development, host, site of infection if given, geographical distribution and author index. The second part consists of a host-parasite list with their author index.

There are two appendices. The first contains references which include information other than original host-parasite data, which is still relevant to the study of the Trypanorhyncha. The second appendix consists of parasite records which I received too late to include in the main text.

In the light of new taxonomic knowledge some authors have used a variety of synonyms for the same trypanorhynch species in successive publications. I have, therefore, exercised my own
judgement in choosing the most commonly accepted name by experts on the group. The synonym may still be used in cross-referencing.

As is often customary for helminthologists who have little experience or knowledge of vertebrate taxonomy, little attempt has been made to investigate the most commonly used host name and its synonyms. Thus, the list of hosts contains those given in the original paper, appearing alphabetically within orders.

Although I have tried to include all papers primarily concerned with the Trypanorhyncha in this checklist, it is certain that some papers will have been missed. The checklist should, however, provide a useful base for workers in this field and it is hoped that a critical review of the literature may follow this checklist.
PARASITE-HOST LIST

PARASITE FAMILY

DASYRHYNCHIDAE

**Callitetrarhynchus gracilis** (Rudolphi, 1819) Pintner, 1931

**Host:** Vertebrata

**Selachi**

*Carcharhinus leucas* (Müller and Henle, 1841)

Location: spiral valve

Distribution: Nicaragua

Watson, D.E. AND Thorson, T.B., 1976

*Prionace glauca* (Linnaeus, 1758)

Distribution: California, southern

Heinz, M.L. AND DAILEY, M.D., 1974

**Osteichthyes**

*Chiascanopsetta lugubris* Alcock

Distribution: Coast of Mozambique

Reimer, L.W., 1984

*Chlorophthalmus agassizi* Bonaparte

Distribution: Coast of Mozambique

Reimer, L.W., 1984

*Malacocephalus laevis* (Lowe)

Distribution: Coast of Mozambique

Reimer, L.W., 1984

*Saurida undosquamis* (Richardson)

Distribution: Coast of Mozambique

Reimer, L.W., 1984

**Callitetrarhynchus gracilis** (Rudolphi, 1819) Pintner, 1931

(tentative identification)

**REMARKS:** Bane remarked that the cysts resembled those of *Callitetrarhynchus gracilis.*

**Host:** Vertebrata

**Osteichthyes**

*Thunnus albacares*

Location: stomach

Distribution: South of Accra, Ghana, Atlantic

BANE, G.W., 1969

**Callitetrarhynchus gracilis** (Rudolphi, 1819) Pintner, 1931 (adult) syn.

*Tentacularia maclei* Southwell, 1929

**REMARKS:** Subhapradha considered *Tentacularia maclei* Southwell, 1929 and *Tentacularia pseudodera* Shuler, 1938 to be synonyms of *Callitetrarhynchus gracilis.*

**Host:** Vertebrata

**Selachi**

*Carcharhinus* sp.

Location: spiral valve

Distribution: Madras Coast, India

Subhapradha, C.K., 1955

**Callitetrarhynchus gracilis** (Rudolphi, 1819) Pintner, 1931 (encysted plerocercoid)

**Host:** Vertebrata

**Osteichthyes**

*Pomatomus saltatrix* (L.)

Location: pyloric caeca, mesenteries

Distribution: Raritan Bay, southern, New Jersey

Meyers, T.R., 1978
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)
Host: Vertebrata
Osteichthyes

Ctenopharyngodon idella (Hamilton) Pintner, 1931 (larva)
Host: Vertebrata
Osteichthyes

H. cordyla (L.)
Distribution: Indian Ocean
REIHER, L.W., 1981

Secutor ruconius Buchanan-Hamilton
Distribution: Indian Ocean
REIHER, L.W., 1981

Selar kalla (Cuvier and Valenciennes)
Distribution: Indian Ocean
REIMER, L.W., 1980

Symphurus luciocepa
Location: mesentery

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (plerocercus)
Host: Vertebrata
Osteichthyes
Alohestea afer
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Caranx crysos (Mitchill)
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Caranx rhomchus Saint-Hilaire, 1829
Location: peritoneum, body cavity
Distribution: Mauritania
DOLLFUS, R.P., 1942

Caranx ruber
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Centropomus undecimalis Lacépède
Location: peritoneum
Distribution: Ilha Marajo, Brazil
DOLLFUS, R.P., 1942

Cephalopholis fulvus
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Epinephelus adscensionis
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Epinephelus aeneus (Et. Geoff. St-Hil)
Location: peritoneum
Distribution: Mauritania, depth 95-100 m
DOLLFUS, R.P., 1942

Epinephelus guttatus
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Epinephelus striatus (Bloch)
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Euthynnus aleteratus (Rafinesque, 1810)
Location: peritoneal cysts
Distribution: Atlantic
BUSSIERAS, J. AND BAUDIN-LAURENCIN, F., 1973

Euthynnus sp. (Cuvier and Valenciennes)
Location: viscera
Distribution: Miami
WARU, H.L., 1954

Lutjanus griseus (L.)
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Lutjanus guineensis Bleeker
Location: peritoneum
Distribution: Guinea Coast, 55-60 m deep
DOLLFUS, R.P., 1942

Morone labrax
Location: peritoneum
Distribution: "SS Vannneau", Ston CXXI
DOLLFUS, R.P., 1942

Mullus barbatus L.
Location: abdominal cavity
Distribution: Concarneau, Finistère, Marseille, Coast of
DOLLFUS, R.P., 1942

Mycteroperca bonaci (Poey)
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Mycteroperca falcata
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Mycteroperca tigris
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Mycteroperca venenosa (L.)
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Ocyurus chrysurus Bloch
Location: body cavity, mesentery, gut, viscera, liver, gonad
Distribution: Bermuda
REES, G., 1969

Otolithus senegalensis Valenciennes
Location: body cavity
Distribution: Mauritania
DOLLFUS, R.P., 1942

Palameton
Location: peritoneum
Distribution: Mauritania
DOLLFUS, R.P., 1942

Platycephalus bassensis
Location: mesenteries, encysted among
Distribution: Hobart, Tasmania
PRUDHOE, S., 1969

Rachycentron canadum (L.)
Location: peritoneum, body cavity
Distribution: Dakar, Senegal
DOLLFUS, R.P., 1942

Sarda sarda (Bloch)
Location: peritoneum
**Callitetrarhynchus gracilis** (Rudolphi, 1819) Pintner, 1931 (post-larva)

*Host: Vertebrata*  
Osteichthyes

*Thunnus albacares*  
Location: visceral surfaces  
Distribution: Mauritania

**Callitetrarhynchus gracilis** (Rudolphi, 1819) Pintner, 1931 syn.

*Tentacularia pseudodera* Shuler, 1938

**Remarks:** Dollfus (1942) and Subhapradha (1955) considered *Tentacularia pseudodera* to be a synonym of *Callitetrarhynchus gracilis*.

*Host: Vertebrata*  
Selachii

*Hypoprion brevirostris* Poey
Location: spiral valve  
Distribution: Tortugas, Florida  
SHULER, R.H., 1938

**Callitetrarhynchus lepidus** (Chandler, 1935) Chandler 1942 (larva)

**Remarks:** Chandler (1942) reallocated *Tentacularia lepidus* Chandler, 1935 to the genus *Callitetrarhynchus*.

*Host: Vertebrata*  
Osteichthyes

*Galeichthys felis*  
Location: mesenteries, attached to  
Distribution: Galveston Bay, Texas  
CHANDLER, A.C., 1935a

REMARKS: Chandler (1942) reallocated Tentacularia lepida Chandler, 1935 to the genus Callitetrarhynchus.

Host: Vertebrata Osteichthyes

Bagre marina
Location: mesenteries, attached to
Distribution: Galveston Bay, Texas
CHANDLER, A.C., 1935a

Callitetrarhynchus nipponica Nakajima and Egusa, 1973 (adult)
Host: Vertebrata Selachii

Scylla scyllia Müller and Henle
Location: spiral valve
Distribution: Japan
NAKAJIMA, K. AND EGUSA, S., 1972b

Sphyrna zygaena (L.)
Location: spiral valve
Distribution: Bungo Channel, Japan
NAKAJIMA, K. AND EGUSA, S., 1972a

Triakis scyllia Müller and Henle
Location: apical valve
Distribution: Japan
NAKAJIMA, K. AND EGUSA, S., 1972d
NAKAJIMA, K. AND EGUSA, S., 1973

Callitetrarhynchus nipponica Nakajima and Egusa, 1973 (plerocercus)
Host: Vertebrata Selachii

Triakis scyllia Müller and Henle
Distribution: Japan
NAKAJIMA, K. AND EGUSA, S., 1972b

Osteichthyes

Seriola quinqueradiata Temmick and Schlegel
Location: body cavity
Distribution: Japan
NAKAJIMA, K. AND EGUSA, S., 1972b
NAKAJIMA, K. AND EGUSA, S., 1972c
NAKAJIMA, K. AND EGUSA, S., 1973
Distribution: Shikoku, Japan
NAKAJIMA, K. AND EGUSA, S., 1969c


Host: Vertebrata Osteichthyes

Seriola quinqueradiata Temmick and Schlegel
Location: abdominal cavity
Distribution: Shikoku, Japan
NAKAJIMA, K. AND EGUSA, S., 1968
**Callitetrarhynchus nipponica** Nakajima and Egusa, 1973 (plerocercus, adult)

Host: Vertebrata Selachii

*Triakis scyllia* Møller and Henle

Location: spiral valve

Distribution: Japan

NAKAJIMA, K. AND EGUSA, S., 1972c

**Callitetrarhynchus nipponica** Nakajima and Egusa, 1973 (procercoid)

Host: Vertebrata Osteichthyes

*Engraulis japonica* (Houttuyn)

Location: body cavity

Distribution: Bungo Channel, Hyuga Sea, Japan

NAKAJIMA, K. AND EGUSA, S., 1971a

Distribution: Bungo Channel, Sea of Suo, Iyo harbour, Japan

NAKAJIMA, K. AND EGUSA, S., 1969a

Distribution: Japan

NAKAJIMA, K. AND EGUSA, S., 1972b

Distribution: Japanese coast

NAKAJIMA, K. AND EGUSA, S., 1971b

Location: body cavity, liver

Distribution: Bungo Channel, Sea of Suo, Japan

NAKAJIMA, K. AND EGUSA, S., 1969b

**Callitetrarhynchus** sp. (larva)

Host: Vertebrata Osteichthyes

*Clevelandia ios* (Jordan and Gilbert)

Distribution: Mission Bay, San Diego, California

BROOKS, D.R. AND BROTHERS, E.B., 1974

*Illyoncus gilberti* (Eigenmann and Eigenmann)

Distribution: Mission Bay, San Diego, California

BROOKS, D.R. AND BROTHERS, E.B., 1974

*Quetula y-cauda* (Jenkins and Evermann)

Distribution: Mission Bay, San Diego, California

BROOKS, D.R. AND BROTHERS, E.B., 1974

**Callitetrarhynchus** sp. Nakajima and Egusa, 1968 SEE: **Callitetrarhynchus nipponica** Nakajima and Egusa, 1973 (plerocercus)

**Callitetrarhynchus** sp. (plerocercoid)

Host: Vertebrata Osteichthyes

*Epinephelus morio* Valenciennes, 1824

Location: muscles, digestive tract, liver, gonads

Distribution: Bance de Campeche

FEJER, E., VALDES, R. AND BARRERA, M., 1979

**Callitetrarhynchus** *speciosus* (Linton, 1897) Carvajal and Rego, 1985 (larva)

Host: Vertebrata Osteichthyes

*Pomatomus saltatrix* (L.)

Location: coelom, attached to the surface of the visceral peritoneum

Distribution: Rio de Janeiro, Brazil

CARVAJAL, J. AND REGO, A.A., 1985
**Dasyrhyynchus giganteus** (Diesing, 1858) Pintner, 1928 (adult)

**Host:** Vertebrata Selachii

*Carcharhinus leucas* (Müller and Henle, 1841)

BUTEAU, J.R., G.H., SIMMONS, J.E., FAIRHAIRN, D., 1969

**REMARKS:** Dollfus (1969b) considered that although the tentacles of his specimens corresponded with descriptions of *D. giganteus*, the strobilus corresponded to *D. veriouncinatus* and *D. talismani*.

**Host:** Vertebrata Selachii

*Carcharhinus leucas* (Müller and Henle, 1841) syn.

*Prionodon platydon* (Poey, 1861) syn. *Carcharhinus commersoni* Blainville, 1816

Distribution: Florida, Sarasota

DOLLFUS, R.P., 1969b

*Negaprion brevirostris* (Poey, 1868) syn. *Hypoprion brevirostris* Poey

Distribution: Florida, Sarasota

DOLLFUS, R.P., 1969b

**Host:** Vertebrata Selachii

*Carcharhinus amblyrhynchos* Bleeker

Location: spiral valve

Distribution: Hawaii


*Carcharhinus limbatus* (Valenciennes)

Location: spiral valve

Distribution: Hawaii


**Dasyrhyynchus insigne** (Linton, 1924)

Host: Vertebrata Selachii

*Carcharias platyodon* (Poey)

CHANDLER, A.C., 1942

**Dasyrhyynchus pacificus** Robinson, 1965 (larva)

Host: Vertebrata Osteichthyes

*Sciaena antarctica* Castelnau

Location: viscera, encysted amongst

Distribution: McKenzie Bay, New South Wales

ROBINSON, E.S., 1965

**Dasyrhyynchus pillerai** (Southwell, 1929)

Host: Vertebrata Osteichthyes

*Saurida undosquamia* (Richardson)

Distribution: Coast of Mozambique

REIMER, L.W., 1984
**Dasyrhynchus pillerai** (Southwell, 1929) (larva)

**Host:** Vertebrata  
**Osteichthyes**

*Pseudotodea erumei* (Bloch and Schneider)

**Distribution:** Coast of Mozambique  
REIMER, L.W., 1984

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**Dasyrhynchus sp.**

**Host:** Vertebrata  
**Osteichthyes**

*Thysites aumon* (Euphrasen, 1791)

**Distribution:** New Zealand, Australia  
KOROTAEVA, V.D., 1971

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**Dasyrhynchus sp.** (adult)

**Host:** Vertebrata  
**Selachii**

*Raja kincaidi*

DOUGLAS, L.T., 1959

---

**Dasyrhynchus sp.** (encysted plerocercoid)

**Host:** Vertebrata  
**Osteichthyes**

*Paralichthys dentatus*

**Location:** stomach wall, intestine wall, pyloric caeca, mesenteries  
**Distribution:** Raritan Bay, southern, New Jersey  
MEYERS, T.R., 1978

*Pomatomus saltatrix* (L.)

**Location:** stomach wall, pyloric caeca, pericardium, mesenteries  
**Distribution:** Raritan Bay, southern, New Jersey  
MEYERS, T.R., 1978

*Scophthalmus aquosus*

**Location:** stomach wall  
**Distribution:** Raritan Bay, southern, New Jersey  
MEYERS, T.R., 1978

---

**Dasyrhynchus sp.** (plerocercus)

**Host:** Vertebrata  
**Osteichthyes**

*Trachurus symmetricus* (Ayres)

**Location:** throughout the fish, abdominal wall and muscle tissue, especially  
DAILEY, M.D., 1969

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**Dasyrhynchus talismani** Dollfus, 1935

**Host:** Vertebrata  
**Selachii**

*Carcharhinus longimanus* (Poey, 1861)

**Distribution:** Pacific Ocean, east  
HEINZ, M.L. AND DAILEY, M.D., 1974

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**Dasyrhynchus talismani** Dollfus, 1935 (adult)

**Host:** Vertebrata  
**Selachii**

*Galeus glaucus* Rondelet, 1554 syn. *Carcharhinus*  
*(Prionodon) glaucus* (L.) Möller and Henle

**Distribution:** Dakar and Ile de Santiago, Cape Verde, Archipelago  
DOLLFUS, R.P., 1942
Dasyrhyynchus talismani Dollfus, 1935 (plerocercus)
Host: Vertebrata Osteichthyes
Thunnus albacares (Bonnaterre, 1788)
Location: circulatory system
distribution: Atlantic
BUSSIFERAS, J. AND BAUDIN-LAURENCIN, F., 1973
Location: liver, spleen, pyloric caeca
distribution: Gulf of Guinea
BUSSIFERAS, J. AND ALDRIN, J.F., 1965

Thunnus obesus (Lowe, 1839)
Location: circulatory system
distribution: Atlantic
BUSSIFERAS, J. AND BAUDIN-LAURENCIN, F., 1973
Location: liver, spleen, pyloric caeca
distribution: Gulf of Guinea
BUSSIFERAS, J. AND ALDRIN, J.F., 1965

Dasyrhyynchus talismani Dollfus, 1935 (post-larva)
Host: Vertebrata Osteichthyes
Thunnus albacares
Location: branchial arteries, ducts in the hepato-spleno-pyloric region
distribution: Gulf of Guinea
BAUDIN-LAURENCIN, F., 1971

Dasyrhyynchus varioucinatus (Pintner, 1913) Pintner, 1928
Host: Vertebrata Selachii
Carcharhinus leucus (Moller and Henle, 1841)
Location: spiral valve
distribution: Nicaragua
WATSON, D.E. AND THORSON, T.B., 1976
Carcharias sp.
Location: spiral valve
distribution: Madras Coast, India
SUBHAPRADHA, C.K., 1955

Dasyrhyynchus varioucinatus (Pintner, 1913) Pintner, 1928 (plerocercoid)
Host: Vertebrata Osteichthyes
Xiphias gladius Linnaeus, 1758
Location: stomach
distribution: Atlantic, north west

Dasyrhyynchus varioucinatus (Pintner, 1913) Pintner, 1928 (plerocercus)
Host: Vertebrata Osteichthyes
Caran sp.
Location: under the tegument in the gill chamber
distribution: Cote d'Annam
DOLLFUS, R.P., 1942
Caranx armatus (Forskal)
Location: under the tegument in the gill chamber
distribution: Cote d'Annam
DOLLFUS, R.P., 1942
Euthynnus yaito Kishinouye
Location: under the tegument in the gill chamber
distribution: Cote d'Annam
DOLLFUS, R.P., 1942
"Loche saumonée"
Location: intramuscular capsules
distribution: New Caledonia
POLYMENUS QUADRIFILIUS Cuvier

Location: gill chamber under the tegument
Distribution: Pointe Padron, Belgian Congo

SERIOLE DUMERIL Riss, 1810
Location: body cavity
Distribution: Miami
WARD, H.L., 1954

DASYRHYNCHUS VARIOUNCINETUS (Pintner, 1913) Pintner, 1928 syn. TENTACULARIA INSIGNIS (Linton, 1819) Shuler, 1938
Host: Vertebrata Selachii

HYPOPRION BREVIROSTRIA Poey
Distribution: Tortugas, Florida
SHULER, R.H., 1938
SHULER, R.H., 1938

FLORICEPS CABELLEROI Cruz-Reyes, 1977 (adult)
Host: Vertebrata Selachii

NEGAPRION BREVIROSTRIA (Poey, 1868)
Location: spiral valve
Distribution: Laguna de Agilabampo, Mexico
CRUZ-REYES, A., 1977

FLORICEPS OXNERI Guiart, 1938 (larva)
Host: Vertebrata Osteichthyes
Coris julis
Location: peritoneal cavity
Distribution: Monaco
GUIART, J., 1938

FLORICEPS SACCATUS Cuvier, 1817
Host: Vertebrata Selachii
Carcharhinus limbatus (Valenciennes)
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Carcharhinus sp.
Location: spiral valve
Distribution: Madras Coast, India
SUBHAPRADHA, C.K., 1955

NOTORHYNCHUS MACULATUS Ayres, 1855
Distribution: Mexico
HEINZ, M.L. AND DAILEY, M.D., 1974

FLORICEPS SACCATUS Cuvier, 1817 (adult)
Host: Vertebrata Selachii
NEGAPRION BREVIROSTRIA (Poey, 1868)
Distribution: Mexico, north west coast
CRUZ-REYES, A., 1974b

FLORICEPS SACCATUS Cuvier, 1817 (adult) syn. DASYRHYNCHUS INGENS (Linton, 1921) (adult)
REMARKS: Dollfus (1942) recognised DASYRHYNCHUS INGENS (Linton, 1921) as a synonym of FLORICEPS SACCATUS Cuvier, 1817.
Host: Vertebrata Selachii
Carcharhinus japonicus
Location: spiral intestine
Distribution: Japan
IWATA, S., 1939
**Floriceps saccatus** Cuvier, 1817 (adult) syn. *Dasyrhyynchus ingens* (Linton, 1921) (adult)

**Host:** Vertebrata

*Selachii*

*Prionace glauca* (Linnaeus, 1758)

- Location: spiral intestine
- Distribution: Japan

IWATA, S., 1959

**Floriceps saccatus** Cuvier, 1817 (larva)

**Host:** Vertebrata

*Osteichthyes*

*Glyptcephalus stelleri* (Schmidt)

- Distribution: Peter the Great Bay

TSIMBALYUK, E.H., 1978b

**Floriceps saccatus** Cuvier, 1817 (larva)

**REMARKS:** Guiart (1935) considered that *Floriceps saccatus* Cuvier, 1817 was a rare, minute trypanorhynch found under the peritoneum of *Mola mola* and not the giant trypanorhynch commonly found in the liver of the same host.

**Host:** Vertebrata

*Osteichthyes*

*Mola mola* (L.)

- Location: under the peritoneum
- Distribution: Nice

GUIART, J., 1935c

**Floriceps saccatus** Cuvier, 1817 (larva)

**Host:** Vertebrata

*Osteichthyes*

*Spheroides borealis*

- Distribution: Peter the Great Bay

TSIMBALYUK, E.H., 1978b

*Trichiurus japonicus*

- Distribution: Peter the Great Bay

TSIMBALYUK, E.H., 1978b

**Floriceps saccatus** Cuvier, 1817 (plerocercoid)

**Host:** Vertebrata

*Osteichthyes*

*Mola mola* (L.)

- Location: body wall, inside
- Distribution: Ireland, Co. Donegal

HILLIS, J.P. AND O'RIORDAN, C.E., 1961

**Floriceps saccatus** Cuvier, 1817 (plerocercus)

**Host:** Vertebrata

*Osteichthyes*

*Coryphaenoides hippurus*

- Location: visceral cavity, wall of
- Distribution: Concarneau

DOLLFUS, R.P., 1946b

*Diodon holocentria* Linnaeus, 1758

- Location: body cavity
- Distribution: Guadeloupe

DOLLFUS, R.P., 1975

*Mola mola* (L.)

- Location: liver

DOLLFUS, R.P., 1942

- Location: peritoneum
- Distribution: Mediterranean

DOLLFUS, R.P., 1969a

*Mola mola* (L.) syn. *Orthagoriscus mola* (L.)

- Location: encysted in liver, mesentery, stomach wall,
surface of the intestine, musculature

DOLLFUS, R.P., 1946a

Seriola mazatlanu Steindachner, 1876

Location: musculature

Distribution: Antofagasta, Chile

SOTO, J. AND CARVAJAL, J., 1979

Tentacularia insignis (Linton, 1819) Shuler, 1938  SEE: Daeyrhynchus varioucinatus (Pintner, 1913) Pintner, 1928


Tentacularia macfiei Southwell, 1929  SEE: Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (adult)

Tentacularia pseudodera Shuler, 1938  SEE: Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
PARASITE FAMILY EUTETRARHYNCHIDAE

Christianella minute (Van Beneden, 1849)
Host: Vertebrate Osteichthyes
Trachurus trachurus trachurus L.
Distribution: Atlantic
GAEVSKAIA, A.V. AND KOVALEVA, A.A., 1986

Christianaella minute (Van Beneden, 1849) (adult)
Host: Vertebrate Selachii
Dasyatis pastinaca L.
Location: spiral valve
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Raja clavata L.
Location: spiral valve
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Rhinobatus helavi (Forsk)
Location: spiral valve
Distribution: Madras Coast, India
SUBHAPRADHA, C.K., 1955
Squalus acantias (L.)
Location: spiral valve
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Squatina acutina (L.)
Location: spiral valve
Distribution: Mauritania, Coasts of
DOLLFUS, R.P., 1942
Trygon imbricata (Bloch and Schneider)
Location: spiral valve
Distribution: Madras Coast, India
SUBHAPRADHA, C.K., 1955

Christianella minute (Van Beneden, 1849) (adult) syn. Tetrarhynchus minutus
Van Beneden, 1849 (in Nybelin, 1946) syn. Wageneria porrecta Lühe, 1902
REMARKS: Nybelin (1946) and Dollfus (1942) both suggested that
Tetrarhynchus minutus and Wageneria porrecta were synonyms of
Christianella minute.
Host: Vertebrate Selachii
Squatina acutina (L.) syn. Rhina acutina (L.)
Distribution: Roscoff, France
NYBELIN, 0., 1946

Christianella minute (Van Beneden, 1849) larva
Host: Vertebrate Osteichthyes
Trachurus trachurus trachurus L.
Distribution: North Sea, Atlantic, north
GAEVSKAIA, A.V. AND KOVALEVA, A.A., 1986

Christianella minute (Van Beneden, 1849) (larva)
Host: Vertebrate Osteichthyes
Mullus barbatua ponticus Essipov
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Ophidium rochel Möller
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Platichthya flesus luscus (Pallas)
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
**Scorpaena porcus** L.
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978

**Solea lascaria nasutsn** (Pallas)
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978

**Christianella minuta** (Van Beneden, 1849) (plerocercus) syn. Lacistorhynchus sp. in Pinter, 1893 syn. Grillotia sp. in Dollfus, 1942

REMARKS: Nybelin (1940) suggested that the plerocercus described as *Lacistorhynchus* sp. by Pinter (1893) was really *Christianella minuta* (Van Beneden, 1849). Dollfus 1942 remarked on its similarity to *Grillotia* sp.

Host: Vertebrates

**Smaris** sp.
Distribution: Naples, Nice, Trieste
NYBELIN, O., 1940

**Christianella sp.** (adult)
Host: Vertebrates

**Urobatis halleri** (Cooper)
Distribution: California, southern
YOUNG, R.T., 1954a

**Christianella sp.** (larva)
Host: Invertebrates

**Bullia melanoides** (Deshayes)
Distribution: Madras, India
REIMER, L.W., 1975a

**Thais rudolphi** (Lamarck)
Distribution: Madras, India
REIMER, L.W., 1975a

Host: Vertebrates

**Osteichthyes**

**Cubiceps natalensis** Gilchrist and Von Bonde
Distribution: Coast of Mozambique
REIMER, L.W., 1984

**Christianella trygon-brucco** of Euzet, 1956
SEE: *Parachristianella trygonis* Dollfus, 1946 (adult)

**Christianella trygonis-buccconia** (Wagener, 1854) adult
Host: Vertebrates

**Urobatis halleri** (Cooper)
Distribution: California, southern
YOUNG, R.T., 1954a

**Christianella trygonis-buccconia** (Wagener, 1854) (larva)
Host: Invertebrates

**Callianassa** sp.
Distribution: California
YOUNG, R.T., 1954a

**Hemigrapsus**
Distribution: California, southern
YOUNG, R.T., 1954a

**Pachygrapsus** sp.
Distribution: California, southern
YOUNG, R.T., 1954a
Eutetrarhynchid sp.  
Host: Vertebrata Selachii  
Carcharhinus leucas (Möller and Henle, 1841)  
Location: spiral valve  
Distribution: Texas  
HENSON, R.N., 1975

Eutetrarhynchidae sp. (larva)  
Host: Invertebrata Crustaces  
Euphausia similis Sars  
Distribution: Saruga Bay, Japan  
SHIMAZU, T., 1975a

Eutetrarhynchus araya (Woodland, 1934) Rego and Dias, 1976  
Host: Vertebrata Selachii  
Paratrygon motoro (Möller and Henle)  
Distribution: Salobra, Mato Grosso  
REGO, A.A., 1979

Eutetrarhynchus araya (Woodland, 1934) Rego and Dias, 1976 (adult) syn.  
Eutetrarhynchus baeri López-Neyra and Díaz-Ungría, 1958  
REMARKS: The hosts Potamotrygon hystricis and Ptericulatys were tentatively identified pending a taxonomic revision of the potamotrygonids.  
Host: Vertebrata Selachii  
Potamotrygon falkneri  
Location: middle third of spiral valve  
Distribution: Venezuela  
BROOKS, D.R., MAYES, W.A. AND THORSON, T.B., 1981

Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959  
Host: Vertebrata Selachii  
Paratrygon hystricis (Möller and Henle)  
Distribution: Río Amazonas, South America  
REGO, A.A., 1979

Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959 (adult) syn.  
Eutetrarhynchus baeri López-Neyra and Díaz-Ungría, 1958  
REMARKS: Rego and Dias (1976) concluded that Eutetrarhynchus baeri described by López-Neyra and Díaz-Ungría (1958) was a synonym of Eutetrarhynchus araya.  
Host: Vertebrata Selachii  
Potamotrygon hystricis (Möller and Troschel)  
Location: spiral valve  
Distribution: Orinoco River Delta, Venezuela  
LOPEZ-NEYRA, C.R. AND DIAZ-UNGRIA, C., 1958

Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959 (adult) syn.  
Eutetrarhynchus baeri López-Neyra and Díaz-Ungría, 1958  
REMARKS: Rego and Dias (1976) redescribed Eutetrarhynchus araya and considered that E. baeri is a synonym.  
Host: Vertebrata Selachii  
Paratrygon motoro (Möller and Henle)  
Location: spiral valve  
Distribution: Salobra, Mato Grosso  
REGO, A.A. AND DIAS, A.P.L., 1976
Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959 (adult) syn.

Eutetrarhynchus baeri López-Neyra and Díaz-Ungría, 1958

Host: Vertebrata Selachii

Potamotrygon hyatrix (Müller and Trochele)
Location: middle third of spiral valve
Distribution: Venezuela
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981

Potamotrygon motoro (Müller and Henle)
Location: middle third of spiral valve
Distribution: Venezuela
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981

Potamotrygon reticulatus (Gunther)
Location: middle third of spiral valve
Distribution: Venezuela
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981

Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959 (post-larva)

Host: Invertebrata Crustacea

Dilocarcinus (Dilocarcinus) papei Stimson, 1861
Distribution: Mato Grosso
REGO, A.A., 1982

Valdivia serrata Bott, 1969
Distribution: Mato Grosso
REGO, A.A., 1982

Eutetrarhynchus australis Prudhoe, 1969 (adult)

Host: Vertebrata Selachii

Mustelus antarcticus Günther
Location: spiral valve
Distribution: Hobart, Tasmania
PRUDHOE, S., 1969

Eutetrarhynchus baeri López-Neyra and Díaz-Ungría, 1958 SEE:
Eutetrarhynchus araya (Woodland, 1934) Rego and Dias, 1976 (adult)

Eutetrarhynchus baeri López-Neyra and Díaz-Ungría, 1958 SEE:
Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959 (adult)

Eutetrarhynchus carayoni Dollfus, 1942 (plerocercus)

Host: Vertebrata Osteichthyes

Clibanarius misanthropus Risso
Location: bile duct
Distribution: Arachon, Gironde, France
DOLLFUS, R.P., 1942

Eutetrarhynchus carayoni Dollfus, 1942 (plerocercus-tentative identification)

Host: Invertebrata Crustacea

Upogebia gracilipes De Man 1927
Location: liver
Distribution: Castiglione, Algiers
DOLLFUS, R.P., 1946b
Eutetrarhynchus caribbensis Kovacs and Schmidt, 1980 (adult)
Host: Vertebrata Selachii
Urolophus jamaicensis (Cuvier, 1817)
Location: apiral valve
Distribution: Discovery Bay, Jamaica
KOVALSKY, K.J. AND SCHMIDT, G.D., 1980

Eutetrarhynchus geraschmidtii Dollfus, 1974 (pre-adult)
Host: Vertebrata Selachii
Urolophus testaceus (Müller and Henle)
Location: apiral valve
Distribution: Australia, South
DOLLFUS, R.P., 1974a

Eutetrarhynchus leucocayanus (Shipley and Hornell, 1966) (larva)
Host: Invertebrata Crustacea
Metapenaeus affinis (Milne Edwards)
Location: digestive gland
Distribution: Bay of Bengal
CHANDRA, K.J., RAO, K.H. AND SHYAMSUNDARI, K., 1981
Metapenaeus brevisornis (Milne Edwards)
Location: digestive gland
Distribution: Bay of Bengal
CHANDRA, K.J., RAO, K.H. AND SHYAMSUNDARI, K., 1981
Metapenaeus monoceros (Fabricius, 1788)
Location: digestive gland
Distribution: Bay of Bengal
CHANDRA, K.J., RAO, K.H. AND SHYAMSUNDARI, K., 1981
Parapenaeus atylifera Alcock
Location: digestive gland
Distribution: Bay of Bengal
CHANDRA, K.J., RAO, K.H. AND SHYAMSUNDARI, K., 1981
Penaeus indicus (Milne Edwards)
Location: digestive gland
Distribution: Bay of Bengal
CHANDRA, K.J., RAO, K.H. AND SHYAMSUNDARI, K., 1981
Penaeus semisulcatus (de Haan)
Location: digestive gland
Distribution: Bay of Bengal
CHANDRA, K.J., RAO, K.H. AND SHYAMSUNDARI, K., 1981

Eutetrarhynchus lineatus (Linton, 1909) syn. Tentaculatia lineata (Linton, 1909) (adult)
REMARKS: Dollfus (1942) examined specimens mentioned by Shuler (1938) as Tentaculatia lineata (Linton) and transferred them into the genus Eutetrarhynchus.
Host: Vertebrata Selachii
Ginglymostoma cirratum (Bonnaterre)
Location: spiral valve
Distribution: Dry Tortugas, Florida
DOLLFUS, R.P., 1942
Eutetrarhynchus lineatus (Linton, 1909) syn. Tentacularia lineata (Linton, 1909) Shuler, 1938

REMARKS: Dollfus, 1942 considered that Rhynchobothrium lineatum Linton, 1909 was an eutetrarhynchid.

Host: Vertebrata Selachii

Ginglymostoma cirratum
Distribution: Tortugas, Florida
SHULER, R.H., 1938

Eutetrarhynchus litocephalus Heinz and Dailey, 1974 (adult)

Host: Vertebrata Selachii

Mustelus californicus
Location: spiral valve
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
Triakis semifasciata Girard, 1854
Distribution: Mexico
HEINZ, M.L. AND DAILEY, M.D., 1974

Eutetrarhynchus macrotrachelus Heinz and Dailey, 1974 (adult)

Host: Vertebrata Selachii

Mustelus californicus
Location: spiral valve
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Eutetrarhynchus ruficollis (Eysenhardt, 1829) (adult)

Host: Vertebrata Selachii

Mustelus canis (Mitchell, 1815)
Distribution: Mediterranean
DOLLFUS, R.P., 1969a
Mustelus mustelus (Linnaeus, 1758)
Distribution: Mediterranean
DOLLFUS, R.P., 1969a

Eutetrarhynchus ruficollis (Eysenhardt, 1829) (larva)

Host: Invertebrata Crustacea

Macropipus depurator (L.)
Location: body cavity
Distribution: Sète, France
VIVARES, C.P., 1971

Eutetrarhynchus ruficollis (Eysenhardt, 1829) (plerocercoid)

Host: Invertebrata Crustacea

Penaeus trisulcatus Leach
Location: hepatopancreas
HELDT, J.H., 1949

Eutetrarhynchus schmidti Heinz and Dailey, 1974 (adult)

Host: Vertebrata Selachii

Rhinobatos productus (Ayres)
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
Urolophus hallieri
Location: spiral valve
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
Eutetrarhynchus sp. (adult)
Host: Vertebrata

Dasyatis pastinaca L.
Location: spiral valve
Distribution: Bay of Bengal, northern
CHOUDURY, A. AND ROY, A., 1982

Dasyatis varnak
Location: spiral valve
Distribution: Bay of Bengal, northern
CHOUDURY, A. AND ROY, A., 1982

Rhinobatus granulatus
Location: spiral valve
Distribution: Bay of Bengal, northern
CHOUDURY, A. AND ROY, A., 1982

Eutetrarhynchus sp. of Sparks and Mackin (1957) SEE: Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (larva)

Eutetrarhynchus sp. (plerocercoid)
Host: Invertebrata

Busycon spiratum pyruloides (Say)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in muscular folds of valve of Leiblein

Crepidula fornicate (Linne)
Location: encysted in muscular folds of valve of Leiblein

Crepidula sp.
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977

Fasciolariella lilium hunteria (Perry)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in muscular folds of valve of Leiblein

Fasciolariella tulipa (Linne)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in muscular folds of valve of Leiblein

Melongena corona (Gmelin)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977

Pleuroplaca gigantea (Kiener)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977

Pleuroplaca gigantea (Kiener)
Location: encysted in muscular folds of valve of Leiblein
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Thais haemastoma canaliculata (Gray)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in muscular folds of valve of
Leiblein
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976
Pelecyphoda
Argopecten irradians concentricus (Say)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976
Atrina rigida (Lightfoot)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976
Atrina aeminuta (Lamarck)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976
Dosinis discus (Reeve)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976
Ensis spp.
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Eutetrarhynchus sp. (post-larva)
Host: Invertebrata Gastropoda
gastropod
Distribution: Gulf of Mexico
CAKE, E.W. JR., 1975
Pelecyphoda
pelecypod
Distribution: Gulf of Mexico
CAKE, E.W. JR., 1975
Eutetrarhynchus spinifer Dollfus, 1969 (larva, adult)
Host: Vertebrata Selachii
Myliobatis aquila (Linnaeus, 1758)
Location: spiral valve
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a
Eutetrarhynchus thalassius Kovacs and Schmidt, 1980 (adult)
Host: Vertebrata Selachii
Urolophus jamaicensis (Cuvier, 1817)
Location: spiral valve
Distribution: Discovery Bay, Jamaica
kovacs, k.j. and schmidt, g.d., 1980
Laciatorhynchus sp. in Pintner, 1893 syn. Grillotia sp. in Dollfus, 1942
SEE: Christianelliella minute (Van Beneden, 1849) (plerocercus)
**Parachristianella dimegacantha** Kruse, 1959

*Host: Invertebrata Crustacea*

*Panaeus duorarum* Burkenroad
- Location: digestive gland with blastocyst protruding through the wall of the digestive gland
- Distribution: Alligator Harbour, Apalachicola Harbour, Florida

**Parachristianella heteromegacanthus** Feigenbaum, 1975 (plerocercoid)

*Host: Invertebrata Crustacea*

*Panaeus brasiliensis* Latreille
- Distribution: Galveston Bay, Texas

**Parachristianella heteromegacanthus** Feigenbaum, 1975 (plerocercus)

*Host: Invertebrata Crustacea*

*Panaeus brasiliensis* Latreille
- Location: body, hepatopancreas
- Distribution: Sinaloa, Mexico

**Parachristianella monomegacantha** Kruse, 1959

*Host: Invertebrata Crustacea*

*Panaeus duorarum* Burkenroad
- Location: digestive gland with blastocyst protruding through the wall of the digestive gland
- Distribution: Gulf Coast, northern, Florida

**Rhinobatos planiceps** Garman, 1886
- Location: spiral valve, stomach
- Distribution: Antofagaster, Chile

**Rhinobatos productus** (Ayres)
- Location: spiral valve
- Distribution: California, southern
Parachristianella monomegacantha Kruse, 1959 (adult)

Host: Vertebrata

Selachii

Dasyatis americana Hildebrand and Shroeder
Distribution: Chesapeake Bay, Virginia
CAMPBELL, R.A. AND CARVAJAL, J., 1975

Dasyatis lata (Garean)
Location: spiral valve
Distribution: Hawaii

Rhinobatos productus (Ayres)
Location: spiral valve
Distribution: Seal Beach, California
MUDRY, D.R., DAILEY, M.D., 1971

Parachristianella monomegacantha Kruse, 1959 (plerocercus)

Host: Invertebrata Crustacea

Penaeus brasiliensis Latreille
Location: body, hepatopancreas
Distribution: Sinaloa, Mexico
FEIGENBAUM, D.L., 1975
Location: digestive gland
Distribution: Biscayne Bay, Florida
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976

Penaeus duorarum Burkenroad
Location: digestive gland
Distribution: Biscayne Bay, Florida
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976

Penaeus merguiensis de Man
Distribution: Norman river, Queensland
OWENS, L., 1980
Location: hepatopancreas
Distribution: Norman River, Queensland, northern
OWENS, L., 1981

Parachristianella monomegacantha Kruse, 1959 (plerocercus) syn.

Prochristianella sp. of Villella, Iversen and Sindermann (1970)

REMARKS: Feigenbaum and Carnuccio (1976) identified the
Prochristianella sp. as Parachristianella monomegacantha.

Host: Invertebrata Crustacea

Penaeus duorarum Burkenroad
Distribution: Biscayne Bay, Florida
VILLELLA, J.B., IVERSEN, E.S. AND SINDERMANN, C.J., 1970

Parachristianella monomegacantha Kruse, 1959 (procercoid)

Host: Invertebrata Crustacea

Tigriopus californicus
Distribution: California
MUDRY, D.R., DAILEY, M.D., 1971

Parachristianella monomegacantha (larva)

Host: Invertebrata Crustacea

Penaeus aztecus Ivae
Distribution: Gulf of Mexico, north western coast
CORKERN, C.C., 1978
Parachriatianella sp. (larva)
Host: Vertebrata
Osteichthyes

Chesacopaetta lugubris Alcock
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Parachriatianella sp. (plero cercoid)
Host: Invertebrata
Gastropoda

Busycon spiratum pyruloidea (Say)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977

Cantharurus cancellarius (Conrad)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Crepidula fornicate (Linna)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Crepidula sp.
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977

Fasciolaria lilium hunteria (Perry)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Fasciolaria tulipa (Linna)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Fasciolaria duplicatus (Say)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Polinices duplicatus (Say)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Pelecypoda

Anadara transversa (Say)
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Argopeanut ir randias concentricus (Say)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Atrina rigida (Lightfoot)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Atrina seminuda (Lamarck)
Distribution: Gulf of Mexico, north eastern
CAKE, E.W. JR., 1977
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Chione cancellata (Linna)
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Chione cancellate (Linné) (sp.1)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Donax variabilis (Say)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Dosinia discus (Reeve)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1977

Macrocallista maculata (Linné)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1977

Macrocallista nebulosa (Lightfoot)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1977

Macrocallista nimboea (Lightfoot)
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1977

Noetia ponderosa (Say)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1977

Raeta plicatella (Lamarck)
Location: encysted in intestine walls
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1976

Spiaula solidissima similis (Say)
Distribution: Gulf of Mexico, northern
CAKE, E.W. JR., 1977

Crustacea
Metapenaeus monoceros (Fabricius, 1788)
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Penaeus indicus Edwards, 1837
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Penaeus japonicus Tate, 1888
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Penaeus monodon Fabricius, 1798
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984
Parachristianella sp. (post-larva)
Host: Invertebrata Gastropoda
gastropod
Distribution: Gulf of Mexico
CAKE, E.W. JR., 1975
Pelecypoda
pelecypod
Distribution: Gulf of Mexico
CAKE, E.W. JR., 1975

Parachristianella trygonia Dollfus, 1946 (adult)
Host: Vertebrata Selachii
Trygon pastinaca (L.)
Location: spiral valve
Distribution: Concarneau
DOLLFUS, R.P., 1946b
Urobatis halleri (Cooper)
Distribution: California, southern
YOUNG, R.T., 1954a

Parachristianella trygonis Dollfus, 1946 (adult) syn. Christianella trygon-brucco of Euzet, 1956
REMARKS: Dollfus (1969a) examined Euzet's specimens and suggested that those described as Christianella trygon-brucco were Parachristianella trygonia.
Host: Vertebrata Selachii
Myliobatis aquila (Linnaeus, 1758)
Distribution: Sète
EUZET, L., 1956

Parachristianella trygonia Dollfus, 1946 (immature adult)
Host: Vertebrata Selachii
Myliobatis aquila (Linnaeus, 1758)
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a

Parachristianella trygonia Dollfus, 1946 (plerocercus)
Host: Invertebrata Crustacea
Upogebia stellata (Montagu, 1808)
Location: body cavity
Distribution: Arcachon
DOLLFUS, R.P., 1946b

Prochristianella aetobatis Robinson, 1959
Host: Vertebrata Selachii
Aetobatis tenuicaudatus (Hector)
Location: spiral valve
Distribution: New Zealand
ROBINSON, E.S., 1959b

Prochristianella fragilia Heinz and Dailey, 1974 (adult)
Host: Vertebrata Selachii
Rhinobatos productus (Ayres)
Location: spiral valve
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
Prochristianella heteracantha Dailey and Carvajal, 1976 (adult)

Host: Vertebrata Selachii
Rhinobatos plineces Garman, 1888
Location: spiral valve, stomach
Distribution: Antofagaster, Chile
DAILEY, M.D. AND CARVAJAL, J., 1976

Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (adult)
Host: Vertebrata Selachii
Dasyatis americana Hildebrand and Shroeder
Distribution: Chesapeake Bay, Virginia
CAMPBELL, R.A. AND CARVAJAL, J., 1975

Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (larva)
syn. Eutetrarhynchu9 sp. of Sparks and Mackin (1957)
REMARKS: Sparks and Mackin (1957) misidentified the trypanorhynch as Eutetrarhynchus sp. Sparks and Fontaine (1973) re-identified it as Prochristianella penaei, a synonym of P. hispida.
Host: Invertebrata Crustacea
Penaeus setiferus (L.)
Location: digestive gland
Distribution: Grand Isle, Louisiana
SPARKS, A.K. AND MACKIN, J.G., 1957

Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (oncosphere, procercoid, plerocercus)
Host: Invertebrata Crustacea
Copepods (unspecified)
Location: haemocoel
Distribution: United States, south eastern
OVERSTREET, R.M., 1983

Host: Invertebrata Crustacea
Penaeus duorarum Burkenroad
Location: hepatopancreas
Distribution: Atlantic, north west
COUCH, J.A., 1978
Penaeus setiferus (L.)
Location: hepatopancreas
Distribution: Gulf of Mexico
SPARKS, A.K. AND FONTAINE, C.T., 1973

Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (plerocercus)
Host: Invertebrata Crustacea
Penaeus brasiliensis Latreille
Location: digestive gland
Distribution: Biscayne Bay, Florida
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Penaeus duorarum Burkenroad
Location: digestive gland
Distribution: Biscayne Bay, Florida
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Penaeus setiferus L.
Location: hepatopancreas
Distribution: Louisiana, south eastern
Prochristianella hispida (Linton, 1890) Campbell and Carvajal, 1975
(plerocercus) syn. Prochristianella penaei Kruse, 1959

Host: Invertebrata Crustacea
Penaeus azte cus Ives
Location: digestive gland
Distribution: Galveston Bay, Gulf of Mexico, Western

ALDRICH, D.V., 1965
Location: digestive gland, tissues surrounding the
digestive gland, stomach
Distribution: Gulf Coast, northern, Florida

KRUSE, D.N., 1959

REMARKS: Campbell and Carvajal (1975) gave Prochristianella
enaei Kruse, 1959 as a synonym of Prochristianella hispida.

Host: Invertebrata Crustacea
Penaeus azte cus Ives
Location: hepatopancreas
Distribution: Louisiana, south eastern

RAGAN, J.C. AND ALDRICH, D.V., 1972

Penaeus duorarum Burkenroad
Location: digestive gland
Distribution: Biscayne Bay, Florida

VILLELLA, J.B., IVERSEN, E.S. AND SINDERMANN, C.J.,
1978
Location: digestive gland, tissues surrounding the
digestive gland, stomach
Distribution: Gulf Coast, northern, Florida

KRUSE, D.N., 1959

Penaeus setiferus L.
Location: digestive gland
Distribution: Galveston Bay, Gulf of Mexico, Western

ALDRICH, D.V., 1965

Penaeus setiferus (L.)
Location: digestive gland, tissues surrounding the
digestive gland, stomach
Distribution: Gulf Coast, northern, Florida

KRUSE, D.N., 1959

Prochristianella hispida (Linton, 1890) Campbell and Carvajal, 1975
(plerocercus) syn. Prochristianella penaei Kruse, 1959

Host: Invertebrata Crustacea
Penaeus azte cus Ives
Location: digestive gland, tissues surrounding the
digestive gland, stomach, various organs within
the cephalothoracic cavity
Distribution: Florida

HUTTON, R.F., SOGANDARES-BERNAL, F., ELDRED, B.,
INGLE, R.M. AND WOODBURN, K.D., 1959

Penaeus duorarum Burkenroad
Location: digestive gland, tissues surrounding the
digestive gland, stomach, various organs within
the cephalothoracic cavity
Distribution: Florida
<table>
<thead>
<tr>
<th><strong>Species</strong></th>
<th><strong>Location</strong></th>
<th><strong>Distribution</strong></th>
<th><strong>Remarks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Penaeus setiferus</em> L.</td>
<td>Digestive gland, tissues surrounding the digestive gland, stomach, various organs within the cephalothoracic cavity</td>
<td>Florida</td>
<td></td>
</tr>
<tr>
<td><em>Trachypenaeus constrictus</em> (Stimpson)</td>
<td>Digestive gland, tissues surrounding the digestive gland, stomach, various organs within the cephalothoracic cavity</td>
<td>Florida</td>
<td></td>
</tr>
<tr>
<td><strong>Prochristianella hispida</strong> (Linton, 1890) Campbell and Carvajal, 1975</td>
<td><strong>(plerocercus)</strong> syn. <em>Rhynchobothrium hispiderum</em> Linton, 1890 syn.</td>
<td><strong>REMARKS:</strong> Campbell and Carvajal (1975) recognised <em>Prochristianella penaei</em> Kruse, 1959 as a synonym of <em>Rhynchobothrium hispiderum</em>, described by Linton (1890) from <em>Dasyatis centroura</em> at Woods Hole, Massachusetts. <em>Rhynchobothrium</em> was listed as an invalid genus by Dollfus (1942) and Yamaguti (1959), so <em>R. hispiderum</em> became a species inquirenda. It is now a synonym of <em>Prochristianella hispiderum</em> (Linton, 1890) Campbell and Carvajal, 1975.</td>
<td><strong>Host:</strong> Invertebrata Crustacea <em>Penaeus brasiliensis</em> Latreille</td>
</tr>
<tr>
<td><strong>Prochristianella micracantha</strong> Carvajal, Campbell and Cornford, 1976</td>
<td><strong>(immature adult)</strong></td>
<td><strong>Host:</strong> Vertebrata Selachi</td>
<td><em>Dasyatis lata</em> (Garman)</td>
</tr>
</tbody>
</table>
Prochristianella minima Heinz and Dailey, 1974 (adult)
Host: Vertebrata Selachii
Platyrhinoides triseriata (Gordon and Gilbert)
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
Urolophus hallieri
Location: spiral valve
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Prochristianella mustelii Carvajal, 1974 (adult)
Host: Vertebrata Selachii
Mustelus mento Cope, 1877
Distribution: San Antonio, Antofagaster
CARVAJAL, J., 1974

Prochristianella penaei Kruse, 1959 SEE: Prochristianella hispida
(Linton, 1895) Campbell and Carvajal, 1975

Prochristianella penaei Kruse, 1959 SEE: Prochristianella hispida
(Linton, 1895) Campbell and Carvajal, 1975 (plerocercoid)

Prochristianella penaei Kruse, 1959 SEE: Prochristianella hispida
(Linton, 1895) Campbell and Carvajal, 1975 (plerocercus)

Prochristianella penaei Kruse, 1959 SEE: Prochristianella hispida
(Linton, 1895) Campbell and Carvajal, 1975 (pre adult and adult)

Prochristianella penaei (larva)
Host: Invertebrata Crustacea
Penaeus aztecus Ives
Distribution: Gulf of Mexico, north western coast
CORKERN, C.C., 1978

Prochristianella sp. in Hutton et al. (1959) SEE: Prochristianella
hispida (Linton, 1895) Campbell and Carvajal, 1975 (plerocercus)

Prochristianella sp. of Villella, Iversen and Sindermann (1970) SEE:
Parachristianella monomacantha Kruse, 1959 (plerocercus)

Prochristianella sp. (plerocercoid)
Host: Invertebrata Crustacea
Metapenaeus monoceros (Fabricius, 1788)
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984
Penaeus indicus Edwards, 1837
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984
Penaeus japonicus Bate, 1888
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984
Penaeus monodon Fabricius, 1798
Location: hepatopancreas
Distribution: Coast of Mozambique
REIMER, L.W., 1984
Prochristianella tenuispine (Linton, 1898)
Host: Vertebrata Selachii
Dasyatis sabina Le Sueur
Location: spiral valve
Distribution: Texas
HENSON, R.N., 1975

Prochristianella trygonicola Dollfus, 1946 (adult)
Host: Vertebrata Selachii
Trygon pastinaca (L.)
Location: spiral valve
Distribution: Concarneau
DOLLFUS, R.P., 1946b

Prochristianella trygonicola Dollfus, 1946 (plerocercus)
Host: Invertebrata Crustacea
Upogebia stellata (Montagu, 1808)
Location: body cavity
Distribution: Arcachon
DOLLFUS, R.P., 1946b


Tentacularia lineata (Linton, 1899) (adult) SEEn: Eutetrarhynchus lineatus (Linton, 1909)

Tentacularia lineata (Linton, 1899) Shuler, 1938 SEEn: Eutetrarhynchus lineatus (Linton, 1909)

Tetrarhynchus minuta Van Beneden, 1849 (in Nybelin, 1948) syn. Wageneria porrecta Lühe, 1902 SEEn: Christianella minuta (Van Beneden, 1849) (adult)
PARASITE FAMILY GILQUINIIDAE

Aporhynchus norvegicum (Olssen, 1868) Nybelin, 1918
Host: Vertebrata Selachii
Spinax spinax (L.)
Location: intestine
Distribution: Porcupine Bank
REES, G. AND LLEWELLYN, J., 1941

Aporhynchus norvegicum (Olssen, 1868) Nybelin, 1918 (adult)
Host: Vertebrata Selachii
Spinax spinax (L.)
Location: intestine
Distribution: Ireland, west
REES, G., 1941b

Gilquinia anteropua (Hart, 1936) (adult) syn. Tetrarhynchus anteropus Hart, 1936 syn. Gilquinia aequali (Fabricius, 1794) syn. Gilquinia tetrabothrium (Van Beneden, 1894) in Wardle (1933) syn. Gilquinia aequali (Fabricius, 1793) in Wardle (1933)
REMARKS: Hart (1936) considered that specimens described by Wardle (1932) as Gilquinia tetrabothrium (Van Beneden, 1849) and by Wardle (1933) as Gilquinia aequali (Fabricius, 1793) were synonyms of Tetrarhynchus anteropus Hart, 1936
REMARKS: Dollfus (1942) considered Tetrarhynchus anteropus to be a synonym of Gilquinia aequali (Fabricius, 1794) but Yamaguti (1959) considered it a separate species Gilquinia anteropus.
Host: Vertebrata Selachii
Squalus suckleyi (Girard)
Location: spiral valve
Distribution: Puget Sound
HART, J.F., 1936

Gilquinia sp. (larva)
Host: Vertebrata Osteichthyes
Micropogon opercularis (Desmarest)
Location: intestine
Distribution: Plate Estuary, Argentina
SURIANO, D.M., 1966

Trachurus trachurus capensis Castelnau
Distribution: Namibia, Coast of, Atlantic, South
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1970
Location: body cavity
KOVALEVA, A.A., 1970

Gilquinia sp. (larvae)
Host: Vertebrata Osteichthyes
Trachurus trachurus capensis Castelnau
Location: body cavity
Distribution: Africa, south west
KOVALEVA, A.A., 1968

Gilquinia sp. (plerocercoid)
Host: Vertebrata Osteichthyes
Ceratoscoelus maderensis (Lowe, 1839)
Distribution: Africa, north west
REIMER, L.W., 1975b
Parasites elongata (Brauer, 1866)
Distribution: Africa, north west
REIMER, L.W., 1975b
**Gilquinia aquali** (Fabricius, 1794)

**Host:** Vertebrata Selachii

*Squalus acanthias* (L.)

- **Distribution:** California, southern
  - HEINZ, M.L. AND DAILEY, M.D., 1974
- **Distribution:** Mediterranean
  - DOLLFUS, R.P., 1969a
- **Distribution:** North Sea
  - WILLEMSE, J.J., 1968
- **Distribution:** Pacific Ocean
  - PAPPAS, P.W., 1976
- **Location:** Intestine
- **Distribution:** British Isles
  - WILLIAMS, H.H., 1968
- **Location:** Spiral valve
- **Distribution:** Iceland
  - MANGER, B.R., 1972

*Squalus ferdinandi* Molina

- **Distribution:** Mediterranean
  - DOLLFUS, R.P., 1969a

**Gilquinia aquali** (Fabricius, 1794) (adult)

**Host:** Vertebrata Selachii

*Raja bicornutata*

- **Location:** Spiral valve anterior portion
- **Distribution:** Puget Sound

*Squalus acanthias* (L.)

- **Location:** Intestine
- **Distribution:** Newfoundland
  - THRELFALL, W., 1969
- **Distribution:** North Sea
  - ORLOWSKA, K., 1979
- **Location:** Spiral valve
- **Distribution:** Irish Sea
  - MCCULLOUGH, J.S. AND FAIRWEATHER, I., 1983

*Squalus suckleyi*

- **Location:** Spiral valve, anterior portion
- **Distribution:** Puget Sound

**Gilquinia aquali** (Fabricius, 1794) (immature adult)

**Host:** Vertebrata Selachii

*Centroscyllium granulosum* Günther, 1880

- **Distribution:** Coquimbo
  - CARVAJAL, J., 1974

**Gilquinia aquali** (Fabricius, 1794) (plerocercoid)

**Host:** Vertebrata Ostechthyes

*Gadus merlangus* L.

- **Location:** Eyes
- **Distribution:** North Sea
  - MACKENZIE, K., 1965

*Merlangius merlangus* (L.)

- **Location:** Eyes
- **Distribution:** North Sea
  - MACKENZIE, K., 1975
Gilquinia squaudi (Fabricus 1794) (plerocercus)
Host: Vertebrata Osteichthyes
Merlangius merlangus (L.)
Location: eye
Distribution: North Sea, northern
HISLOP, J.R.G. AND MACKENZIE, K., 1976

Tetrarhynchus anteropus Hart, 1936 syn. Gilquinia squaudi (Fabricius, 1794)
syn. Gilquinia tetrabothrium (Van Beneden, 1894) in Wardle (1933) syn.
Gilquinia squaudi (Fabricius, 1793) in Wardle (1933) SEE: Gilquinia anteropus (Hart, 1936) (adult)
<table>
<thead>
<tr>
<th>Parasite Family</th>
<th>Gymnorhynchidae</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gymnorhynchus cybiumi</strong></td>
<td>Chincholikar and Shinde, 1977 (larva)</td>
</tr>
<tr>
<td>Host: Vertebrata</td>
<td>Osteichthyes</td>
</tr>
<tr>
<td>Cybium guttatum</td>
<td>Location: intestinal wall, encysted in</td>
</tr>
<tr>
<td>Distribution: India, Maharashtra, Ratnagiri</td>
<td></td>
</tr>
<tr>
<td>CHINCHOLIKAR, L.N. AND SHINDE, G.B., 1977</td>
<td></td>
</tr>
</tbody>
</table>

| **Gymnorhynchus gigas** | (Cuvier, 1817) |
| Host: Vertebrata | Selachii |
| Isurus oxyrinchus Rafinesque, 1818 | Distribution: California, southern |
| HEINZ, W.L. AND DAILEY, M.D., 1974 |
| Osteichthyes | Brama raii (Bloch, 1791) |
| Distribution: Madrid, Malaga |
| LOPEZ-NEYRA, C.R., 1947 |
| Location: muscle |
| Distribution: British Isles |
| WILLIAMS, H.H., 1966 |

| **Gymnorhynchus gigas** | (Cuvier, 1817) (adult) |
| Host: Vertebrata | Selachii |
| Carcarodon lamia | Location: intestine |
| LOPEZ-NEYRA, C.R., 1947 |
| Cetrina vulpecula Cuv | Location: intestine |
| Distribution: Madrid, Malaga |
| LOPEZ-NEYRA, C.R., 1947 |
| Oxyrina pellmanii Bonaterre | Location: intestine |
| Distribution: Madrid, Malaga |
| LOPEZ-NEYRA, C.R., 1947 |

| **Gymnorhynchus gigas** | (Cuvier, 1817) (larva) |
| Host: Vertebrata | Osteichthyes |
| Otolithus argenteus (C.V.) | Location: body cavity |
| Distribution: Karachi coast |
| BILQEES, F.M. AND KAZHI, F.S., 1974 |

| **Gymnorhynchus gigas** | (Cuvier, 1817) (plerocercoid) |
| Host: Vertebrata | Osteichthyes |
| Diodon hystrix L. | Location: liver |
| Distribution: Shankyemughom, Trivandrum, India, Val ysthalai, Trivandrum, India |
| RADHAKRISHNAN, S. AND NAIR, N.B., 1986 |

| **Gymnorhynchus gigas** | (Cuvier, 1817) (plerocercus) |
| Host: Vertebrata | Osteichthyes |
| Brama raii (Bloch, 1791) | Location: muscle |
| Distribution: Africa, north west coast |
| SEYDA, W., 1976 |
| Brama rayi Schneid. | Location: musculature |
| Distribution: Genoa |
| BRIAN, A., 1952 |
Gymnorhynchus isuri Robinson, 1959 (adult)
Host: Vertebrata Selachii
   Isurus glaucus (Müller and Henle)
Location: spiral valve
Distribution: Makara, New Zealand, Cook Strait, New Zealand
ROBINSON, E.S., 1959b

Gymnorhynchus malleus (larva)
Host: Invertebrata Crustacea
   Penaeus indicus (Milne Edwards)
Location: digestive gland
Distribution: Waltair Coast, Bay of Bengal
CHANDRA, K.J. AND RAO, K.H., 1982

Gymnorhynchus (Molicola) horridus Goodsir, 1841
Host: Vertebrata Osteichthyes
   Thyrsites sp.
Location: musculature
Distribution: Amsterdam
JOYEUX, C. AND BAER, J.G., 1954

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (adult)
REMARKS: Dollfus (1942) recognised Floriceps elongatus (Rudolphi, 1819) as a synonym of Gymnorhynchus (Molicola) horridus Goodsir, 1841.
Host: Vertebrata Selachii
   Isuropsis glauca
Location: spiral intestine
Distribution: Japan
IWATA, S., 1939

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (larva)
Host: Vertebrata Osteichthyes
   Mola mola (L.)
Location: liver
Distribution: Japan
IWATA, S., 1939

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (plerocercus)
Host: Vertebrata Osteichthyes
   Mola mola (L.)
Location: liver
Distribution: Marché de Lorient, Morbihan
DOLLFUS, R.P., 1942

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (larva) syn. Tetrarhynchus elongatus Wagener, 1901
REMARKS: Dollfus 1942 considered Tetrarhynchus elongatus to be a synonym of Gymnorhynchus horridus.
Host: Vertebrata Osteichthyes
   Mola mola (L.)
Location: liver
Distribution: Newfoundland
THRELFALL, W., 1967
ROBINSON, E.S., 1959a
Mola mola (L.) syn. Orthogoricus mola (L.)
Location: encysted in liver, musculature

DOLLFUS, R.P., 1946a

Gymnorhynchus (Molicola) horridus Goodier, 1841 (plerocercus) syn.
Tetrarhynchus elongatus Wagener, 1901
REMARKS: Dollfus (1942) considered Tetrarhynchus elongatus to be a synonym of Gymnorhynchus horridus.
Host: Vertebrata
Osteichthyes
Mola mola (L.)

THRELFALL, W., 1967
Gymnorhynchus (Holicola) thyrsitae Robinson, 1959
Host: Vertebrata
Osteichthyes
Thyrsites atun (Euphrasen, 1791)
Distribution: New Zealand, Australia
KOROTAEVA, V.D., 1971
Location: muscle
Distribution: Cape Campbell, New Zealand, Cook Strait, New Zealand
ROBINSON, E.S., 1959b
Location: musculature
Distribution: New Zealand
VALOVA, V.N., 1976
Location: ventral muscle mass, dorsal muscle mass
Distribution: eastern Cook Strait, New Zealand
MEHL, J.A.P., 1978

Gymnorhynchus (Molicola) thyrsitae Robinson, 1959 (plerocercus)
Host: Vertebrata
Osteichthyes
Thyrsites atun (Euphrasen, 1791)
Location: muscle mass
Distribution: sore of Island of Banks, New Zealand
KAGEI, W., KIHATA, M. AND ASANO, K., 1977

Gymnorhynchus sp.
Host: Vertebrata
Osteichthyes
Coridodax pullus (Bloch and Schneider, 1801)
Location: spine, around, skull, behind
Distribution: New Zealand
RITCHIE, L.D., 1969
H. ilisha (full name missing)
Location: coelom
Distribution: Chandpur, East Pakistan
ALI, M.Y., 1968
P. pengasius (full name missing)
Location: coelom
Distribution: Chandpur, East Pakistan
ALI, M.Y., 1968
S. pema (full name missing)
Location: coelom
Distribution: Chandpur, East Pakistan
ALI, M.Y., 1968
S. silondia (full name missing)
Location: coelom
Distribution: Chandpur, East Pakistan
ALI, M.Y., 1968
**Gymnorhynchus sp. (larva)**
- **Host:** Vertebrata Osteichthyes
- **Pama pana**
  - Location: viscera on the coelom, encysted on, free in the viscera
  - **RAHMAN, A.K.A., 1971**

**Molicola horridus (Goodair, 1841)**
- **Host:** Vertebrata Selachii
  - **Isurus oxyrinchus Rafinesque, 1810**
    - Distribution: California, southern
    - **HEINZ, M.L. AND DAILEY, M.D., 1974**
  - **Osteichthyes Masturus oxyuropterus (Bleeker)**
    - Location: liver
    - Distribution: Gulf of Mannar, Pudumadam, Indian Coast
    - **DEVARAJ, H., NAMMALWAR, P. AND THIAGARAJAN, T., 1976 [1981]**

**Molicola uncinatus (Linton, 1924)**
- **Host:** Vertebrata Selachii
  - **Alopia vulpinus (Bonnaterre)**
    - Distribution: California, southern
    - **HEINZ, M.L. AND DAILEY, M.D., 1974**

**Molicola uncinatus (Linton, 1924) (adult) syn. Rhynchobothrium uncinatum**
- Linton, 1924 syn. Floriceps uncinatus (Linton, 1924) Yamaguti, 1952
  - **REMARKS:** Yamaguti (1952) placed Rhynchobothrium uncinatum in the genus Floriceps. He later (1959) transferred it to the genus Molicola.
- **Host:** Vertebrata Selachii
  - **Vulpecula marina Valmont**
    - Location: spiral valve
    - Distribution: Taizi, Japan
    - **YAMAGUTI, S., 1952**

**Hyrmillorhynchus pearsoni (Southwell, 1929) Bilqees, 1986 (adult) syn. Tetrahynchus pearsoani Southwell, 1929**
- **REMARKS:** Bilqees described Myrmillorhynchus pearsoni n.g., n.comb., as the adult of Tetrahynchus pearsoani Southwell, 1929. Yamaguti (1959) listed T. pearsoani amongst those species of incorrect or doubtful generic diagnosis.
- **Host:** Vertebrata Selachii
  - **Myrmillo manazo (Bik.)**
    - Location: intestine
    - Distribution: Karachi coast
    - **BILQEEES, F.M., 1986**

**Myrmillorhynchus pearsoni (Southwell, 1929) Bilqees, 1986 (larva) syn. Tetrahynchus pearsoani Southwell, 1929**
- **REMARKS:** Bilqees (1986) i.e. described Tetrahynchus pearsoani as Myrmillorhynchus pearsoni.
- **Host:** Vertebrata Osteichthyes
  - **Otolithus argenteus (C.V.)**
    - Distribution: Karachi coast
    - **BILQEEES, F.M. AND KAZMI, F.S., 1974**
**Neogymnorhynchus platycephali** Bilqees and Shah, 1982 (plerocercus)

**REMARKS:** The absence of large hooks at the base of the tentacles distinguishes the genus *Neogymnorhynchus* Bilqees and Shah, 1982 from other genera in the family Gymnorhynchidae.

**Host:** Vertebrata  Osteichthyes

**Platycephalus scaber** (L.)

Location: encysted on the visceral mesenteries

Distribution: Karachi coast

BILQEES, F.M. AND SHAH, M., 1982

**Rhynchobothrium uncinatum** Linton, 1924 syn. *Floricepe uncinatus* (Linton, 1924) Yamaguti, 1952 SEE: *Molicola uncinatus* (Linton, 1924) (adult)

Tetrarhynchus elongatus Wagener, 1901 SEE: *Gymnorhynchus* (Molicola)

horridus Goodsir, 1841 (larva)

Tetrarhynchus elongatus Wagener, 1901 SEE: *Gymnorhynchus* (Molicola)

horridus Goodsir, 1841 (plerocercus)

Tetrarhynchus pearsoni Southwell, 1929 SEE: *Myrmillorhynchus pearsoni* (Southwell, 1929) Bilqees, 1988 (adult)

Tetrarhynchus pearsoni Southwell, 1929 SEE: *Myrmillorhynchus pearsoni* (Southwell, 1929) Bilqees, 1988 (larva)
PARASITE FAMILY  HEPATOXYLIDAE

Dibothriocephalus attenuatus (Rudolphi, 1819)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (plero cercoid)

Dibothriocephalus attenuatus (Rudolphi, 1819)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (post-larva)

Dibothriocephalus carcariae (Welch, 1876)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (post-larva)

Dibothriocephalus claviger (Leuckart, 1819)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (post-larva)

Dibothriocephalus grossus (Rudolphi, 1819)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (larva)

Dibothriocephalus grossus (Rudolphi, 1819)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (plerocercoid)

Dibothriocephalus squali La Martinère, 1797  SEE:  Hepatoxylon trichiuri (Holten, 1882) (adult)

Dibothriocephalus squali (La Martinère, 1797)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (larva)

Dibothriocephalus stenocephala Guiart, 1935  SEE:  Hepatoxylon trichiuri (Holten, 1882) (post-larva)

Hepatoxylon attenuatus (Rudolphi, 1819) (plerocercoid)

REMARKS: Dolfus (1942) considers Hepatoxylon attenuatus a synonym of H. trichiuri.
Host: Vertebrata Osteichthyes
Xiphias gladius Linnaeus, 1758
Location: stomach, mesenteries and serosa, intestine, mesenteries and serosa
Distribution: Atlantic, north west

Hepatoxylon grossum (Rudolphi)  SEE:  Hepatoxylon trichiuri (Holten, 1882) (post-larva)

Hepatoxylon megacephalum (Rudolphi, 1819) (adult)
Host: Vertebrata Selachii
Carcharodon carcharias (Linnaeus)
Location: spiral valve
Distribution: Tory Channel, New Zealand
ROBINSON, E.S., 1959a

Hepatoxylon megacephalum (Rudolphi, 1819) (post-larva)
Host: Vertebrata Selachii
Dalatius licha (Bonnaterre)
Location: body cavity
Distribution: Kaikoura Coast, New Zealand
ROBINSON, E.S., 1959a
Galeorhinus australis Macleay
Location: body cavity
Distribution: Cook Strait, New Zealand
ROBINSON, E.S., 1959a
Notorhynchus pectorosus (Garman)
Location: body cavity
Hepatoxylon aquali (?) Martiniere, 1797) **SEE:** Hepatoxylon trichiuri (Holten, 1802) (post-larva)

Hepatoxylon aquali Bosc, 1811 **SEE:** Hepatoxylon trichiuri (Holten, 1802) (post-larva)

Hepatoxylon aquali (Martin, 1797) in Heinz and Dailey, 1974 **SEE:** Hepatoxylon trichiuri (Holten, 1802)

Hepatoxylon trichiuri Host: Vertebrata Osteichthyes

*Salmo salar* L.  
Location: attached to or partially embedded in viscera  
Distribution: S.W. England, Godthaab, Greenland, Greenland, west, Miramichi River, New Brunswick, Margaree River, Nova Scotia, Chaleur Bay, Canada, Bay of Fundy, Canada  
PIPPY, J.H.C., 1969

Hepatoxylon trichiuri (Holten, 1802) Host: Vertebrata Selachii

*Leanes cornubica* (Gmelin)  
Location: stomach  
Distribution: British Isles  
WILLIAMS, H.H., 1969

Osteichthyes  

*Gadus viridus* L.  
Location: mesentery  
Distribution: British Isles  
WILLIAMS, H.H., 1969

Genypterus chilensis (Guenénot, 1848)  
Location: mesenteries  
Distribution: Talcahuano, Chile  
VERGARA, L.A. AND GEORGE-NASCIMENTO, M., 1982

Hippoglossus hippoglossus (L.)  
Location: mesentery  
Distribution: British Isles  
WILLIAMS, H.H., 1969

Lepidopus lex Phillips, 1932  
Distribution: New Zealand, Australia  
KOROTAEVA, V.D., 1971

Merluccius merluccius (L.)  
Location: mesentery  
Distribution: British Isles  
WILLIAMS, H.H., 1969

Ostorhinchus cornwalli  
Location: intestines  
Distribution: Great Australian Bight  
KOROTAEVA, V.D., 1974

*Salmo salar* L.  
Distribution: Labrador, Coastal  
HICKS, F.J. AND THRELFAU, W., 1973  
Location: stomach  
Distribution: tributaries of River Backwater, County Cork, Lake Curran, County Kerry, Ireland  
KANE, M.B., 1966
Hepatoxylon trichiuri (Holten, 1802) (adult) syn. Dibothriorynchus squali
La Martinère, 1797
Host: Vertebrata - Selachii
Isurus glaucus
Location: spiral valve
Distribution: Japan
IWATA, S., 1939

Hepatoxylon trichiuri (Holten, 1802) (larva)
Host: Vertebrata - Osteichthyes
Argentina elongata
Distribution: Antarctic
POIS, N.V., 1975

Gadus aeglefinus L.
Location: peritoneal cavity
Distribution: Iceland
BAER, J.G., 1962

Gadus callarias L.
Location: peritoneal cavity
Distribution: Iceland
BAER, J.G., 1962

Gadus vircea L.
Location: peritoneal cavity
Distribution: Iceland
BAER, J.G., 1962

Genypterus blacodes
Distribution: Antarctic
POIS, N.V., 1975

Hippoglossus maximus Nilsen
Location: peritoneal cavity
Distribution: Iceland
BAER, J.G., 1962

Lepidorhynchus denticulatus
Distribution: Antarctic
POIS, N.V., 1975

Macrurus australis
Distribution: Antarctic
POIS, N.V., 1975

Merluccius capensis Castelnau
Location: body cavity
Distribution: Namibia
KRZEPTOWSKI, M., 1982

"merluza"
Location: muscles
Distribution: Puerto Montt, Chile
TAGLE, I., 1951

Hepatoxylon trichiuri (Holten, 1802) (larva) syn. Dibothriorynchus grossum
(Rudolphi, 1819)
Host: Vertebrata - Osteichthyes
Gadus vircea L.
Location: coelom
Distribution: Irish Atlantic Slope
REES, G. AND LLEWELLYN, J., 1941

Mammalia
Homo sapiens
Location: anus, passed alive from
Distribution: Johannesburg
HEINZ, H.J., 1954
Hepatoxylon trichiuri (Holten, 1802) (larva) syn. Dibothriorchynchus sguali (La Martinière, 1797)
Host: Vertebrata Selachii
Prionace glauca (Linnaeus, 1758)
Location: stomach, liver
Distribution: Japan
IWATA, S., 1939

Hepatoxylon trichiuri (Holten, 1802) (metacestode)
Host: Vertebrata Osteichthyes
Salmo salar L.
Location: coelom
Distribution: River Lune, Lancashire
CHUBB, J.C., 1965

Hepatoxylon trichiuri (Holten, 1802) (plerocercoid)
Host: Vertebrata Agnatha
Geotria australis Gray
Location: coelom-
Distribution: Donnelly River, Australia, south western
LETHBRIDGE, R.C., POTTER, I.C., BRAY, R.A. AND HILLIARD, R.W., 1983
Osteichthyes
Gadus callarias L.
Location: coelom
Distribution: Iceland
REES, G., 1953
Genypterus blacodes
Location: muscles
Distribution: South Island, New Zealand, Campbell Island, New Zealand
GRABDA, J. AND SLOSARCZYK, W., 1981

Hippoglossus hippoglossus (L.)
Location: body cavity, mesenteries
Distribution: Atlantic, north east
RAE, B.B., 1958

Macrurus nova-zealandiae (Hector)
Location: body cavity
Distribution: South Island, New Zealand, Campbell Island, New Zealand, Auckland Island, New Zealand
GRABDA, J. AND SLOSARCZYK, W., 1981

Merluccius australis
Location: muscles
Distribution: South Island, New Zealand
GRABDA, J. AND SLOSARCZYK, W., 1981

Micromesistius australis
Location: muscles
Distribution: Campbell Island, New Zealand
GRABDA, J. AND SLOSARCZYK, W., 1981

Pollachius virens (L.) syn. Gadus virens
Location: all organs, liver, stomach, intestine
Distribution: Atlantic, north
HEINRICI, L., 1975
Hepatoxylon trichiuri (Holten, 1802) (plerocercoid) syn. Dibothriorchynchus attenuatus (Rudolphi, 1819)
Host: Vertebrata Osteichthyes
Xiphias gladius Linnaeus, 1758
Location: body cavity
Distribution: Nova Scotia
NIGRELLI, R.F., 1938

Hepatoxylon trichiuri (Holten, 1802) (plerocercoid) syn. Dibothriorchynchus grossum (Rudolphi, 1819)
REMARKS: Dibothriorchynchus grossum (Rudolphi) was recognised by Dollfus (1942) as a synonym of Hepatoxylon trichiuri.
Host: Vertebrata Selachii
Prionace glauca (Linnaeus, 1758)
Location: visceral cavity
Distribution: Chile, Caleta Cochoa
YANEZ, A.P., 1958

Hepatoxylon trichiuri (Holten, 1802) (plerocercoid) syn. Dibothriorchynchus grossum (Rudolphi, 1819)
Host: Vertebrata Osteichthyes
Gadus virens L.
Location: coelom
Distribution: Ireland, west
REES, G., 1941a

Hepatoxylon trichiuri (Holten, 1802) (plerocercus)
Host: Vertebrata Selachii
Prionace glauca (Linnaeus, 1758)
Location: body cavity, on serous membrane of stomach, liver
Distribution: Antofagaster
CARVAJAL, J., 1974

Hepatoxylon trichiuri (Holten, 1802) (post-larva)
Host: Invertebrata Cephalopoda
Architeuthis dux Steenstrup, 1857
Location: caecal portion of digestive tract
Distribution: White Bay, Newfoundland

Host: Vertebrata Selachii
Daenia kiakourae Whitley
Distribution: Kaikoura Coast, New Zealand
ROBINSON, E.S., 1959a
Galaeus glaucus Rondelet, 1554 syn. Squalus glaucus L. 1758
Location: liver
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942
Isurus glaucus (Müller and Henle)
Distribution: Bay of Islands, New Zealand
ROBINSON, E.S., 1959a

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*Isurus nasus* (Bonnaterre, 1788) *Lamna cornubica* (Gmelin, 1789)
Location: liver
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942

*Isurus oxyrinchus* Rafinesque, 1818 syn. *Oxyrhina* Spallanzanii (Rafinesque, 1818) Bonaparte, 1841
Location: liver
Distribution: Concarneau, Finistère, France, Cape Hadia, Morocco
DOLLFUS, R.P., 1942

*Prionace glauca* (Linnaeus, 1758)
Distribution: Kapiti Island, New Zealand
ROBINSON, E.S., 1959a
Location: liver
Distribution: Juan Fernandez Archipelago
CATTAN, P.E., CARVAJAL, J., TORRES, D. AND YANEZ, J.L., 1979

*Scomniosoma pacificum*
Location: attached to internal intestinal wall
Distribution: Curaco de Vélez, Chile
REYES PIRIANO, X, 1982

*Squalus acanthias* (L.)
Location: free in coelom
Distribution: Strangford Lough, Co. Down, Ireland
GOTTO, R.V., 1955

*Squalus acanthias* (Rondelet, 1554) L.1754 syn. *Acanthias vulgaris* Risso, 1826
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942

*Squalus lebruni* (Vaillant)
Distribution: Cape Campbell, New Zealand
ROBINSON, E.S., 1959a

*Torpedo fairchildi* Hutton
Distribution: Cape Campbell, New Zealand
ROBINSON, E.S., 1959a

*Osteichthyes*

*Cheilodactylus macropterus* (Bloch and Schneider)
Distribution: New Zealand
VOOREN, C.M. AND TRACEY, D., 1976

*Cyttus nova-zealandiae* (Arthur)
Location: body cavity
Distribution: Pallister Bay, New Zealand
ROBINSON, E.S., 1959a

*Gadus (Pollachius) viridens* L.
Location: on the liver
Distribution: La Rochelle, Coast of
DOLLFUS, R.P., 1942

*Genypterus blacodes* (Bloch and Schneider)
Location: body cavity
Distribution: Kapiti Island, New Zealand
ROBINSON, E.S., 1959a

*Genypterus blacodes* Schneider
Location: stomach
Distribution: Talcahuano, Chile
CATTAN, P.E., 1977

*Gerio aalona* (Gmelin)
Location: internal and external stomach walls
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942

*Katsuwonus pelamys* (L.)
Location: body cavity, stomach wall
Distribution: Atlantic
BUSSIERAS, J. AND BAUDIN-LAURENCIN, F., 1973

Lepidopus caudatus (Euphrasen)
Location: body cavity, pericardium, mesentery, swim bladder
Distribution: Castle Point, New Zealand
ROBINSON, E.S., 1959a

Macruronus novae-zealandiae (Hector)
Location: body cavity
Distribution: Cape Campbell, New Zealand
ROBINSON, E.S., 1959a

Oncorhynchus tschawytscha (Walbaum)
Location: abdominal cavity
Distribution: Curaco de Vélez, Chile
REYES PIRIANDO, X., 1982

Thunnus albacores (Bonnaterre, 1788)
Location: body cavity, stomach wall
Distribution: Atlantic
BUSSIERAS, J. AND BAUDIN-LAURENCIN, F., 1973

Thyrrites atun (Euphrasen, 1791)
Location: body cavity
Distribution: sore of Island of Banks, New Zealand
KAGEI, N., KIHATA, M. AND ASANO, K., 1977

Hepatoxylon trichiuri (Holten, 1802) (post-larva)
REMARKS: The child had been eating fish while on holiday in Maputo.
Host: Vertebrata Mammalia
Homo sapiens
Location: passed in faeces
FRIPP, P.J. AND HASON, P.R., 1983

Hepatoxylon trichiuri (Holten, 1802) (post-larva) syn. Dibothriorchus attenuatus (Rudolphi, 1819)
Host: Vertebrata Osteichthyes
Coryphaena hippurus Linnaeus
Location: stomach
Distribution: L’Ile Flores, Azores, Atlantic
GUIART, J., 1935a
Coryphaena sp.
Location: intestine wall
Distribution: Azores, west of, Atlantic
GUIART, J., 1935a

Hepatoxylon trichiuri (Holten, 1802) (post-larva) syn. Dibothriorchus carchariae (Welch, 1876)
Host: Vertebrata Selachii
Carcharias (Galeus) glaucus (Rond., 1554) Rafinesque, 1819
Location: abdominal cavity
Distribution: Strait of Gibraltar, Atlantic
GUIART, J., 1935a

Hepatoxylon trichiuri (Holten, 1802) (post-larva) syn. Dibothriorchus claviger (Leuckart, 1819)
Host: Vertebrata Osteichthyes
Coryphaena sp.
Location: stomach
Distribution: Azores, Atlantic
GUIART, J., 1935a
Hepatoxylon trichiuri (Holten, 1882) (post-larva) syn. Dibothriorhynchus stenocephales Guiart, 1935
Host: Vertebrata Osteichthyae
Coryphaena sp.
Location: intestinal wall
Distribution: Azores, Atlantic
GUIART, J., 1935a

Hepatoxylon trichiuri (Holten, 1882) (post-larva) syn. Hepatoxylon grossum (Rudolphi)
Host: Vertebrata Osteichthyae
Xiphias gladius Linnaeus, 1758
Location: swim bladder
Distribution: Roskilde fjord, Denmark
RASMUSSEN, E., 1973

Hepatoxylon trichiuri (Holten, 1882) (post-larva) syn. Hepatoxylon squali (? Martinire, 1797)
Host: Vertebrata Selachii
Prionace glauca (Linnaeus, 1758)
Location: body cavity
Distribution: Newfoundland
THRELFALL, W., 1969

Hepatoxylon trichiuri (Holten, 1882) (post-larva) syn. Hepatoxylon squali Bosc, 1811
Host: Vertebrata Selachii
Prionace glauca (Linnaeus, 1758)
Location: exterior of liver
Distribution: Humboldt Bay
PAPPAS, P.W., 1978

Hepatoxylon trichiuri (Holten, 1882) syn. Hepatoxylon squali (Martin, 1797)
in Heinz and Dailey, 1974
Host: Vertebrata Selachii
Alopias vulpinus (Bonnaterre)
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
PARASITE FAMILY  HORNELLIELLIDAE

Hornelliella annandalei (Hornell, 1912) Yamaguti, 1954 (adult) syn. Tetrarhynchus annandalei, Hornell, 1912

REMARKS: Yamaguti (1954) describes the family Hornelliellidae with a characteristic hermaphroditic vesicle. He places Hornelliella annandalei, originally described as Tetrarhynchus annandalei, in this family.

Host: Vertebrata  Selachii
Stegostoma tigrinum
Location: spiral valve
Distribution: Macassar, Celebes
YAMAGUTI, S., 1954

Hornelliella palasoorahi Zaidi and Khan, 1976 (adult)

Host: Vertebrata  Selachii
Scoliodon palasoorah (Cuvier)
Location: intestine
Distribution: Karachi, Arabian Sea
ZAIDI, D.A. AND KHAN, D., 1976

Tetrarhynchus annandalei, Hornell, 1912  SEE: Hornelliella annandalei (Hornell, 1912) Yamaguti, 1954 (adult)
PARASITE FAMILY LACISTORHYNCHIDAE

Eulacistorhynchus chiloocyllius Subhapradha, 1955 (adult)

REMARKS: Subhapradha (1955) erected the subfamily Eulacistorhynchidae and the genus Eulacistorhynchus to accommodate Eulacistorhynchus chiloocyllius.

Host: Vertebrata Selachii
Chiloscyllium griseum Müller and Henle
Location: spiral valve
Distribution: Madras Coast, India
SUBHAPRADHA, C.K., 1955

Grillotia acanthoscolex Rees, 1944 (adult)

Host: Vertebrata Selachii
Hexanchus griseus (Gmelin)
Location: intestine
Distribution: Porcupine Bank, Atlantic
REES, G., 1944

Grillotia angeli Dollfus, 1969 (immature adult)

Host: Vertebrata Selachii
Squatina squatina (L.)
Location: spiral valve
Distribution: Mediterranean
DOLLFUS, R.P., 1969a

Grillotia angeli Dollfus, 1969 (larva)

Host: Vertebrata Osteichthyes
Scomber acombrus l.
Location: visceral cavity outside the gut
Distribution: North Sea
MACKENZIE, K., 1982

Grillotia angeli Dollfus, 1969 (plero cercus)

Host: Vertebrata Osteichthyes
Scomber acombrus l.
Location: stomach wall, the outer surfaces of pyloric caeca, intestine
Distribution: Mevagissey Bay, Cornwall
MACKENZIE, K., 1982

Grillotia bothridiopunctata Dollfus, 1969 (larva)

Host: Vertebrata Osteichthyes
Caranx trachurus (L.)
Location: body cavity
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a

Grillotia branchii Shaharom and Lester, 1982 (metacestode)

Host: Vertebrata Osteichthyes
Scomberomorus commersoni (Lacépède)
Location: gill arches
Distribution: Brisbane, Australia, Pulau Ketam, Malaysia
SHAHAROM, F.M. AND LESTER, R.J.G., 1982
Grillotia dolichocephala (Guiart, 1935) (larva)

REMARKS: Dollfus (1942) was unable to comment on the validity of Grillotia dolichocephala (Guiart, 1935) without a more detailed description.

Host: Vertebrata
Selachii

Centroscymnus coelolepis Bocage and Capello, 1864
Location: skin, under
Distribution: S. Jorge, north, Cape Verde Isles, Atlantic
GUIART, J., 1935a

Grillotia dolichocephala (Guiart, 1935) (larva)

Host: Vertebrata
Selachii

Pseudotriakis microdon Capello, 1867
Location: musculature
Distribution: Sal, south west, Cape Verde Islands, Atlantic
GUIART, J., 1935a

Grillotia dollfusi Carvajal, 1971

Host: Vertebrata
Selachii

Raja chilensis Guichenot, 1848
Distribution: Anna Pink Bay, Chile
WHITTAKER, F.H., CARVAJAL, J.G. AND APKARIAN, R., 1982

Grillotia dollfusi Carvajal, 1971 (adult)

Host: Vertebrata
Selachii

Raja chilensis Guichenot, 1848
Location: spiral valve
Distribution: Chile
CARVAJAL, J., 1971

Grillotia dollfusi Carvajal, 1971 (plerocercus)

Host: Vertebrata
Osteichthyes

Merluccius gayi (Guichenot, 1848)
Distribution: Los Vilos and Constitución, Chile
CARVAJAL, J., CATTAN, P.E., CASTILLO, C. AND SCHATTE, P., 1979
Location: surface of gonads, serosal surface of intestine and liver
Distribution: Chile
CARVAJAL, J. AND CATTAN, P.E., 1978

Grillotia erinaceus (Van Beneden, 1858)

Host: Vertebrata
Selachii

Raja batis L.
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1966

Raja brachyura Lafont
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1966

Raja clavata L.
Location: intestine
Distribution: Irish Sea
REES, G. AND LLEWELLYN, J., 1941
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1966

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**Raja fullonica L.**
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1968

**Raja laevis Mitchell, 1817 syn. Raja stabuliformis**
Garman, 1913
Distribution: Magdalen Islands, Gulf of St. Lawrence
MYERS, B.J., 1959

**Raja micro-ocellata Montagu**
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1968

**Raja miraletus L. 1758**
Distribution: Arcachon
DOLLFUS, R.P., 1946b

**Raja naevus Müller and Henle, 1841**
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1968
Location: spiral intestine
Distribution: Aberdeen, North Sea, Plymouth, English Channel
MCVICAR, A.H., 1979

**Raja ocellata Mitchell, 1815**
Location: spiral valve
Distribution: Buzzard’s Bay, Massachusetts
SIMMONS, J.E., 1961

**Raja ocellata Mitchell, 1815 syn. Raja diaphanes**
Garman, 1913
Distribution: Magdalen Islands, Gulf of St. Lawrence
MYERS, B.J., 1959

**Raja oxyrhynchus L.**
Location: intestine
Distribution: Irish Atlantic Slope
REES, G. AND LLEWELLYN, J., 1941
Location: intestine, mesentery
Distribution: British Isles
WILLIAMS, H.H., 1968

**Raja radiata Donovan**
Distribution: Iceland
BAER, J.G., 1962

**Ray**
Location: spiral valve
Distribution: Irish Sea
HALTON, D.W. AND MCKERR, G., 1979

**Osteichthyes**

**Limanda aspera** (Pallas)
Distribution: Far Eastern seas
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

**Melanogrammus aeglefinus** (L.)
Location: mesenteries
Distribution: Scotian Gulf, Canada
SCOTT, J.S., 1981

**Solea solea**
Distribution: Porto-Lago, Aegean Sea
PAPOUTSOGLOU, S.E. AND PAPAPARASKEVA-PAPOUTSOGLOU, E.G., 1977

**Trachurus trachurus trachurus L.**
Distribution: Atlantic
Grillotia erinaceus (Van Beneden, 1858) (?) (tentative identification) syn. Tetrarhynchus erinaceus Van Beneden

REMARKS: Tetrarhynchus erinaceus Van Beneden, 1858 is accepted (Dollfus, 1942) (Rae, 1958) (Jones, 1978) as a synonym of Grillotia erinaceus.

Host: Vertebrata Osteichthyes

Selachii

Grillotia erinaceus (Van Beneden, 1858) (adult)

Host: Vertebrata Selachii

Raja clavata L.

Location: musculature

Distribution: Norway, coast of

Kahl, W., 1937

Selachii

Grillotia erinaceus (Van Beneden, 1858) (larva)

Host: Vertebrata Selachii

Centrophorus squamosus (Gmelin)

Location: coelom

Distribution: Porcupine Bank, Atlantic

Rees, C. AND Llewellyn, J., 1941

Raja naevus Müller and Henle

Location: intestine wall

Distribution: Porcupine Bank

Rees, C. AND Llewellyn, J., 1941

Osteichthyes

Clupea harengus L., 1758

Location: mesenteries, pyloric caeca, stomach wall

Distribution: Gulf of Maine, Cape Cod

Sindermann, C.J., 1957

Conger conger

Distribution: South Devon, British Isles

Baylis, H.A., 1939

Cottus bubalis Euphrasen

Location: stomach wall

Distribution: Aberystwyth, rock pools, Wales

Rees, C., 1945

Gadus merlangus L.

Distribution: South Devon, British Isles

Baylis, H.A., 1939

Location: stomach wall

Distribution: Irish Sea

Rees, C. AND Llewellyn, J., 1941

Glyptocephalus cynoglossus (L.)

Location: stomach wall

Distribution: Porcupine Bank

Rees, C. AND Llewellyn, J., 1941

Merluccius bilinearis

Distribution: Atlantic, north west

Gaeyskaya, A.V. AND Umndva, B.A., 1977

Odontogadus merlangus euxinus (Nordman)
Distribution: Black Sea
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Pleuronectes platessa L.
Location: stomach wall
Distribution: Irish Atlantic Slope
REES, G. AND LLEWELLYN, J., 1941
Scophthalmus rhombus
Distribution: South Devon, British Isles
BAYLIS, H.A., 1939
Theragra chalcogramma (Pallas, 1811)
Distribution: Kamchatka
MAMAEV, Y.L. AND BAEVA, O.M., 1963
Trachurus trachurus trachurus L.
Distribution: North Sea, Atlantic, north
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1985b

Grillotia erinaceus (Van Beneden, 1858) (larva; tentative identification)
Host: Vertebrata
Sebastes mentella Trav
Location: mesenteries lining the body cavity or supporting the viscera
Distribution: Atlantic, North
JONES, D.H., 1978

Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tentacularia sp. of Hart 1936
Host: Vertebrata
Osteichthyes
Ophiodon elongatus Girard
Location: vertebrae, region of
Distribution: Puget Sound
HART, J.F., 1936

Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tetrarhynchus erinaceus
Host: Vertebrata
Osteichthyes
Lophius piscatorius Linnaeus, 1758
Location: musculature
Distribution: San Benedetto del Tronto, Italy
TESTI, F., 1965

Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tetrarhynchus erinaceus REMARKS: Tetrarhynchus erinaceus was widely accepted (Dollfus, 1942) (Jones, 1978) as a synonym of Grillotia erinaceus.
Host: Vertebrata
Osteichthyes
Sebastes marinus (L.)
Location: musculature
LULING, K.H., 1952

Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tetrarhynchus erinaceus REMARKS: Lüling (1951) considered that the larval trypanorhynchs found by Kahl (1937) were specimens of Grillotia (=Tetrarhynchus) erinaceus.
Host: Vertebrata
Osteichthyes
Sebastes marinus (L.)
Location: musculature
Distribution: Norway, Coast of
LULING, K.H., 1951
Grillotia erinaceus (Van Beneden, 1858) (plerocercoid)

REMARKS: Lubieniecki (1976) commented on the possibility of previous identifications of Grillotia erinaceus being misidentifications of Grillotia pseudoerinaceus.

**Host:** Vertebrata Osteichthyes

**Gadus morhua** L.
- **Location:** oesophagus, stomach, pyloric caeca, intestine
- **Distribution:** North Sea
  LUBIENIECKI, B., 1976

**Grillotia erinaceus** (Van Beneden, 1858) (plerocercoid)

**Host:** Vertebrata Osteichthyes

**Hippoglossus hippocampus** (L.)
- **Location:** throughout the fish
- **Distribution:** Atlantic, north east
  RAE, B.B., 1958

**Melanogrammus aeglefinus** (L.)
- **Location:** oesophagus, stomach, pyloric caeca, intestine
- **Distribution:** North Sea
  LUBIENIECKI, B., 1976

**Merlangius merlangus** (L.)
- **Location:** musculature of pyloric stomach, perivisceral cavity, posterior of
- **Distribution:** Isle of Man, British Isles
  SHOTTER, R.A., 1976

**Odontogadus merlangus** L.
- **Location:** body cavity, viscera
- **Distribution:** Isle of Man, British Isles
  SHOTTER, R.A., 1973

**Pollachius virens** (L.)
- **Location:** oesophagus, stomach, pyloric caeca, intestine
- **Distribution:** North Sea
  LUBIENIECKI, B., 1976

**Trigla gurnardus** (L.)
- **Location:** body cavity
- **Distribution:** Shetland Islands
  DUNIEC, H., 1980

**Witching**
- **Location:** stomach wall, body cavity
  MCKERR, C., 1978

**Grillotia erinaceus** (Van Beneden, 1858) (plerocercus)

**Host:** Vertebrata Selachii

**Raja clavata** L.
- **Distribution:** Concarneau, Finistère
  DOLLFUS, R.P., 1942

**Raja maculata** Montagu 1815 **Raja montagui** Fowler 1916
- **Location:** mesentery, peritoneum
- **Distribution:** Concarneau, Finistère
  DOLLFUS, R.P., 1942

**Raja neivus** MÖLLER and Henle, 1841
- **Distribution:** SS "Président Théodore Tissier" St.85, 3-1-1934
  DOLLFUS, R.P., 1942
Reje sp.
Distribution: Arcachon, Gironde
DOLLFUS, R.P., 1942
Osteichthyes

Clupea harengus L., 1758
Location: stomach wall, encysted
Distribution: Massachusetts, Woods Hole
DOLLFUS, R.P., 1956

Gadus morhua L.
Location: mesentery
Distribution: New Brunswick, Atlantic, north west
APPY, R.G. AND BURT, M.D.B., 1982
APPY, R.G. AND BURT, M.D.B., 1982

Melanogrammus aeglefinus (L.)
Location: body cavity
Distribution: North Sea
LUBIENIECKI, B., 1977

Mullus surmuletus L.
Location: stomach wall
Distribution: Bay of Biscay
DOLLFUS, R.P., 1942

Trigle sp.
Location: mesentery, peritoneum
Distribution: Concarneau, Finistère
DOLLFUS, R.P., 1942

Grillotia erinaceus (Van Beneden, 1858) (ploercercus) tentative identification
Host: Vertebrata
Osteichthyes
Melanoglaes ventralis Barnard, 1941
Location: body cavity
Distribution: Kayar
DOLLFUS, R.P., 1968

Grillotia heptanchi (Vaullegeard, 1899) (adult)
Host: Vertebrata
Selachii
Hexanchus griseus (Bonnaterre, 1788)
Distribution: Chile
CARVAJAL, J., 1974
Location: spiral valve
Distribution: Chile
CARVAJAL, J., 1971
Notorhynchus pectorosus (Germain)
Location: spiral valve
Distribution: Cook Strait, New Zealand
ROBINSON, E.S., 1959a

Grillotia heptanchi (Vaullegeard, 1899) (larva)
Host: Vertebrata
Osteichthyes
"merluza"
Location: muscles
Distribution: Puerto Montt, Chile
TAGLE, I., 1951
Molva dipterygia (Pennant, 1764)
Location: musculature
Distribution: Rockall, North Sea
DOLLFUS, R.P., 1975b

Sciaena coiter
Location: abdominal cavity in cloacal region
Distribution: Burma, Rangoon, estuarine
KYAW-MYINT, 1968

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<table>
<thead>
<tr>
<th>Species</th>
<th>Host</th>
<th>Location</th>
<th>Distribution</th>
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</thead>
<tbody>
<tr>
<td><em>Grillotia heptanchi</em> (Vaullegeard, 1899) (plerocercoid)</td>
<td><em>Vertebrata</em></td>
<td>Merluccius merluccius (L.)</td>
<td>Location: supra-orbital lateral line canal</td>
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<td>Distribution: British Isles, west coast</td>
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<td>Theragra chalcogramma (Pallas, 1811)</td>
<td>Location: cephalic canals</td>
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<td></td>
<td>Distribution: Strait of Georgia, British Columbia, Pacific Ocean, north eastern, West Coast, British Columbia, Pacific Ocean, north eastern</td>
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<tr>
<td><em>Grillotia heptanchi</em> (Vaullegeard, 1899) (plerocercoid)</td>
<td><em>Vertebrata</em></td>
<td>Genypterus chilena (Guichenot, 1848)</td>
<td>Location: musculature</td>
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<td></td>
<td>Distribution: Puerto Montt, Chile</td>
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<tr>
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<td></td>
<td>Macruronus magellanicus</td>
<td>Location: viscera and coelomic cavity</td>
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<td></td>
<td>Distribution: Puerto Montt, Chile</td>
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<tr>
<td></td>
<td></td>
<td>Merluccius polylepsis</td>
<td>Location: musculature</td>
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<td>Distribution: Puerto Montt, Chile</td>
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<td>Distribution: Puget Sound</td>
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<td>HART, J.F., 1936</td>
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<tr>
<td><em>Grillotia microthrix</em> Dollfus, 1969 (plerocercoid)</td>
<td><em>Vertebrata</em></td>
<td>Torpedo nobiliana Bonaparte</td>
<td>Distribution: Mediterranean, Sète</td>
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<td>DOLLFUS, R.P., 1969a</td>
</tr>
<tr>
<td><em>Grillotia minor</em> Guiart, 1935 (larva)</td>
<td><em>Vertebrata</em></td>
<td>Lepidorhinus aquamocus (Bonnaterre, 1788)</td>
<td>Location: under peritoneum</td>
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<td></td>
<td>Distribution: Bay of Biscay</td>
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<td>GUIART, J., 1935a</td>
</tr>
</tbody>
</table>
Grillotia musculosa (Hart, 1936) Dollfus, 1942 (adult) syn. Tentacularia musculosa Hart, 1936
Host: Vertebrata Selachii
Raja rhina (Jordan and Gilbert)
Location: spiral valve
Distribution: Puget Sound
HART, J.F., 1936

Grillotia musculicola (Yamaguti, 1934) (larva) syn. Pintneriella musculicola Yamaguti, 1934
REMARKS: Yamaguti (1959) transferred Pintneriella musculicola to the genus Grillotia.
Host: Vertebrata Osteichthyes
Epinephelus akaara
Location: flesh
Distribution: Tarumi, Kobe, Japan
YAMAGUTI, S., 1952

Grillotia (Paragrillotia) rowei Campbell, 1977 (immature adult)
Host: Vertebrata Selachii
Bethyraja richardsoni (Garrick, 1961)
Location: spiral valve
Distribution: Hudson Submarine Canyon, Atlantic, north west
CAMPBELL, R.A., 1977

Grillotia (Paragrillotia) rowei Campbell, 1977 (larva)
Host: Vertebrata Osteichthyes
Coryphaenoides (Chalinura) carapinus (Goode and Bean, 1883)
Distribution: New York Bight
Coryphaenoides (Nematonurus) armatus (Hector, 1875)
Distribution: New York Bight

Grillotia (Paragrillotia) rowei Campbell, 1977 (plerocercus)
Host: Vertebrata Osteichthyes
Coryphaenoides (Chalinura) leptolepis Gunther, 1877
Location: encysted in liver, mesenteries, tunica serosa of stomach, pyloric caeca, intestine
Distribution: Hudson Submarine Canyon, Atlantic, north west
CAMPBELL, R.A., 1977
Coryphaenoides (Lionurus) carapinus Goode and Bean, 1883
Location: encysted in liver, mesenteries, tunica serosa of stomach, pyloric caeca, intestine
Distribution: Hudson Submarine Canyon, Atlantic, north west
CAMPBELL, R.A., 1977
Coryphaenoides (Nematonurus) armatus (Hector, 1875)
Location: encysted in liver, mesenteries, tunica serosa of stomach, pyloric caeca, intestine
Distribution: Hudson Submarine Canyon, Atlantic, north west
CAMPBELL, R.A., 1977
Grillotia (Paragrillotia) ai_monai Dollfus, 1969 (adult)
Host: Vertebrata Selachii
Ginglymostoma cirratum
Distribution: Florida
BUTEAU, JR., G.H., SIMMONS, J.E., FAIRBAIRN, D., 1969

Grillotia (Paragrillotia) ai_monai Dollfus, 1969 (adult)
REMARKS: The subgenus Paragrillotia described by Dollfus (1969b) showed no demarcation between the rows of principal hooks and the chainette.
Host: Vertebrata Selachii
Ginglymostoma cirratum (Gaelin, 1788)
Location: alimentary canal
Distribution: Florida, Sarasota
DOLLFUS, R.P., 1969b

Grillotia perelica (Shuler, 1938) Dollfus, 1942
Host: Vertebrata Selachii
Carcharhinus sp.
Location: spiral valve
Distribution: Madras Coast, India
SUBHAPRADHA, C.K., 1955

Grillotia perelica (Shuler, 1938) Dollfus, 1942 (adult)
Host: Vertebrata Selachii
Carcharhinus platyodon (Poey)
Location: spiral valve
Distribution: Bermuda
REES, G., 1969

Grillotia perelica (Shuler, 1938) Dollfus, 1942 (adult) syn. Tentacularia perelica Shuler, 1938
Host: Vertebrata Selachii
Hypoprion brevirostris Poey
Location: spiral valve
Distribution: Tortugas, Florida
SHULER, R.H., 1938

Grillotia (Progrillotia) pastinacea Dollfus, 1946 (adult)
Host: Vertebrata Selachii
Irygon pastinacea (L.)
Location: spiral valve
Distribution: Concarneau
DOLLFUS, R.P., 1946b

Grillotia pseuderinaceus Dollfus, 1969 (immature adult)
Host: Vertebrata Selachii
Raja oxyrhynchus L.
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a

Grillotia recurvispinis Dollfus, 1969 (immature adult)
Host: Vertebrata Selachii
Raja clavata L.
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a
Grillotia scolecina (Rudolphi, 1819) (larva)

REMARKS: Dollfus (1942) was unable to comment on the validity of Grillotia scolecina (Rudolphi, 1819) without further information.

Host: Vertebrata Selachii

Centroscyanus coelelepis Bocage and Capello, 1864
Location: skin, under
Distribution: S. Jorge, north, Azores, Atlantic
GUIART, J., 1935a

Grillotia smaris-gora (Wagener, 1854)

Host: Vertebrata Selachii

Squatina californica Ayres
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Grillotia smaris-gora (Wagener, 1854) Dollfus, 1946 (adult)

Host: Vertebrata Selachii

Squatina squatina (L.)
Location: spiral valve
Distribution: Concarneau Arcachon
DOLLFUS, R.P., 1946b

Grillotia smaris-gora (Wagener, 1854) (plerocercoid)

Host: Vertebrata Osteichthyes

Syndus lucioperca
Location: mesentery, spleen, stomach

Grillotia sp.

Host: Vertebrata Selachii

Raja clavata L.
Location: spiral valve
Distribution: St. Andrews Bay, Scotland
LAVERACK, M.S. AND BLACKLER, M., 1974

Raja naevus Möller and Henle, 1841
Location: spiral valve
Distribution: North Sea
WILLIAMS, H.H., 1968

Raja scabra
Location: spiral valve, intestine
Distribution: Baie de Chaleur region, Canada
HELLER, A.F., 1949

Grillotia sp. (adult)

Host: Vertebrata Selachii

Raja radiata Donovan
Location: spiral valve, tiers 1-3
Distribution: Scotland, waters
WILLIAMS, H.H., MCVICAR, A.H. AND RALPH, R., 1978

Grillotia sp. (encysted plerocercoid)

Host: Vertebrata Osteichthyes

Merluccius bilinearis
Location: intestinal wall, liver surface, mesenteries, stomach wall
Distribution: Raritan Bay, southern, New Jersey
MEYERS, T.R., 1978
Grillotia sp. (identified as G. heptanchi group by Dollfus, 1942)
Host: Vertebrata Osteichthyes
Cynoscion nebulosus (Cuvier)
CHANDLER, A.C., 1954

Grillotia sp. (larva)
Host: Vertebrata Osteichthyes
Genypterus blacodes
Location: muscles
Distribution: Campbell Island, New Zealand
GRABDA, J. AND SLOSARCZYK, W., 1981
Macruronus novae-zealandiae (Hector)
Location: muscles
Distribution: South Island, New Zealand
GRABDA, J. AND SLOSARCZYK, W., 1981
Platichthys flesus (L.)
Distribution: Scotland, Coast of Aberdeenshire
GIBSON, D.L., 1972

Grillotia sp. (plerocercoid)
Host: Vertebrata Osteichthyes
Micromesistius poutassou (Risso)
Location: visceral cavity
Distribution: Scotland, north and west coast of, Faroe Islands
MACKENZIE, K., 1979

Grillotia sp. (plerocercus)
Host: Vertebrata Osteichthyes
Lophius piscatorius Linnaeus, 1758
Location: in the thickness of the stomach wall
Distribution: La Rochelle, Charente-Maritime
DOLLFUS, R.P., 1942
Thunnus thynnus
Location: peritoneum
Distribution: Persian Gulf
TIGARI, M., RADHAKRISHNAN, C.V. AND HOWARD, B.R., 1975
Trachurus trachurus (L.)
Location: encysted on surface of stomach
Distribution: SS "Président Théodore Tissier" St.2, 24-11-1933
DOLLFUS, R.P., 1942
Trigla sp.
Location: body cavity
Distribution: Concarneau, Finistère
DOLLFUS, R.P., 1942

Grillotia spinossissima Dollfus, 1969 (larva, immature adult, adult)
Host: Vertebrata Selachii
Hexanchus griseus (Bonnaterre, 1788)
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a
Lacistorhynchus bulbifer (Linton, 1889)  SEE:  Lacistorhynchus tenuis (Van Beneden, 1858) (adult)

Lacistorhynchus sp.
Host: Vertebrata  Osteichthyes

Clupea harengus L., 1758
Location: surfaces of the pyloric caeca
Distribution: Scotland, north and west, North Sea
MACKENZIE, K., 1985

Morone saxatilis (Walbaum, 1792)
Location: muscle, encysted in
Distribution: California, Sacramento-Sn Joaquin delta
HENSLEY, G.H. AND NAHAS, F.M., 1975

Scromber scombrus L.
Distribution: Mediterranean

Dollfus, R.P., 1969a

Sebastodes diploprion
Distribution: Pacific, north eastern

Lacistorhynchus sp. (larva)
Host: Vertebrata  Osteichthyes

herring
Location: visceral cavity outside the gut
Distribution: Blüden area, North Sea
MACKENZIE, K., 1982

Lacistorhynchus sp. syn. Lacistorhynchus sp. of Kilejian and MacInnis, 1976
Host: Vertebrata  Selachii

Mustelus canis (Mitchell, 1815)
Distribution: Bodega Bay, California
KILEJIAN, A. AND MACINNIS, A.J., 1976

Lacistorhynchus tenuis (Van Beneden, 1858) Pintner, 1913  SEE:
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)

Lacistorhynchus tenuis (Van Beneden, 1858) (Van Beneden, 1858)

Lacistorhynchus tenuis (Van Beneden, 1858)  SEE:  Lacistorhynchus tenuis (Van Beneden, 1858) (adult)

Lacistorhynchus tenuis (Van Beneden, 1858)
Host: Vertebrata  Selachii

Mustelus californicus
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Mustelus canis (Mitchell, 1815)
Distribution: Massachusetts
LUMSDEN, R.D., OAKS, J.A. AND ALWORTH, W.L., 1978
Location: spiral valve
LAURIE, J.S., 1961
PAPPAS, P.W., 1978
READ, C.P., 1957
Distribution: Buzzard's Bay, Massachusetts
SIMMONS, J.E., 1961
SIMMONS, J.E., 1969
Distribution: Massachusetts
LUMSDEN, R.D. AND BYRAM, J., III., 1967
Mustelus henlei (Gill)
Distribution: California, southern
HEinez, M.I. AND DAILEY, M.D., 1974

Rhinobatos productus (Ayres)
Distribution: California, southern, California, southern
HEinez, M.I. AND DAILEY, M.D., 1974

Rhinotriakis henlei
Location: spiral valve, rectal gland
Distribution: San Francisco

Triakis henlei (Gill, 1862)
Location: spiral valve, rectal gland
Distribution: Humboldt Bay
PAPPAS, P.W., 1970

Triakis semifasciata Girard, 1854
Distribution: California, southern
HEinez, M.I. AND DAILEY, M.D., 1974
Location: spiral valve
Distribution: Humboldt Bay
PAPPAS, P.W., 1970
Location: spiral valve, rectal gland
Distribution: Tomales Bay

Osteichthyes

Belone belone (L.)
Distribution: North Sea
WILLEMSE, J.J., 1968

Clupea harengus L., 1758
MACKenzie, K., 1978

Coridodax pullus (Bloch and Schneider, 1801)
Location: body wall
Distribution: New Zealand
RITCHe, L.D., 1969
RITCHe, L.D., 1969

Trachurus trachurus trachurus L.
Distribution: Atlantic
GAEVSKAYA, A.V. AND KOVALEV, A.A., 1980

Lacistorhynchus tenuis (Van Beneden, 1858) (adult)
Host: Vertebrata Selachii

Galeorhinus australis Macleay
Location: spiral valve, anterior portion
Distribution: Cook Strait, New Zealand
ROBINSON, E.S., 1959a

Location: spiral valve
Distribution: Ostende, Concarneau, Finistère, Lorient, La Rochelle
DOLLFUS, R.P., 1942

Mustelus canis (Mitchell, 1815)
Distribution: Massachusetts
LUMSDEN, R.D., 1965
LUMSDEN, R.D., 1966a
OAKS, J.A. AND LUMSDEN, R.D., 1971
Location: intestine
Distribution: Mediterranean, Sète
DOLLFUS, R.P., 1969a
Mustelus mustelus (Linnaeus, 1758)
Location: intestine
Distribution: Mediterranean, Sète
DOLFFUS, R.P., 1969a

Rhinotriakis bennellii
Distribution: California
VOGE, M., EDMONDS, H., 1969

Triakis maculata Kner and Steindachner, 1867
Distribution: Antofagasta
CARVAJAL, J., 1974

Triakis semifasciata Girard, 1854
Distribution: California
VOGE, M., EDMONDS, H., 1969
Distribution: California, southern
YOUNG, R.T., 1954a
Location: spiral valve
RISER, N.W., 1956
Distribution: Mission Bay, California
MUDRY, D.R., DAILEY, M.D., 1971
Distribution: Monterey Bay, California
SAKANARI, J. AND MOSER, M., 1985b

Lacistorhynchus tenuis (Van Beneden, 1858) (adult) syn. Lacistorhynchus bulbifer (Linton, 1889)
Host: Vertebrata Selachii
Eugaleus galeus (L., 1758) Gill, 1864
Location: spiral valve
Distribution: Azores, Atlantic
GUIART, J., 1935a

Lacistorhynchus tenuis (Van Beneden, 1858) (adult) syn. Lacistorhynchus tenuis (Van Beneden, 1858)
Host: Vertebrata Selachii
Mustelus canis (Mitchell, 1815)
Location: spiral valve
STUNKARD, H.W., 1981

Lacistorhynchus tenuis (Van Beneden, 1858) (immature adult)
Host: Vertebrata Selachii
Triakis semifasciata Girard, 1854
Location: spiral valve
Distribution: kept in laboratory
SAKANARI, J. AND MOSER, M., 1985b

Lacistorhynchus tenuis (Van Beneden, 1858) (immature adult) (experimental infection)
Host: Vertebrata Selachii
Triakis semifasciata Girard, 1854
Distribution: California
YOUNG, R.T., 1954b
**Lacistorhynchus tenuis** (Van Beneden, 1858) (larva)

**Host:** Vertebrata  
**Osteichthyes**

**Clupea harengus L., 1758**  
Location: mesenteries, pyloric caeca, stomach wall  
Distribution: Gulf of Maine, Cape Cod  
**SINDELMANN, C. J., 1957**

**Merluccius gayi peruanae** Gingsburg, 1954  
Location: mesenteries  
Distribution: Callao, Peru  
**DURAN, L. E. AND OLIVA, M., 1986**

**Trachurus trachurus trachurus L.**  
Distribution: North Sea, Atlantic, north  
**GAVISKAYA, A. V. AND KOVALEVA, A. A., 1986**

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**Lacistorhynchus tenuis** (Van Beneden, 1858) (metacestode)

**Host:** Vertebrata  
**Osteichthyes**

**Gambusia affinis**  
Location: body cavity, musculature  
Distribution: kept in laboratory  
**SAKANARI, J. AND MOSER, M., 1985b**

**Genyonemus lineatus** Ayres, 1855  
Distribution: Monterey Bay, California  
**SAKANARI, J. AND MOSER, M., 1985b**

**Morone saxatilis** (Walbaum, 1792)  
Location: mesentery, intestine, peritoneum, muscle, external surface, lesions  
Distribution: San Francisco Bay, California  
**MOSER, M., SAKANARI, J., WELLINGS, S. AND LINDSTROM, K., 1984**  
Location: surface of the fish  
Distribution: San Francisco Bay, Delta area  
**SAKANARI, J. A., MOSER, M. AND SIMMONS, J. E., 1983**

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**Lacistorhynchus tenuis** (Van Beneden, 1858) (plerrercercoid)

**Host:** Vertebrata  
**Osteichthyes**

**Clupea harengus pallasi** Valenciennes, 1847  
Distribution: San Francisco Bay, California  
**SAKANARI, J. AND MOSER, M., 1985a**

**Cymatogaster aggregata** Gibbons  
Distribution: California, southern  
**YOUNG, R. T., 1954a**  
Distribution: San Diego Bay, California  
**YOUNG, R. T., 1954b**

**Damalichthys vacca** (Girard, 1855)  
Distribution: San Francisco Bay, California  
**SAKANARI, J. AND MOSER, M., 1985a**

**Genyonemus lineatus** Ayres, 1855  
Distribution: San Francisco Bay, California  
**SAKANARI, J. AND MOSER, M., 1985a**

**Morone saxatilis** (Walbaum, 1792)  
Distribution: San Francisco Bay, California  
**SAKANARI, J. AND MOSER, M., 1985a**

**Platichthys stellatus** (Pallas)  
Location: intestine, stomach wall  
Distribution: Monterey Bay, California  
**ORCUTT, H. G., 1956**

**Synodus lucioceps**  
Location: liver, mesentery, skeletal, muscle  
<table>
<thead>
<tr>
<th>Host: Vertebrata</th>
<th>Location</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agnostomaus forsteri (Cuvier and Valenciennes)</td>
<td>body cavity</td>
<td>Waikane, New Zealand</td>
</tr>
<tr>
<td>Belone belone (L.)</td>
<td>Distribution: Mediterraneen</td>
<td>DOLLFUS, R.P., 1969a</td>
</tr>
<tr>
<td></td>
<td>Location: abdominal cavity</td>
<td>Pomeranian Bay</td>
</tr>
<tr>
<td>Belone belone (L.) syn. Belone vulgaris Fleu.</td>
<td>Location: on the liver and intestine</td>
<td>DOLLFUS, R.P., 1942</td>
</tr>
<tr>
<td>Clupea harengus L., 1758</td>
<td>Location: muscles, encysted in, viscera, encysted in</td>
<td>Massachusetts, Woods Hole</td>
</tr>
<tr>
<td>Gadus luscus L.</td>
<td>Location: under the tegument of gill cavity</td>
<td>DOLLFUS, R.P., 1942</td>
</tr>
<tr>
<td>Gadus pollachius L.</td>
<td>Location: on and encapsulated in liver and pyloric and external surfaces of stomach and external surface of intestine,</td>
<td>France, Coasts of, Roscoff, Finistere</td>
</tr>
<tr>
<td>Morone labrax (L.) syn. Labrax lupus Cuvier</td>
<td>Location: peritoneum</td>
<td>DOLLFUS, R.P., 1942</td>
</tr>
<tr>
<td>Scamberg acanther (L.)</td>
<td>Location: peritoneum, body cavity</td>
<td>Erquy, France, north coast, Goury and Aurigny</td>
</tr>
<tr>
<td>Thyreites ston (Euphrasen, 1791)</td>
<td>Location: body cavity, ribs, anterior extremity of</td>
<td>Petone Beach, New Zealand</td>
</tr>
<tr>
<td>Trachurus trachurus (L.)</td>
<td>Location: body cavity</td>
<td>Gijon, Oviedo</td>
</tr>
<tr>
<td>Trigla gurnardus (L.)</td>
<td>Location: body cavity</td>
<td>Concarneau, Finistere</td>
</tr>
<tr>
<td>Undetermined gadoid</td>
<td>Distribution: Dogger Bank</td>
<td>DOLLFUS, R.P., 1942</td>
</tr>
<tr>
<td>Zenopsis nebulosus (Schlegel)</td>
<td>Location: body cavity</td>
<td>Cape Campbell, New Zealand</td>
</tr>
<tr>
<td>Zeus faber L.</td>
<td>Distribution: French Coasts</td>
<td>DOLLFUS, R.P., 1942</td>
</tr>
</tbody>
</table>
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercous) syn. Lacistorhynchus tenuis (Van Beneden, 1858) Pintner, 1913
Host: Invertebrata Cephalopoda
Loligo pealeii (LeSueur, 1821)
Location: stomach washings
Distribution: Cape Cod area
STUNKARD, H.W., 1977

Lacistorhynchus tenuis (Van Beneden, 1858) (procercoid)
Host: Invertebrata Crustacea
Tigriopus californicus
Distribution: California
HUDRY, D.R., DAILEY, M.D., 1971
Location: kept in laboratory
SAKANARI, J. AND MOSER, W., 1985b
Tigriopus fulvus (Fisher)
Location: haemocoele
RISER, N.W., 1951
RISER, N.W., 1956

Lacistorhynchus tenuis (Van Beneden, 1858) syn. Lacistorhynchus tenuis (Van Beneden, 1858)
Host: Invertebrata Crustacea
Acartia tonsa
Distribution: sea water, experimental
STUNKARD, H.W., 1981

Lacistorhynchus sp. of Kilejian and MacInnis, 1976 SEE: Lacistorhynchus

Pintneriella musculicola Yamaguti, 1934 SEE: Grillotia musculicola
(Yamaguti, 1934) (larva)

Progrillotia dollfusi Carvajal and Rego, 1983
Host: Vertebrata Osteichthyes
Cynoscion striatus (Cuvier)
Location: visceral cavity
Distribution: Rio de Janeiro
CARYAJAL, J. AND REGO, A.A., 1983

Progrillotia louisemuzetii Dollfus, 1969 (immature adult)
Host: Vertebrata Selachii
Dasypatis violacea Bonaparte
Distribution: Mediterranean
DOLLFUS, R.P., 1969a

Tentacularia megabothridia Hart, 1936 syn. Grillotia heptanchi
(Vaullegeard, 1899) SEE: Grillotia megabothridia (Hart, 1936) (adult)

Tentacularia musculare Hart, 1936 SEE: Grillotia musculare (Hart, 1936)
Dollfus, 1942 (adult)

Tentacularia perelica Shuler, 1938 SEE: Grillotia perelica (Shuler, 1938) Dollfus, 1942 (adult)
Tentaculata sp. of Hart 1936  SEE: Grillotia erinaceus (Van Beneden, 1858) (larva)

Tetrarhynchus erinaceus Van Beneden SEE: Grillotia erinaceus (Van Beneden, 1858) (?) (tentative identification)

Tetrarhynchus erinaceus SEE: Grillotia erinaceus (Van Beneden, 1858) (larva)
PARASITE FAMILY  MIXODIGMATIDAE

Mixodigma leptaleum Dailey and Vogelbein, 1982 (adult)

REMARKS: Dailey and Vogelbein (1982) erected the family Mixodigmatidae for the species Mixodigma leptaleum which possesses some features of the Eutetrarhynchidae and the Dasyrhynchidae, and distinguishing features such as combined heteroacanthous and poeciloacanthous arrangements of hooks.

Host: Vertebrata  Selachii

"Megamouth"
Location: spiral valve
Distribution: Hawaii

DAILEY, M.D. AND VOGELBEIN, W., 1982
PARASITE FAMILY MUSTELICOLIDAE

Mustelicola woodsholei Dollfus, 1969 (adult)

REMARKS: Dollfus, 1969b described a new family, Mustelicolidae to contain the species Mustelicola woodsholei. The family belongs to the atypical Heterocanths.

Host: Vertebrata Selachii
Mustelus canis (Mitchell, 1815)
Location: alimentary canal
Distribution: Massachusetts, Woods Hole
DOLLFUS, R.P., 1969b
PARASITE FAMILY  OTOBOTHRIIDAE

**Diplootobothrium springeri** Chandler, 1942 (adult)
**Host:** Vertebrata  Selachii
**Platysqualus tudes** (Cuvier)
**Location:** spiral valve
**Distribution:** Florida, Gulf Coast
**CHANDLER, A.C., 1942**

**Diplootobothrium springeri** Chandler, 1942 (plerocercoid)
**Host:** Vertebrata  Osteichthyes
**Pogonias cromis** (Linnaeus)
**Location:** musculature, encysted in
**Distribution:** Texas, Avanas Bay
**SCHLICHT, F.G. AND MCFARLAND, W.N., 1967**

**Diplootobothrium tamiilnadensis** Reimer, 1980 (plerocercoid)
**Host:** Vertebrata  Osteichthyes
**Secutor ruconius** Buchanan-Hamilton
**Distribution:** Indian Ocean
**REIMER, L.W., 1980**

**Otobothrium arii** Bilqees and Shaukat, 1976 (plerocercoid)
**Host:** Vertebrata  Osteichthyes
**Arius serratus** (Day)
**Location:** encysted in head muscles and visceral mesenteries
**Distribution:** Karachi coast
**BILQEES, F.M. AND SHAUKAT, N., 1976**

**Otobothrium conglobatum** Khabata and Bal, 1953
**Host:** Vertebrata  Selachii
**Eelasmobranch sp.**
**Distribution:** Bombay
**KHAMBATA, F.S. AND BAL, D.V., 1953**

**Otobothrium crenacolle** Linton, 1890
**Host:** Vertebrata  Osteichthyes
**Neoscombrops annectens** Gilchrist
**Distribution:** Coast of Mozambique
**REIMER, L.W., 1984**

**Otobothrium crenacolle** Linton, 1890 (larva)
**Host:** Vertebrata  Osteichthyes
**Bagre bahiensis**
**Location:** peritoneum, mesenteries
**Distribution:** Alvarado, Veracruz, Mexico
**PALACIOS, N.M. AND BARROETA, L.F., 1967**
**Location:** peritoneum, muscles
**Distribution:** Alvarado, Veracruz, Mexico
**PALACIOS, N.M., 1963**
**Leptidotrigla natalensis** Gilchrist and Thompson
**Distribution:** Coast of Mozambique
**REIMER, L.W., 1984**
**Wallagonia attu**
**Location:** body wall under the peritoneum, encysted in
**Distribution:** Burma, Rangoon
**KYAW-MYINT, 1968**
Otobothrium crenacolle Linton, 1899 (larva)

REMARKS: O'Rourke does not state whether Otobothrium crenacolle was found in one or more of the named hosts.

Host: Vertebrata Osteichthyes Food fishes including Cynoscion regalis, Micropogon undulatus and Leiostomus xanthurus

Distribution: Maryland, Solomons
O'ROURKE, A.E., 1949

Otobothrium crenacolle Linton, 1899 (plerocercus)

Host: Invertebrata Cephalopoda

Loligo paeleii (LeSueur, 1821)
Location: stomach washings
Distribution: Cape Cod area
STUNKARD, H.W., 1977

Host: Vertebrata Osteichthyes

Acanthurus caeruleus Bloch and Schneider
Location: body cavity, intestine, surface of, stomach
Distribution: Bermuda
REES, G., 1969

Euthynnus aletteratus (Rafinesque, 1819)
Location: body cavity, intestine, surface of, stomach
Distribution: Bermuda
REES, G., 1969

Otobothrium cysticum (Mayer, 1842)

Host: Vertebrata Selachii

Dasybatis sp.

Distribution: Cameroons
DOLLFUS, R.P., 1942

Otobothrium cysticum (Mayer, 1842) (plerocercus)

Host: Vertebrata Selachii

Carcharinus melanopterus (Quoy and Gaimard)
Location: stomach wall
Distribution: Red Sea
DOLLFUS, R.P., 1942

Osteichthyes

Corvina nigra Cuvier
Location: peritoneum
Distribution: Cameroons
DOLLFUS, R.P., 1942

Dentex macrophthalmus Cuvier and Valenciennes
Location: intestine
Distribution: Castiglione, Algiers
DOLLFUS, R.P., 1942

Osteoleamus tetraedris Cope
Location: stomach wall
Distribution: French Congo
DOLLFUS, R.P., 1942

Reptilia

Chelone mydas L.
Location: stomach wall, external
Distribution: Port-Etienne, Mauritia
DOLLFUS, R.P., 1942
Otobothrium dipsacum Linton, 1897  
**SEE:** Otobothrium (Pseudotobothrium) dipsacum Linton, 1897

Otobothrium harpodoni Kotwal and Masurekar, 1978 (encysted larva)  
**Host:** Vertebrata Osteichthyes  
**Harpodon nehereus** (Ham-Buch)  
**Location:** muscles and visceral organs  
**Distribution:** Bombay  
**KOTWAL, V.P. AND MASUREKAR, V.B., 1978**

Johnius ruber (Bloch-Schn)  
**Location:** muscles and visceral organs  
**Distribution:** Bombay  
**KOTWAL, V.P. AND MASUREKAR, V.B., 1978**

Otobothrium ilisha (Southwell and Prashad, 1918) Goldstein, 1963  
(plerocercus) syn. Poecilancistrium ilisha (Southwell and Prashad, 1918) Dollfus, 1942  
**REMARKS:** Goldstein (1963) suggested that Poecilancistrium ilisha (Southwell and Prashad, 1918) should be placed in the genus Otobothrium.

**Host:** Vertebrata Osteichthyes  
**Hilsa hilsa**  
**GOLDSTEIN, R.J., 1963**

Otobothrium karachiensis Bilqees and Muslehuddin, 1976 (adult)  
**Host:** Vertebrata Selachii  
**Myrmillo manazo** (Bik.)  
**Location:** intestine  
**Distribution:** Karachi Coast  
**BILQEES, F.M. AND MUSLEHUDDIN, R., 1976**

Otobothrium kurisi Shields, 1985 (adult)  
**Host:** Vertebrata Selachii  
**Sphyrna lewini**  
**Location:** spiral valve  
**Distribution:** 400 m east of Campus Point, Santa Barbara, California  
**SHIELDS, J.D., 1985**

Otobothrium linstowi Southwell, 1912 (adult)  
**Host:** Vertebrata Selachii  
**Rhynchobatus djeddensis** (Forsk) Bleeker  
**Location:** spiral valve  
**Distribution:** Madras Coast, India  
**SUBHAPRADHA, C.K., 1955**

Otobothrium minutum Subhapradha, 1955 (adult)  
**Host:** Vertebrata Selachii  
**Carcharinus limbatus** (Müller and Henle)  
**Location:** spiral valve  
**Distribution:** Madras Coast, India  
**SUBHAPRADHA, C.K., 1955**

**Carcharhinus waibeehmi** Bleeker  
**Location:** spiral valve  
**Distribution:** Madras Coast, India  
**SUBHAPRADHA, C.K., 1955**
Otobothrium mugilis Hiscock, 1954
Host: Vertebrata Osteichthyes
Hilsa ilisha (Hamilton)
Location: coelom, mesentery
Distribution: Sind River
RIZVI, S.S.H., 1971

Otobothrium mugilis Hiscock, 1954 (plerocercus)
Host: Vertebrata Osteichthyes
Mugil cephalus L.
Location: gut mesentery
Distribution: Brisbane, Australia
HISCOCK, I.D., 1954

Netuma australis (Gunther)
Location: body wall, between peritoneum and musculature
Distribution: Brisbane, Australia
HISCOCK, I.D., 1954

Otobothrium penetrans Linton, 1907
Host: Vertebrata Selachii
Carcharhinus leucas (Müller and Henle, 1841)
Location: spiral valve
Distribution: Nicaragua
WATSON, D.E. AND THORSON, T.B., 1976

Carcharhinus limbatus (Müller and Henle)
Distribution: Tortugas, Florida
SHULER, R.H., 1938

Scoliodon terrae-novae (Richardson)
Distribution: Tortugas, Florida
SHULER, R.H., 1938

Otobothrium pephrikos Dollfus, 1969 (adult)
Host: Vertebrata Selachii
Sphyrna zygaena (L.)
Location: intestine
Distribution: Mediterranean
DOLLFUS, R.P., 1969a

Otobothrium propertasticum Dollfus, 1969 (adult)
Host: Vertebrata Selachii
Sphyrna zygaena (L.)
Location: intestine
Distribution: Mediterranean
DOLLFUS, R.P., 1969a

Otobothrium (Pseudotobothrium) dipsacum (Linton, 1897) Dollfus, 1942 syn. Otobothrium (Pseudotobothrium) insignis (Linton, 1905) Dollfus, 1942
REMARKS: Cruz-Reyes (1974) re-described Otobothrium (Pseudotobothrium) dipsacum and relegated Otobothrium (Pseudotobothrium) insignis as a synonym.
Host: Vertebrata Osteichthyes
Balistes polylepis Steindachner, 1876
Distribution: Mexico, Puerto Angel
CRUZ-REYES, A., 1974a
Otobothrium (Pseudotobothrium) dipsacum Linton, 1897 (plerocercus)

Host: Vertebrata Osteichthyes
Otoperca aurita (Valenciennes)
Location: encysted in gills
Distribution: Pointe Padron, Belgian Congo
DOLLFUS, R.P., 1942
Polynemus quadrifiliis Cuvier
Location: encysted in gills, encysted in musculature of head
Distribution: Pointe Padron, Belgian Congo
DOLLFUS, R.P., 1942

Otobothrium (Pseudotobothrium) dipsacum (Linton, 1897) (plerocercus) syn.
Pseudotobothrium dipsacum (Linton, 1897) in Ward (1954)

Host: Vertebrata Osteichthyes
Sphyraena barracuda (Walbaum)
Location: body cavity
Distribution: Miami
WARD, H.L., 1954

Otobothrium (Pseudotobothrium) dipsacum Linton, 1897 syn. Otobothrium dipsacum Linton, 1897

REMARKS: Dollfus (1942), Wardle and McLeod (1952) and Yamaguti (1959) recognised that Otobothrium dipsacum belonged to the subgenus Pseudotobothrium.

Host: Vertebrata Osteichthyes
Chelidonichthys kumu Lesson and Garnot
Location: body cavity
Distribution: East China Sea
YAMAGUTI, S., 1952

Otobothrium (Pseudotobothrium) linstowi (Southwell, 1912) (plerocercoid)

Host: Vertebrata Osteichthyes
Coryphaesopia cornuta (Kaup)
Distribution: Indian Ocean
REIMER, L.W., 1988

Otobothrium robustum Chandler, 1935 (larva)
Host: Vertebrata Osteichthyes
Eriscion nebulosus
Location: musculature
Distribution: Galveston Bay, Texas
CHANDLER, A.C., 1935b

Otobothrium septemspinigerens Khambata and Bal, 1953
Host: Vertebrata Selachii
Elaasmobranch sp.
Distribution: Bombay
KHAMBATA, F.S. AND BAL, D.V., 1953
Otobothrium sp. (larva)
Host: Vertebrata Osteichthyes
Trachynotus sp.
Location: encysted in body cavity
Distribution: Madras, India
ANANTARAMAN, S., 1963

Otobothrium vermicularia Khambata and Bal, 1953
Host: Vertebrata Selachii
Elasmobranch sp.
Distribution: Bombay
KHAMBATA, F.S. AND BAL, D.V., 1953

Poecilancistrium caryophyllum (Diesing, 1856) Dollfus, 1929 (adult)
Host: Vertebrata Selachii
Carcharhinus leucas (Müller and Henle, 1841)
BUTEAU, JR., G.H., SIMMONS, J.E., FAIRBAIRN, D., 1969
Distribution: Gulf of Mexico
GOLDSTEIN, R.J., 1963
Negaprion brevirostris (Poey, 1868)
Distribution: Gulf of Mexico
GOLDSTEIN, R.J., 1963

Poecilancistrium caryophyllum (Diesing, 1856) Dollfus, 1929 (larva)
Host: Vertebrata Osteichthyes
Sciaena antarctica Castelnau
Location: encysted in flesh
Distribution: McKenzie Bay, New South Wales, Richmond River, New South Wales
ROBINSON, E.S., 1965

Poecilancistrium caryophyllum (Diesing, 1856) Dollfus, 1929 (plerocercoid)
Host: Vertebrata Osteichthyes
Bairdiella chrysura (Lacépède)
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977
Cynoscion arenarius Ginsberg
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977
Cynoscion nebulosus (Cuvier)
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977
Distribution: Steinhatchee, Gulf of Mexico
Distribution: United States, north eastern coast,
Gulf of Mexico, northern
OVERSTREET, R.M., 1978b

Cynoscion notthus
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Leiostomus xanthurus Lacépède
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Leiostomus xanthurus Lacépède
Location: musculature
Distribution: Seahorse Key, Gulf of Mexico

Menticirrhus americanus (Linnaeus)
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977

Micropogon undulatus (Linnaeus)
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Micropogonias undulatus (Linnaeus)
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977

Pogonias cromis (Linnaeus)
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977

Sciaenops ocellata (Linnaeus)
Location: dorsal muscle masses, adjacent to the vertebral column and in the vicinity of the vent
Distribution: Texas, coast
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Umbrina coroides (Cuvier)
Location: musculature
Distribution: Palm Beach, Florida

Poecilancistrum caryophyllum (Diesing, 1858) Dollfus, 1929 (plerocercus)
Host: Vertebrata
Cynoccion nebulosus (Cuvier)
GOLDSTEIN, R.J., 1963
Cynoccion regulus
GOLDSTEIN, R.J., 1963
Micropogon undulatus (Linnaeus)
GOLDSTEIN, R.J., 1963
Poecilancistrium caryophyllum (Diesing, 1850) Dollfus, 1929 syn. Poecilancistrium gangeticum (Shipley and Hornell, 1906) syn. Otobothrium robustum (Chandler, 1935)

REMARKS: Goldstein (1963) suggested that the genus Poecilancistrium is monotypic and that Poecilancistrium gangeticum (Shipley and Hornell, 1906) and Poecilancistrium robustum (Chandler, 1935) are synonyms of Poecilancistrium caryophyllum (Diesing, 1850) Dollfus, 1942.

Host: Vertebrata Osteichthyes
Leiostomus xanthurus Lacépède
GOLDSTEIN, R.J., 1963

Poecilancistrium gangeticum (Shipley and Hornell, 1906) syn. Otobothrium robustum (Chandler, 1935) SEE: Poecilancistrium caryophyllum (Diesing, 1850) Dollfus, 1929

Poecilancistrium ilisha (Southwell and Prashad, 1918) Dollfus, 1942
Host: Vertebrata Osteichthyes
Hilsa ilisha (Hamilton)
Location: coelom, mesentery
Distribution: Sind River
RIZVI, S.S.H., 1971

Poecilancistrium ilisha (Southwell and Prashad, 1918) Dollfus, 1942 SEE: Otobothrium ilisha (Southwell and Prashad, 1918) Goldstein, 1963 (plero cercus)

Poecilancistrium robustum
Host: Vertebrata Osteichthyes
Cynoscion nebulosus (Cuvier)
Distribution: Gulf of Mexico
GUEST, W.C. AND GUNTER, G., 1958

Poecilancistrium robustum (Chandler, 1935) Dollfus, 1942
Host: Vertebrata Osteichthyes
Pogonias cromis (Linnaeus)
Distribution: Texas, coast
CHANDLER, A.C., 1954

Poecilancistrium robustum (Chandler, 1935) Dollfus, 1942 (adult)
Host: Vertebrata Selachii
Carcharhinus leucas (Müller and Henle, 1841)
Distribution: Gulf of Mexico, north west
GOLDSTEIN, R.J., 1962
Carcharhinus limbatus (Müller and Henle)
Location: spiral valve
Distribution: Gulf of Mexico, northern, Grand Isle, Barataria Pass
THATCHER, V.E., 1961
Negaprion brevirostris (Poey, 1868)
Distribution: Gulf of Mexico, north west
GOLDSTEIN, R.J., 1962
**Poecilancistrium robustum** (Chandler, 1935) Dollfus, 1942 (plerocercoid)

**Host:** Vertebrata Osteichthyes

**Cynoscion nebulosus** (Cuvier and Valenciennes)

**Location:** musculature

**Distribution:** Gulf Coast, Louisiana

**BOERTJE, S.B., 1976**

**Pseudotobothrium dipsacum** (Linton, 1897) in Ward (1954)  **SEE:**

**Otothrium (Pseudotobothrium) dipsacum** (Linton, 1897) (plerocercus)
**PARASITE FAMILY**

**PSEUDOGILQUINIIDAE**

*Pseudogilquinia karachiensis* Bilqees and Khatoon, 1980 (plerocercus)

**Host:** Vertebrata Osteichthyes

**Pomadaeus olivaceus** Day

**Location:** stomach mesenteries

**Distribution:** Karachi, Pakistan

BILQEEs, F.M. AND KHATOON, A., 1980
PARASITE FAMILY PSEUDOGRILOTTIIDAE

Pseudogrillotia basipunctata Carvajal, Campbell and Cornford, 1976 (adult)
Host: Vertebrata Selachii
*Caranx ambyrhynchos* Bleeker
Location: spiral valve
Distribution: Hawaii

Pseudogrillotia basipunctata Carvajal, Campbell and Cornford, 1976 (plerocercus)
Host: Vertebrata Osteichthyes
*Diodon hystrix* L.
Location: pharyngeal connective tissue
Distribution: Hawaii

Pseudogrillotia pleistacantha Dollfus, 1969 (plerocercoid)
Host: Vertebrata Osteichthyes
*Pogonias cromis* (Linnaeus)
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977

Pseudogrillotia pleistacantha Dollfus, 1969 (post-larva)
REMARKS: The family Pseudogrillotiidae, described by Dollfus (1969) contains the species *Pseudogrillotia pleistacantha*. This differs from any species of *Grillotia* because it possesses a post-larval stage and a long, craspedote scolex.
Host: Vertebrata Osteichthyes
*Pogonias cromis* (L., 1766)
Location: musculature
Distribution: Texas, Galveston
DOLLFUS, R.P., 1969b

Pseudogrillotia sp. (larva)
Host: Vertebrata Osteichthyes
*Coelorhynchus parallelus* (Gunther)
Distribution: Coast of Mozambique
REIMER, L.W., 1984
PARASITE FAMILY  PTEROBOOTHRIIDAE

Gymnorhynchus gigas (Cuvier, 1817) of Chandler (1935a)  SEE:
   Pterobothrium filicolle (Linton, 1889) (larva)

Halysiothynus macrocephalus (Shipley and Hornell, 1906) (adult)
Host: Vertebrata  Selachii
   Pteroplatea micrura Day
      Location: intestine
      Distribution: Karachi, Arabian Sea
      ZAI DI, D.A. AND KHAN, D., 1976

Pterobothrium chaeturichthydis Yamaguti, 1952 (larva)
Host: Vertebrata  Osteichthyes
   Chaeturichthys hexanemus (Bleeker)
      Location: body cavity
      Distribution: Maisaka, Sikioka Prefecture, Japan
      YAMAGUTI, S., 1952

Pterobothrium filicolle (Linton, 1889) (larva) syn. Gymnorhynchus gigas
   (Cuvier, 1817) of Chandler (1935a)
Host: Vertebrata  Osteichthyes
   Galeichthys fellea
      Location: mesenteries, encysted on
      Distribution: Galveston Bay, Texas
      CHANDLER, A.C., 1935a

Pterobothrium filicolle (Linton, 1889) (larva) syn. Gymnorhynchus gigas
   (Cuvier, 1817) of Chandler (1935a)
Host: Vertebrata  Osteichthyes
   Micropogon undulatus (Linnaeus)
      Location: body cavity
      Distribution: Galveston Bay, Texas
      CHANDLER, A.C., 1935a

Pterobothrium hawaiiense Carvajal, Campbell and Cornford, 1976 (adult)
Host: Vertebrata  Selachii
   Dasyatis lata (Garman)
      Location: spiral valve
      Distribution: Hawaii

Pterobothrium heteracanthum Diesing, 1850
Host: Vertebrata  Osteichthyes
   Hilsa ilisha (Hamilton)
      Location: parietal layer, liver
      Distribution: Sind River
      RIZVI, S.S.H., 1971

Pterobothrium heteracanthum Diesing, 1850 (plerocercoid) syn. Syndesmobothrium filicolle Linton, 1890
   REMARKS: Dollfus, 1942 considered Syndesmobothrium filicolle Linton, 1890 to be a synonym of Pterobothrium heteracanthum Diesing, 1850.
Host: Vertebrata  Osteichthyes
   Hilsa ilisha (Hamilton)
      Location: lateral muscle
      Distribution: Hooghly Estuary
      PAL, R.N., 1963
**Pterobothrium heteracanthum** Diesing, 1850 **syn. Syndesmobothrium filicolle**

Host: Vertebrata

Osteichthyes

*Hilsa ilisha* (Hamilton)

Distribution: Hooghly River

GOPALAKRISHNAN, V. AND PAL, R.N., 1964

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**Pterobothrium hirs**

Host: Vertebrata

Osteichthyes

*Ilisha elongata* (Bennett)

Location: body cavity, especially on liver and pyloric caeca

Distribution: Sea of Ariake, Kyusu, Japan

YAMAGUTI, S., 1952

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**Pterobothrium lintoni** (MacCallum, 1916)

Host: Vertebrata

Selachii

*Dasyatis centrura*

Location: spiral valve

Distribution: Buzzard's Bay, Massachusetts

SIMMONS, J.E., 1961

Osteichthyes

*Arius gago*

Distribution: Burma

KYAW-MYINT, 1968

*Silloga* sp.

Distribution: Burma

KYAW-MYINT, 1968

---

**Pterobothrium lintoni** (MacCallum, 1916) **(larva)**

Host: Vertebrata

Osteichthyes

*Arius platystomus*

Distribution: Burma

KYAW-MYINT, 1968

*Sciaena coiter*

Location: abdominal cavity

Distribution: Burma, Rangoon, estuarine

KYAW-MYINT, 1968

---

**Pterobothrium lintoni** (MacCallum, 1916) **(larva)** **syn. Pterobothrium malleum**

(Linton, 1924) **syn. Gymnorhynchus malleus** (Linton, 1924) of Chandler, 1942

REMARKS: Chandler (1942) reidentified his specimens of *Gymnorhynchus malleus* (in Chandler 1935a) as *Pterobothrium malleum*. Dollfus (1942) considered *Pterobothrium malleum* to be a synonym of *Pterobothrium lintoni*.

Host: Vertebrata

Osteichthyes

*Galeichthys felleus*

Location: mesenteries

Distribution: Galveston Bay, Texas

CHANDLER, A.C., 1935a
**Pterobothrium lintoni** (MacCallum, 1916) (plerocercoid)

**Host:** Vertebrata 
**Osteichthyes**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menticirrhus</td>
<td>americanus</td>
<td>musculature</td>
<td>Gulf of Mexico</td>
<td>OVERSTREET, R.M., 1977</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micropogonias</td>
<td>undulatus</td>
<td>musculature</td>
<td>Gulf of Mexico</td>
<td>OVERSTREET, R.M., 1977</td>
</tr>
</tbody>
</table>

**Pterobothrium malleum** (Linton, 1924) (adult)

**Host:** Vertebrata 
**Selachii**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dasyatis</td>
<td>akajei</td>
<td>spiral intestine</td>
<td>Japan</td>
<td>IWATA, S., 1939</td>
</tr>
</tbody>
</table>


**Pterobothrium rubromaculatum** (Diesing, 1863) (plerocercoid)

**Host:** Vertebrata 
**Osteichthyes**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rastrelliger</td>
<td>kanagurta</td>
<td></td>
<td>Indian Ocean</td>
<td>REIMER, L.W., 1980</td>
</tr>
</tbody>
</table>

**Pterobothrium sp.** (larva)

**Host:** Vertebrata 
**Osteichthyes**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pteroplatea</td>
<td>micrura</td>
<td>encysted in body cavity</td>
<td>Madras, India</td>
<td>ANANTARAMAN, S., 1963</td>
</tr>
</tbody>
</table>

**Pterobothrium sp.** (plerocercoid)

**Host:** Vertebrata 
**Osteichthyes**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
</table>

**Menticirrhus americanus** (Linnaeus)

<table>
<thead>
<tr>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscera, entwined about the, mesenteries, in the</td>
<td>Texas, coast</td>
<td>SCHLICH, F.G. AND MCFARLAND, W.N., 1967</td>
</tr>
</tbody>
</table>

**Pterobothrium sp.** (plerocercus)

**Host:** Vertebrata 
**Selachii**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dasyatis</td>
<td>uranak</td>
<td>ovary</td>
<td></td>
<td>TANDON, R.S., 1972</td>
</tr>
</tbody>
</table>

Ray sp.

<table>
<thead>
<tr>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
</table>

**Osteichthyes**

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Location</th>
<th>Distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caranx</td>
<td>sp.</td>
<td>intestine</td>
<td>Persian Gulf</td>
<td>MIRZAYANS, A., 1970</td>
</tr>
</tbody>
</table>
Cynoscion leiarchus (Cuvier and Valenciennes)
Location: body cavity
Distribution: Rio de Janeiro
REGO, A.A., SANTOS, J.C. AND SILVA, P.P., 1974
Reptilia
Hydrodynastes bicinctus bicinctus
Location: body cavity
Distribution: Rio Approyage, French Guyana
REGO, A.A., 1980

Syndesmobothrium filicolle
Host: Vertebrata Osteichthyes
Hilsa ilisha (Hamilton)
Distribution: Hugli estuary, India
PAL, R.N., 1980

Syndesmobothrium filicolle Linton, 1890 SEE: Pterobothrium heteracanthum Diesing, 1850

Syndesmobothrium filicolle Linton, 1890 SEE: Pterobothrium heteracanthum Diesing, 1850 (plerocercoid)
PARASITE FAMILY  RENIBULBIDAE

Renibulbus penaeus Feigenbaum, 1975 (plerocercus)

REMARKS: Feigenbaum described the heterocanthous family Renibulbidae as being most similar to the family Otobothriidae, but lacking sensory fossettes.

Host: Invertebrata Crustacea

Penaeus brasiliensis Latreille
Location: body, hepatopancreas
Distribution: Sinaloa, Mexico
FEIGENBAUM, D.L., 1975

Renibulbus penaeus Feigenbaum, 1975 (plerocercus)
Host: Invertebrata Crustacea

Penaeus brasiliensis Latreille
Location: digestive gland
Distribution: Biscayne Bay, Florida
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976

Penaeus duorarum Burkenroad
Location: digestive gland
Distribution: Biscayne Bay, Florida
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
PARASITE FAMILY RHINOPTERICOLIDAE

Rhinoptericola megacantha Carvajal and Campbell, 1975 (adult)

REMARKS: Carvajal and Campbell erected a new family Rhinoptericolidae to accommodate this new species. It belongs to the heteroacanthous trepanorhynchs with atypical armature and is most closely allied to the families Otobothriidae and Mustelicolidae.

Host: Vertebrata Selachii
Rhinoptera bonasus (Mitchell, 1815)
Location: spiral valve
Distribution: Chesapeake Bay, Virginia
CARVAJAL, J. AND CAMPBELL, R.A., 1975
PARASITE FAMILY  SPHYRIOCEPHALIDAE

Sphyriocephalus Alberti Guiart, 1935  SEE:  Sphyriocephalus viridis
(Wagener, 1854) Pintner, 1913 (post-larva)

Sphyriocephalus alberti Guiart, 1935  SEE:  Sphyriocephalus viridis
(Wagener, 1854) (post-larva)

Sphyriocephalus dolifusai Bussièras and Aldrin, 1968 (post-larva)
Host: Vertebrata  Osteichthyes
Thunnus obesus (Lowe, 1839)
Location: stomach
Distribution: Africa, West Coast
Distribution: Atlantic
BUSSIÈRAS, J. AND BAUDIN-LAURENCIN, F., 1973

Sphyriocephalus peolorusoma Heinz and Dailey, 1974 (adult)
Host: Vertebrata  Selachii
Alopias superciliosus (Lowe)
Location: stomach
Distribution: California, southern
HEINZ, H.L. AND DAILEY, H.D., 1974

Sphyriocephalus Richardi Guiart, 1935  SEE:  Sphyriocephalus viridis
(Wagener, 1854) Pintner, 1913 (post-larva)

Sphyriocephalus tergestinus Pintner, 1913 (adult)
Host: Vertebrata  Selachii
Euprotomicrus bispinatus (Quoy and Gaimard, 1842)
Location: stomach, cardiac
Distribution: Indian Ocean, east South Pacific
DOLLFUS, R.P., 1967a

Sphyriocephalus viridis (Wagener, 1854) Pintner, 1913
Host: Vertebrata  Selachii
Alopias superciliosus (Lowe)
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974
Scymnorhinus licha (Bonnaterre)
Location: stomach
Distribution: British Isles
WILLIAMS, H.H., 1965

Sphyriocephalus viridis (Wagener, 1854) Pintner, 1913 (adult)
Host: Vertebrata  Selachii
Isurus glaucus
Location: spiral intestine
Distribution: Japan
IWATA, S., 1939
Scymnorhinus licha (Bonnaterre)
Location: stomach
Distribution: Concarneau
DOLLFUS, R.P., 1946b
**Sphyriocephalus viridis** (Wagener, 1854) Pintner, 1913 (post-larva) syn. **Sphyriocephalus Alberti** Guiart, 1935

**Host:** Vertebrata Selachii

**Centroscymnus coelolepis** Bocage and Capello, 1864
- **Location:** digestive tract
- **Distribution:** Azores, south west, Atlantic
  - **GUIART, J., 1935a**

**Pseudotriakis microdon** Capello, 1867
- **Location:** stomach mucosa
- **Distribution:** Cape Verde Isles, Atlantic
  - **GUIART, J., 1935a**

**Sphyriocephalus viridis** (Wagener, 1854) Pintner, 1913 (post-larva) syn. **Sphyriocephalus Richardi** Guiart, 1935

**Host:** Vertebrata Osteichthyes

**Synaphobranchus sp.**
- **Location:** abdominal cavity
- **Distribution:** Azores, south west, Atlantic
  - **GUIART, J., 1935a**

**Sphyriocephalus viridis** (Wagener, 1854) (post-larva) syn. **Sphyriocephalus alberti** Guiart, 1935

**REMARKS:** Bussieras considered **Sphyriocephalus alberti** Guiart, 1935 to be synonymous with **S. viridis** after making a detailed comparison of scolex morphology and proboscis armature.

**Host:** Vertebrata Selachii

**Centroscymnus coelolepis** Bocage and Capello, 1864
- **Distribution:** La Corse
  - **Bussieras, J., 1970**
<table>
<thead>
<tr>
<th>Species</th>
<th>Host</th>
<th>Location</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Nybelinia (? Syngenes) sp.</em> Dollfus, 1942</td>
<td>Vertebrata Osteichthyes</td>
<td><em>Thyrsites atun</em> (Euphrasen, 1791)</td>
<td>Distribution: Cook Strait, New Zealand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ROBINSON, E.S., 1959a</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>Trachurus nova-zelandiae</em> Richardson</td>
<td>Distribution: Cook Strait, New Zealand</td>
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<tr>
<td></td>
<td></td>
<td>ROBINSON, E.S., 1959a</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>Zeus faber</em> L.</td>
<td>Location: body cavity, cardiac stomach</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distribution: Cook Strait, New Zealand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ROBINSON, E.S., 1959a</td>
<td></td>
</tr>
<tr>
<td><em>Nybelinia africana</em> Dollfus, 1960</td>
<td>Vertebrata Osteichthyes</td>
<td><em>Mullus barbatas</em> L.</td>
<td>Location: pharynx, wall of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distribution: Mediterranean</td>
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<tr>
<td></td>
<td></td>
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<td>DOLLFUS, R.P., 1960b</td>
</tr>
<tr>
<td><em>Nybelinia africana</em> Dollfus, 1960</td>
<td>Vertebrata Selachii</td>
<td><em>Galeoides polydactylus</em></td>
<td>Location: body cavity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distribution: Atlantic, Dakar</td>
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<td></td>
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<td>DOLLFUS, R.P., 1960b</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Serranus cabrilla</em> L. 1758</td>
<td>Location: branchial cavity</td>
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<td></td>
<td></td>
<td>Distribution: Algiers</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>DOLLFUS, R.P., 1960b</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Trigla sp.</em></td>
<td>Location: gills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distribution: Atlantic, Goree</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DOLLFUS, R.P., 1960b</td>
</tr>
<tr>
<td><em>Nybelinia alloiotica</em> Dollfus, 1960</td>
<td>Vertebrata Osteichthyes</td>
<td><em>Sphyraena guachancho</em> Cuvier, 1829</td>
<td>Location: branchial cavity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distribution: Atlantic, Goree</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>DOLLFUS, R.P., 1960b</td>
</tr>
<tr>
<td><em>Nybelinia alloiotica</em> Dollfus, 1960</td>
<td>Vertebrata Osteichthyes</td>
<td><em>Coryphaena equiseta</em> Linnaeus, 1758</td>
<td>Location: branchial cavity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distribution: Atlantic, Goree</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DOLLFUS, R.P., 1960b</td>
</tr>
</tbody>
</table>
Nybelinia anantaramanorum Reimer, 1980 (plerocercoid)

Host: Vertebrata Osteichthyes
Sparidae gen. spec.
Distribution: Indian Ocean
REIMER, L.W., 1980

Nybelinia anguillicola Yamaguti, 1952 (larva)

Host: Vertebrata Osteichthyes
Anguilla japonica
Location: encysted in submucosa of the intestine
Distribution: Kuki, Mie Prefecture, Japan
YAMAGUTI, S., 1952

Nybelinia anthicosum Heinz and Dailey, 1974 (adult)

Host: Vertebrata Selachii
Heterodontus francisci (Girard)
Distribution: Mexico
HEINZ, M.L. AND DAILEY, M.D., 1974
Triakis semifasciata Girard, 1854
Location: stomach, spiral valve
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Nybelinia basimegacantha Carvajal, Campbell and Cornford, 1976 (post-larva)

REMARKS: The presence of the very mobile plerocerci in the mouth may have been a result of post mortem migration.

Host: Vertebrata Osteichthyes
Parapeneus multifasciatus Quoy and Gaimard
Location: mouth
Distribution: Hawaii

Nybelinia bengalensis Reimer, 1980 (plerocercoid)

Host: Vertebrata Osteichthyes
Cynoglossus macrolepidotus (Bleeker)
Distribution: Indian Ocean
REIMER, L.W., 1980
Cynoglossus sp.
Distribution: Indian Ocean
REIMER, L.W., 1980

Nybelinia bisulcata (Linton, 1889) Poche, 1926

Host: Vertebrata Selachii
Carcharhinus leucas (Müller and Henle, 1841)
Location: spiral valve
Distribution: Nicaragua
WATSON, D.E. AND THORSON, T.B., 1976

Nybelinia bisulcata (Linton, 1889) Poche, 1926 (plerocercus)

Host: Invertebrata Cephalopoda
Loligo pealeii (LeSueur, 1821)
Location: encysted in the wall of the stomach and caecum
Distribution: Cape Cod area
STUNKARD, H.W., 1977

Host: Vertebrata Osteichthyes
Coryphaena hippurus Linnaeus
Location: viscera
Distribution: Miami
WARD, H.L., 1954
Nybelinia bisulcata (Linton, 1899) Poche, 1926 (larva)

**REMARKS:** O’Rourke (1949) did not state whether N. bisulcata was found in one or more of the named hosts.

**Host:** Vertebrata Osteichthyes Food fishes including Cynoscion regalis, Micropogon undulatus and Leiostomus xanthurus

**Distribution:** Maryland, Solomons

O’ROURKE, A.E., 1949

Nybelinia cadenati Dollfus, 1965

**Host:** Vertebrata Osteichthyes

**Fistularia tabaccaria** L. 1758

**Location:** branchial cavity

**Distribution:** Atlantic, Gorée

DOLLFUS, R.P., 1965b

Hynnis goreensis (Valenciennes, 1846)

**Distribution:** Atlantic, Gorée

DOLLFUS, R.P., 1965b

Nybelinia cadenati Dollfus, 1965 (post-larva)

**Host:** Vertebrata Osteichthyes

**Epinephelus alexandrinus** (Cuvier and Valenciennes, 1828)

**Location:** branchial cavity

**Distribution:** Atlantic, Gorée

DOLLFUS, R.P., 1965b

Nybelinia cogeni Guiart, 1935 (larva)

**REMARKS:** Dollfus (1942) questions the validity of this species.

**Host:** Vertebrata Osteichthyes

**Synaphobranchus pinnatus** (Gronnovius) (tentative identification)

**Location:** stomach wall, encysted in

**Distribution:** Maio, Cape Verde Isles, north east of Atlantic

GUIART, J., 1935a

Nybelinia dakari Dollfus, 1965 (plerocercoid)

**Host:** Vertebrata Osteichthyes

**Secutor ruconius** Buchanan-Hamilton

**Distribution:** Indian Ocean

REIMER, L.W., 1985

Nybelinia dakari Dollfus, 1965 (post-larva)

**Host:** Vertebrata Osteichthyes

**Vorner (Argyreioius) setipinnus** (Mitchell, 1815)

**Location:** gills

**Distribution:** Atlantic, Dakar

DOLLFUS, R.P., 1965b

Nybelinia edwinlintoni Dollfus, 1965 (post-larva)

**Host:** Vertebrata Selachii

**Sphyrna diaplan Springer**

**Location:** intestine

**Distribution:** Atlantic, Gorée

DOLLFUS, R.P., 1965b
**Nybelinia elongata** Shah and Bilqees, 1979 (plerocercoid)

**Host:** Vertebrata  
**Osteichthyes**  
**Eretheistis elongata**  
**Distribution:** Karachi Coast, Pakistan  
**BILQEEs, F.M., 1981**  
**Pellona elongata**  
**Distribution:** Karachi Coast  
**SHAH, M. AND BILQEEs, F.M., 1979**

**Nybelinia erythraea** Dollfus, 1960 (post-larva)

**Host:** Vertebrata  
**Osteichthyes**  
**Cynoglossus sunus-arabici** Chabanaud  
**Location:** muscles of caudal fin  
**Distribution:** Gulf of Suez  
**DOLLFUS, R.P., 1960b**

**Nybelinia estigmana** Dollfus, 1960 (post-larva) (forma typica)

**Host:** Vertebrata  
**Osteichthyes**  
**Vorner (Argyreiosus) setipinnus** (Mitchell, 1815)  
**Location:** branchial cavity  
**Distribution:** Atlantic, Dakar  
**DOLLFUS, R.P., 1960b**

**Nybelinia estigmana** Dollfus, 1960 (var. 1) (post-larva)

**Host:** Vertebrata  
**Osteichthyes**  
**Hynnis goreensis** (Valenciennes, 1846)  
**Location:** branchial cavity  
**Distribution:** Atlantic, Goree  
**DOLLFUS, R.P., 1960b**

**Nybelinia estigmana** Dollfus, 1960 (var. 2) (post-larva)

**Host:** Vertebrata  
**Osteichthyes**  
**Box boops** (L. 1758)  
**Location:** branchial cavity  
**Distribution:** Atlantic, Goree  
**DOLLFUS, R.P., 1960b**

**Nybelinia eureia** Dollfus, 1960 (post-larva)

**Host:** Vertebrata  
**Selachii**  
**Mustelus canis** (Mitchell, 1815)  
**Location:** gills  
**Distribution:** Atlantic, Goree  
**DOLLFUS, R.P., 1960b**  
**Osteichthyes**  
**Congrid sp.**  
**Location:** stomach contents  
**Distribution:** Atlantic, Dakar  
**DOLLFUS, R.P., 1960b**

**Nybelinia javanesusazariahz Reimer, 1980 (plerocercoid)**

**Host:** Vertebrata  
**Osteichthyes**  
**Cynoglossus sp.**  
**Distribution:** Indian Ocean  
**REIMER, L.W., 1980**
Nybelinia lamontaeae Nigrelli, 1938
Host: Vertebrata Osteichthyes
Xiphias gladius Linnaeus, 1758
Location: mesenteries
Distribution: Nova Scotia
NIGRELLI, R.F., 1938

Nybelinia lamontaeae Nigrelli, 1938 (plerocercoid)
Host: Vertebrata Osteichthyes
Xiphias gladius Linnaeus, 1758
Location: stomach
Distribution: Atlantic, north west

Nybelinia lingualis (Cuvier, 1817)
Host: Vertebrata Selachii
Carcharhinus leucas (Müller and Henle, 1841)
Location: spiral valve
Distribution: Texas
HENSON, R.N., 1975

Osteichthyes
Maena amaris
Distribution: Saronicos Gulf, Athens, Greece
PAPOUTSOGLIOU, S.E., 1976

Mullus surmuletus L.
Distribution: Saronicos Gulf, Athens, Greece
PAPOUTSOGLIOU, S.E., 1976

Phycis blennioides
Distribution: Saronicos Gulf, Athens, Greece
PAPOUTSOGLIOU, S.E., 1976

Trachurus trachurus (L.)
Distribution: Saronicos Gulf, Athens, Greece
PAPOUTSOGLIOU, S.E., 1976

Trachurus trachurus trachurus L.
Distribution: Atlantic
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980a

Nybelinia lingualis (Cuvier, 1817) f. typica (larva)
Host: Invertebrata Cephalopoda
Sthenoteuthis pteropus (Steenstrup, 1855)
Distribution: Atlantic Ocean
GAEVSKAYA, A.V., 1977

Nybelinia lingualis (Cuvier, 1817) (larva)
Host: Invertebrata Cephalopoda
Ommastrephes bartrami Le Sueur
Distribution: tropical zone, Atlantic Ocean
GAEVSKAYA, A.V., 1976

Host: Vertebrata Osteichthyes
Merluccius bilinearis
Distribution: Atlantic, north west
GAEVSKAYA, A.V. AND UMNOVA, B.A., 1977

Trachurus trachurus capensis Castelnau
Distribution: Namibia, Coast of, Atlantic, South
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b

Trachurus trachurus trachurus L.
Distribution: North Sea, Atlantic, north
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Nybelinia lingualis (Cuvier, 1817) (larva or post larva)
Host: Invertebrata Cephalopoda
Eledone Aldrovandi Rafin.
Location: capsules in the branchial region
Distribution: Morocco
DOLLFUS, R.P., 1942

Host: Vertebrata Selachii
Mustelus asterias (Rondolet)
Location: intestine
Distribution: Mauritania
DOLLFUS, R.P., 1942

Osteichthyes
Balistes capriacus L.
Location: encapsulated on the viscera
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942

Mullus barbatus Rondelet
Location: encapsulated on the body wall
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942

Trigla gurnardus (L.)
Location: branchial cavity
Distribution: Concarneau, Finistère, France
DOLLFUS, R.P., 1942

Trigla lyra L.
Location: encapsulated on the mesentery
Distribution: Cape Cantin, Morocco
DOLLFUS, R.P., 1942

Nybelinia lingualis (Cuvier, 1817) (post-larva)
REMARKS: Dollfus reviewed previous records of trypanorhynchs from cephalopods.
Host: Invertebrata Cephalopoda
Eledone moschata (Lamarck, 1799)
Location: branchial region
Distribution: Monaco
DOLLFUS, R.P., 1958

Nybelinia lingualis (Cuvier, 1817) var. 1 (larva)
Host: Invertebrata Cephalopoda
Sthenoteuthis pteropus (Steenstrup, 1855)
Distribution: Atlantic Ocean
GAEVSKAYA, A.V., 1977

Nybelinia manazo Yamaguti, 1952 (adult)
Host: Vertebrata Selachii
Mustelus manazo Bleeker
Location: stomach
Distribution: Hamazina, Japan
YAMAGUTI, S., 1952

Nybelinia nipponica Yamaguti, 1952 (larva)
Host: Vertebrata Osteichthyes
Argentina kagoshimae Jordan and Snyder
Location: gastro-intestinal wall and body cavity
Distribution: Maisaka, Sikuoka Prefecture, Tosa Bay, Japan, Obama, Hukui Prefecture, Japan
YAMAGUTI, S., 1952

Neobythites macrops Günther
Location: gastro-intestinal wall and body cavity
Distribution: Maisaka, Sikuoka Prefecture, Tosa Bay,
Pseudo rhombus pentaphthalmus Günther
Location: gastro-intestinal wall and body cavity
Distribution: Maisaka, Sikuoka Prefecture, Tosa Bay, Japan, Obama, Hukui Prefecture, Japan

YAMAGUTI, S., 1952

Xystrias grigorjewi (Herzenstein)
Location: gastro-intestinal wall and body cavity
Distribution: Maisaka, Sikuoka Prefecture, Tosa Bay, Japan, Obama, Hukui Prefecture, Japan

YAMAGUTI, S., 1952

Nybelinia oodes Dollfus, 1969 (post-larva)
Host: Vertebrata Osteichthyes
Pristipoma bennetti Lowe, 1837
Location: gills
Distribution: Atlantic, Goree
DOLLFUS, R.P., 1969b

Nybelinia palliata (Linton, 1924) (adult)
Host: Vertebrata Selachii
Sphyraena zygaena (L.)
Location: spiral valve
Distribution: Florida, Gulf Coast
CHANDLER, A.C., 1942

Nybelinia perideraeus (Shipley and Hornell, 1916) (adult)
Host: Vertebrata Selachii
Carcharinus melanopterus (Quoy and Gaimard)
Location: stomach
Distribution: Ghardaqua, Egypt, south, The Gulf of Suez
DOLLFUS, R.P., 1942

Nybelinia pintneri Yamaguti, 1934
Host: Vertebrata Selachii
Isurus oxyrinchus Rafinesque, 1810
Distribution: California, southern
HEINZ, M.L. AND DAILEY, M.D., 1974

Nybelinia pintneri Yamaguti, 1934 (adult)
Host: Vertebrata Selachii
Carcharias acutus Muller and Henle
Location: intestine
Distribution: Bombay, India, West Coast
DESHMUKH, R.A., 1989
Prionace glauca (Linnaeus, 1758)
Location: spiral valve
Distribution: Japan
IWATA, S., 1939

Nybelinia pintneri Yamaguti, 1934 (larva)
Host: Vertebrata Osteichthyes
Paralichthys olivaceus
Location: mesentery
Distribution: Japan
IWATA, S., 1939
Nybelinia punctatissima Dollfus, 1960

Host: Vertebrata Osteichthyes

_Hynnis goreensis_ (Valenciennes, 1846)
- Location: branchial cavity
- Distribution: Atlantic, Goree
- _DOLLFUS, R.P., 1960b_

_Seriola dumerili_ Risso, 1818
- Location: branchial cavity
- Distribution: Atlantic, Goree
- _DOLLFUS, R.P., 1960b_

_Nybelinia punctatissima_ Dollfus, 1960 (forma typica) (post-larva)

Host: Vertebrata Osteichthyes

_Sphyraena guachancho_ Cuvier, 1829
- Location: branchial cavity
- Distribution: Atlantic, Goree
- _DOLLFUS, R.P., 1960b_

_Nybelinia punctatissima_ Dollfus, 1960 (var.) (post-larva)

Host: Vertebrata Osteichthyes

_Echeneis naucrates_ L. 1758
- Location: gills
- Distribution: Atlantic, Goree
- _DOLLFUS, R.P., 1960b_

_Nybelinia riseri_ Dollfus, 1960 (post-larva)

Host: Vertebrata Selachii

_Raja binoculata_
- Location: stomach wall, spiral valve
- Distribution: California, Monterey
- _DOLLFUS, R.P., 1960b_

_Nybelinia robusta_ (Linton, 1890) (adult)

Host: Vertebrata Selachii

_Scoliodon sorarakowah_
- Distribution: Burma, estuary
- _KYAW-MYINT, 1968_

_Nybelinia robusta_ (Linton, 1890) (larva)

Host: Vertebrata Osteichthyes

_Sciema coiter_
- Location: mesentery, in the region of the oesophagus
- Distribution: Burma, Rangoon, estuarine
- _KYAW-MYINT, 1968_

_Nybelinia rougetcampaæae_ Dollfus, 1960 (plerocercoid)

Host: Vertebrata Osteichthyes

_Hoploteuthus mediterraneus_ (Val., 1928)
- Distribution: Africa, north west
- _REIMER, L.W., 1975b_

_Nybelinia rougetcampaæae_ Dollfus, 1960 (post-larva)

Host: Vertebrata Osteichthyes

_Liosaccus cutaneus_ (Günther, 1870)
- Location: body cavity
- Distribution: Atlantic, Dakar
- _DOLLFUS, R.P., 1960b_
Nybelinia senegalensis Dollfus, 1960
Host: Vertebrata Osteichthyes
   Caranx rhonchus Saint-Hilaire, 1809
   Location: branchial cavity
   Distribution: Atlantic, Gorée
   DOLLFUS, R.P., 1960b

Nybelinia senegalensis Dollfus, 1960 (post-larva)
Host: Vertebrata Osteichthyes
   Hynnis goreensis (Valenciennes, 1846)
   Distribution: Atlantic, Gorée
   DOLLFUS, R.P., 1960b

Nybelinia sp.
Host: Invertebrata Cephalopoda
   Lepidoteuthis grimaldi Joubin, 1895
   Location: pen sac
   Distribution: Madeira
   Crustacea
   Thysanoessa sp.
   Distribution: Bering Sea, Japan, Chukchi Sea, Japan
   TSIMBALYUK, E.H., 1980

Host: Vertebrata Agnatha
   Lampetra japonica (Martens)
   Distribution: Amur
   STRELCOV, YU A. AND SHULMAN, S.S.
   Selachii
   Dasyatis violacea Bonaparte
   Distribution: Mediterranean
   DOLLFUS, R.P., 1969a
   Hexanchus griseus (Bonnaterre, 1788)
   Distribution: Mediterranean
   DOLLFUS, R.P., 1969a
   Isurus oxyrinchus Rafinesque, 1810
   Distribution: Mediterranean
   DOLLFUS, R.P., 1969a
   Notorhynchus maculatus Ayres, 1855
   Distribution: Humboldt Bay
   PAPPAS, P.W., 1970
   Scyliorhinus canicula (L.)
   Distribution: Mediterranean
   DOLLFUS, R.P., 1969a

Osteichthyes
   Gadus morhus macrocephalus (Tilesius)
   Distribution: Pacific, north eastern
   TKACHEV, V.A., 1976
   Glyptocephalus zachirus
   Distribution: Pacific, north eastern
   TKACHEV, V.A., 1976
   Hippoglossoides elassodon
   Distribution: Pacific, north eastern
   TKACHEV, V.A., 1976
   Hippoglossus hippoglossus stenolepis Schmidt
   Distribution: Pacific, north eastern
   TKACHEV, V.A., 1976
   Hoplostethus
   Distribution: Blanc, Cape and the Channel
   REIMER, L.W., 1974
   Scomber australasicus (Cuvier et Valenciennes, 1832)
   Location: body cavity
**Nybelinia sp. (adult)**
*Host: Vertebrata*

Selachii

*Carcharias walbeemhi* Bleeker

*Location: spiral valve*

*Distribution: Madras Coast, India*

SUBHAPRADHA, C.K., 1955

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**Nybelinia sp. (encysted plerocercoid)**

*Host: Vertebrata*

Osteichthyes

*Cynoscion regalis*

*Location: pericardium*

*Distribution: Raritan Bay, southern, New Jersey*

MEYERS, T.R., 1978

**Paralichthys dentatus**

*Location: stomach wall*

*Distribution: Raritan Bay, southern, New Jersey*

MEYERS, T.R., 1978

**Pomatomus saltatrix (L.)**

*Location: pericardial cavity, mesenteries, gill filaments*

*Distribution: Raritan Bay, southern, New Jersey*

MEYERS, T.R., 1978

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**Sebastodes a1utus**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes brevispinis**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes crameri**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes diplopros**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes flavidus**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes goodei**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes jordani**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes melanops**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes mystenus**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Sebastodes proriger**

*Distribution: Pacific, north eastern*

TKACHEV, V.A., 1976

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**Trachurus trachurus (L.)**

*Distribution: Strait of Gibraltar*

KOVALEVA, A.A., 1966
Nybelinia sp. (larva)
Host: Invertebrata Cephalopoda
Stenoteuthis pteropus (Steenstrup, 1855)
Distribution: Atlantic Ocean
GAEVSKAYA, A.V., 1977

Pelecypoda
Atrina seminuda (Lamarck)
Location: digestive gland
Distribution: Texas, Galveston Beach
WARDLE, W.J., 1974

Nybelinia sp. (larva)
REMARKS: The trypanorhynch probably came from partially digested teleost flesh in the stomach of the kahawai.
Host: Vertebrata Osteichthyes
Arripis trutta (Bloch and Schneider)
Location: stomach
Distribution: Wellington Harbour, New Zealand
BAKER, A.N., 1971

Nybelinia sp. (larva)
Host: Vertebrata Osteichthyes
Chascanopsetta lugubris Alcock
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Coelorhynchus parallellus (Gunther)
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Coryphaenoides (Coryphaenoides) rupestris Gunnerus, 1765
Distribution: New York Bight

Glyptoccephalus stelleri (Schmidt)
Distribution: Zaliv Petra Velikogo, Japan, Sea of
TSIMBALYUK, E.M., 1978a

Gonorynchus gonorynchus (L.)
Location: flesh
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Limanda aspera (Pallas)
TSIMBALYUK, E.M., 1978b
Distribution: Zaliv Petra Velikogo, Japan, Sea of
TSIMBALYUK, E.M., 1978b

Limanda yokohamae (Gunther)
Distribution: Peter the Great Bay
TSIMBALYUK, E.M., 1978b
Distribution: Zaliv Petra Velikogo, Japan, Sea of
TSIMBALYUK, E.M., 1978a

Malacocephalus laevis (Lowe)
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Melanogrammus aeglefinus (L.)
Location: body cavity, intestine
Distribution: Atlantic, north, Atlantic, south
RADULESCU, I.I., 1969

Merluccius gayi peruanus Gingsburg, 1954
Location: intestine
Distribution: Callao, Peru
DURAN, L.E. AND OLIVA, M., 1988

Merluccius merluccius cephalus Castelnau
Distribution: Coast of Mozambique
REIMER, L.W., 1984
Merluccius merluccius paradoxus (Franca, 1966)
Distribution: Coast of Mozambique

REIMER, L.W., 1984
Naucrates ductor Linnaeus
Location: intestine
Distribution: Georges Bank, Atlantic coast, United States
RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972

Peristion adenii (Lloyd)
Distribution: Coast of Mozambique

Peristion cataphractum
Location: body cavity, intestine
Distribution: Atlantic, north, Atlantic, south
RADULESCU, I.I., 1969

Physiculus bacchus
Distribution: Antarctic
POISS, N.V., 1975

Polymixia nobilis (Lowe)
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Promethichthys prometheus
Location: body cavity, muscle of stomach and intestine
Distribution: Sagami Bay, Japan
ICHIHARA, A., 1968

Pseus rotundatus Smith
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Salmo salar L.
Location: swim bladder
Distribution: River Sella, Spain
ALVAREZ, PELLITERO, M.P., 1973

Scomber colias Gmelin
Location: body cavity
Distribution: Africa, south west coast
SOLONCHENKO, A.I., 1968

Scomberesox saurus (W.)
Location: oesophagus
Distribution: Atlantic, south west
REIMER, L.W., 1982

Thyreitoideae marleyi Fowler
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Trachurus mediterraneus ponticus Aleev
Distribution: Black Sea
NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966

Trachurus mediterraneus (Steindachner)
KOVALEVA, A.A., 1970
Location: muscles, pharynx, intestine
Distribution: Mediterranean Sea
NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966

Trachurus tracei
KOVALEVA, A.A., 1970

Trachurus trachurus capensis Castelnaau
KOVALEVA, A.A., 1970
Distribution: Namibia, Coast of, Atlantic, South
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1984b

Trachurus trachurus (L.)
KOVALEVA, A.A., 1970
Trichiuris haumela
Location: encysted in body cavity
Distribution: Madras, India
ANANTARAMAN, S., 1963

Mammalia
Phoca vitulina largha Pallas
Location: stomach
Distribution: Tatarskii Straits, Pacific Ocean, USSR
POPOV, V.N. AND GOL'TSEV, V.N., 1975

Nybelinia sp. (larva) syn. "Scolex" sp. VIII
Host: Invertebrata Pelecypoda

Donax variabilis (Say)
Location: digestive gland
Distribution: Texas, Galveston Beach
WARDLE, W.J., 1974

Nybelinia sp. (larvae)
Host: Vertebrata Osteichthyes

Trachurus trachurus capensis Castelnau
Distribution: Africa, south west
KOVALEVA, A.A., 1968

Nybelinia sp. of Wardle (1932) syn. Tetrarhynchus sp. of Hart (1936) SEE:
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

Nybelinia sp. (plerocercoid)
Host: Vertebrata Osteichthyes

Diodon hystrix L.
Location: oesophagus
Distribution: Trivandrum, India
RADHAKRISHNAN, S. AND NAIR, N.B., 1981

Fishballs
KOYAMA, T. AND KOMIYA, Y., 1964

Saurida undosquamia (Richardson)
Location: flesh
Distribution: Coast of Mozambique
REIMER, L.W., 1984

Nybelinia sp. (plerocercus)
Host: Invertebrata Cephalopoda

Octopus sp.
Location: interior ventral wall of the mantle
Distribution: Andaman Isles, Indian Ocean
ADAM, W., 1938

Host: Vertebrata Osteichthyes

Trachurus murphyi Nichols, 1920
Distribution: Antofagaster, Chile
SOTO, J. AND CARVAJAL, J., 1979

Nybelinia sp. (post-larva)
Host: Invertebrata Cephalopoda

Illex illecebrosus illecebrosus (LeSueur, 1821)
Distribution: Newfoundland
BROWN, C.L. AND THRELFALL, W., 1968

Host: Vertebrata Osteichthyes

Cheilodactylus macropterus (Bloch and Schneider)
Distribution: New Zealand
VOOREN, C.M. AND TRACEY, D., 1976
Nybelinia sp. syn. Pleronybelinia sp. (plerocercoid)

REMARKS: Sezen and Price (1969) established the genus Pleronybelinia for cases in which the plerocercoid is known and the adult form is uncertain or unknown. Heinz and Dailey (1974) later suppressed the genus.

Host: Vertebrata Osteichthyes

*Mullus barbatus* L.
- Distribution: Turkey
- SEZEN, Y. AND PRICE, C.E., 1969

Nybelinia strongyla Dollfus, 1960 (post-larva)

Host: Vertebrata Osteichthyes

*Liosaccus cutaneus* (Günther, 1878)
- Location: body cavity
- Distribution: Atlantic, Dakar
- DOLLFUS, R.F., 1960b

Nybelinia surmenicola Okada in Dollfus, 1929

Host: Invertebrata Cephalopoda

*Todarodes pacificus* Steenstrup
- Distribution: Bering Sea
- SHIMAZU, T., 1975b
- Distribution: Ussuriiskii Gulf, USSR
- KUROCHKIN, Y.V., 1972

Crustacea

Euphausiid sp.
- Distribution: Bering Sea
- SHIMAZU, T., 1975b
- Distribution: Pacific Ocean, north northern
- SHIMAZU, T., 1975c

Host: Vertebrata Osteichthyes

*Acanthopsettia nadeshnyi*
- Distribution: Far Eastern seas
- MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

*Atheresthes evermanni* Jordan et Starks
- Distribution: Far Eastern seas
- MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

*Enophrys diceraus*
- Location: body cavity, stomach wall
- Distribution: Pacific
- KOROTAEVA, V.D., 1968a

*Hippoglossomidae elassodon*
- Distribution: Far Eastern seas
- MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

*Icelus spiniger*
- Location: body cavity, stomach wall
- Distribution: Pacific
- KOROTAEVA, V.D., 1968a

*Lepidopsetia bilineata* (Ayres)
- Distribution: Far Eastern seas
- MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

*Limanda aspera* (Pallas)
- Distribution: Far Eastern seas
- MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

*Limanda punctatissima*
- Distribution: Far Eastern seas
- MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

*Oncorhynchus gorbusche* (Walbaum)
- Location: body cavity
- Distribution: Amgun River, Amur River
- BOGDANOVA, E.A., 1963
Location: stomach, liver
Distribution: littoral zone, western Kamchatka, Okhotsk Sea
TSIMBALYUK, E.M. AND SEMESHKO, N.N., 1971

Oncorhynchus keta (Walbaum)
Distribution: Amur
STRELKOV, YU A. AND SHULMAN, S.S.

Oncorhynchus masu (Brevoort)
STRELKOV, YU A. AND SHULMAN, S.S.

Oncorhynchus nerka (Walbaum)
Distribution: Bering Sea
SHIMAZU, T., 1975b

Reinhardius hippoglossoides
Distribution: Far Eastern seas
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Salmon, pink
Location: stomach wall
Distribution: King Cove, Puget Sound, Central British Columbia, Alaska Peninsula
MARGOLIS, L., 1956

Salvelinus alpinus (L.)
Distribution: Chaun River, Lake Rossyapnoe, USSR, north eastern
RUDMINAITENE, A.F. AND RUDMINAITIS, E.A., 1979
Location: musculature, body cavity
Distribution: Lake Kurilskoe
KONOVALOV, S.M., 1975

Sockeye salmon
Location: stomach wall
Distribution: Kodiak, Skeena River
MARGOLIS, L., 1956

Theragra chalcogramma (Pallas, 1811)
GUSEV, A.V., ZHUKOV, E.V. AND STRELKOV, YU.A., 1959
Distribution: Bering Sea
SHIMAZU, T., 1975b

Nybelinia surmenicola Okada in Dollfus, 1929 (adult)
Host: Vertebrata Selachii
Lamna ditropis Hubbs and Follett, 1947
Location: stomach
Distribution: Bering Sea
SHIMAZU, T., 1975b

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
Host: Vertebrata Osteichthyes
Aprodon cortezianus Gilbert
Location: intestine
Distribution: Burke Channel, British Columbia
ARAI, H.P., 1969

Atheroathes evermanni Jordan et Starks
Distribution: Kamchatka, east
STRELKOV, J.A., 1966

Careproctus sp.
Distribution: Kamchatka, east
STRELKOV, J.A., 1966

Eleginus gracilis (Tilesius)
Distribution: Kamchatka, east
STRELKOV, J.A., 1966

Gadus morhua macrocephalus (Tilesius)
Distribution: Kamchatka, east
STRELKOV, J.A., 1966

Gymnacanthus detriaea Gilbert
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Hemilepidotus jordani Bean
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Hexagrammos stelleri
Location: body cavity
Distribution: Kamchatka
SKRIABINA, E.S., 1963

Hippoglossoides elassodon
Location: body cavity
Distribution: Kamchatka
SKRIABINA, E.S., 1963

Hippoglossoides elassodon elassodon Jordan et Gilbert
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Hippoglossus hippoglossus stenolepis Schmidt
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Lepidopsetia bilineata (Ayres)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Limanda aspere (Pallas)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Melletes papilio Bean
Location: stomach wall
Distribution: Barents Sea
ZHUKOV, E.V., 1963

Myoxocephalus jaok Cuvier et Valenciennes
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Myoxocephalus verrucosus
Location: stomach wall
Distribution: Barents Sea
ZHUKOV, E.V., 1963

Oncorhynchus gorbuscha (Walbaum)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Oncorhynchus keta (Walbaum)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Oncorhynchus kisutch (Walbaum)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Oncorhynchus nerka (Walbaum)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Oncorhynchus tachawytscha (Walbaum)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Ophiodon elongatus Girard
Location: intestine, stomach
Distribution: Burke Channel, British Columbia
ARAI, H.P., 1969

Platessa quadrituberculata (Pallas)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Pleurogrammus monopterigius (Pallas)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Pleuronectes stellatus Pallas
Distribution: Kamchatka, east
STRELKOV, J.A., 1960
Location: stomach wall and mesentery

Distribution: Barents Sea
ZHUKOV, E.V., 1963

Podothecus acipenserinus (Pallas)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Salvelinus leucomaenis (Pallas)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Salvelinus malma (Walbaum)
Distribution: Kamchatka, east
STRELKOV, J.A., 1960

Sebastes aleutianus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes alutus Gilbert, 1899
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977
Location: stomach wall, mesenteries

Sebastes borealis
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes brevispiris
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes caurinus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes ciliatus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes crameri
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes dipsoprae
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes elongatus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes entomelas
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes flavidus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes maliger
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes nigrocinctus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes pinniger
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977
Sebastes polyspinis
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes proriger
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes reedi
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes ruberrimus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes variegatus
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes zacentrum
Distribution: Pacific Ocean, north eastern
SEKERAK, A.D. AND ARAI, H.P., 1977

Theragra chalcogramma (Pallas, 1811)
Distribution: Kamchatka, Kuril Islands, Hokkaido
SASAKI, M., 1973
Distribution: Kamchatka, east
STRELKOV, J.A., 1966
Location: abdominal cavity, muscles
Distribution: USSR
GRABDA, J., 1977
Location: body cavity
Distribution: Kamchatka
SKRIABINA, E.S., 1963
Location: body cavity, muscles
Distribution: Far East
Location: intestine, stomach
Distribution: Burke Channel, British Columbia
ARAI, H.P., 1969
Location: muscles of the abdominal wall
Distribution: Kamchatka
MAMAEV, Y.L. AND BAEVA, O.M., 1963

Trichodon trichodon (Tilesius)
Distribution: Kamchatka, east
STRELKOV, J.A., 1966

Triglops pingeli Reinhardt
Distribution: Burke Channel, British Columbia
ARAI, H.P., 1969

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

REMARKS: The man had been eating raw squid (Ommastrphes solani pacificus).

Host: Vertebrata Mammalia

Homo sapiens
Location: left palatine tonsil
Distribution: Japan
**Nybelinia surmenicola** Okada in Dollfus, 1929 (larva) syn. **Nybelinia sp.** of Wardle (1932) syn. **Tetrarhynchus sp.** of Hart (1936)

**REMARKS:** Dollfus (1942) considered **Tetrarhynchus sp.** of Hart (1936) to be **Nybelinia surmenicola**.

**Host:** Vertebrata

**Hexanchus griseus** (Bonnaterre, 1788)

- **Location:** intestine, wall of
- **Distribution:** Puget Sound, Alaskan waters
  - Hart, J.F., 1936

**Nybelinia surmenicola** Okada in Dollfus, 1929 (plerocercoid)

**Host:** Invertebrata

**Euphausia pacifica** Hansen

- **Distribution:** Pacific Ocean, north northern
  - Shimazu, T., 1975c

**Thysanoessa inermis** Krøyer

- **Distribution:** Pacific Ocean, north northern
  - Shimazu, T., 1975c

**Thysanoessa longipes** Brandt

- **Distribution:** Pacific Ocean, north northern
  - Shimazu, T., 1975c

**Thysanoessa raschii** (Sars)

- **Distribution:** Pacific Ocean, north northern
  - Shimazu, T., 1975c

**Host:** Vertebrata

**Clupea harengus pallasi** Valenciennes, 1847

- **Location:** encysted in the liver
- **Distribution:** Alaska

**Oncorhynchus gorbuscha** (Walbaum)

- **Location:** body cavity
- **Distribution:** Amur River Region
  - Akhmerov, A.K., 1963

**Oncorhynchus keta** (Walbaum)

- **Location:** body cavity
- **Distribution:** Amur River Region
  - Akhmerov, A.K., 1963

**Oncorhynchus tschawytscha** (Walbaum)

- **Distribution:** British Columbia
  - Arthur, J.R., 1984
  - Location: body cavity and musculature
  - Margolis, L., Whitaker, D.J. AND Mcdonald, T.E., 1982

**Osteichthyes**

**Theragra chalcogramma** (Pallas, 1811)

- **Location:** body cavity, stomach wall, mesenteries, musculature
- **Distribution:** Strait of Georgia, British Columbia, Pacific Ocean, north eastern, West Coast and Queen Charlotte Sound, British Columbia, Pacific Ocean, north eastern
  - Arthur, J.R., 1984

**Nybelinia (Syngene8) goreensis** Dollfus, 1960 (adult)

**Host:** Vertebrata

**Sphyraena diphra Springer**

- **Location:** intestine
- **Distribution:** Atlantic, Gorée
  - Dollfus, R.P., 1960b
Nybelinia (Syngenes) *palliata* (Linton, 1924)  
Host: Vertebrata Selachii  
*Lamna ditropis* Hubbs and Follett, 1947  
Distribution: California, southern  
YOUNG, R.T., 1954a

Nybelinia (Syngenes) *sphyrnae* Yamaguti, 1952 (adult)  
Host: Vertebrata Selachii  
*Sphyra zygaena* (L.)  
Location: pars pylorica  
Distribution: Nagasaki, Japan  
YAMAGUTI, S., 1952

Nybelinia thrysites (Leiper and Atkinson, 1915) Korotaeva, 1971  
Host: Vertebrata Osteichthyes  
*Thyrsites atun* (Euphrasen, 1791)  
Distribution: New Zealand, Australia  
KOROTAEVA, V.D., 1971

Nybelinia (*? Syngenes*) sp. Dollfus, 1942  
Host: Vertebrata Osteichthyes  
*Lepidopus caudatus* (Euphrasen)  
Distribution: New Zealand, Australia  
KOROTAEVA, V.D., 1971

Nybelinia yamagutii Dollfus, 1966 (larva)  
Host: Invertebrata Cephalopoda  
*Sthenoteuthis pteropus* (Steenstrup, 1855)  
Location: coelomic membrane, gills  
Distribution: Atlantic Ocean  
GAEVSKAYA, A.V., 1977

Nybelinia yamagutii Dollfus, 1966 (plerocercus)  
Host: Invertebrata Cephalopoda  
*Loligo pealeii* (LeSueur, 1821)  
Location: stomach washings  
Distribution: Cape Cod area  
STUNKARD, H.W., 1977

Nybelinia yamagutii Dollfus, 1966 (post-larva)  
Host: Vertebrata Osteichthyes  
*Liosaccus cutaneus* (Günther, 1878)  
Location: body cavity  
Distribution: Atlantic, Dakar  
DOLLFUS, R.P., 1966b

Pleronybelinia sp. (plerocercoid) SEE: Nybelinia sp.

"Scolex" ap. VIII SEE: Nybelinia sp. (larva)

Tentacularia arayae Woodland, 1934
Host: Vertebrata Selachii
Trygon sp.
DOLLFUS, R.P., 1975b

Tentacularia coryphaenae Bosc, 1802
Host: Vertebrata Cephalopoda
Sthenoteuthis pteropus (Steenstrup, 1855)
Location: hyperparasitic within the parenchyma of a Phyllodobothrium larva
Distribution: Atlantic
GAEVSKAYA, A.V., 1978

Host: Vertebrata Carcharhinus limbatus (Valenciennes)
Distribution: California, southern HEINZ, M.L. AND DAILEY, M.D., 1974
Carcharhinus longimanus (Poey, 1861)
Location: spiral valve
Distribution: Pacific Ocean, east HEINZ, M.L. AND DAILEY, M.D., 1974

Host: Vertebrata Osteichthyes
Coryphaena sp.
Location: peritoneum, adhering to Distribution: Indian Ocean JOYEUX, C. AND BAER, J.G., 1954
Gadus morhua L.
Ruvettus tydemani Weber
Distribution: New Zealand, Australia KOROTAEVA, V.D., 1971
Salmo salar L.
Distribution: Newfoundland SANDEMAN, I.M. AND PIPPY, J.H.C., 1967
Location: free in body cavity, attached to or partially embedded in viscera

Tentacularia coryphaenae Bosc, 1802 (adult)
Host: Vertebrata Carcharhinus galapagensis (Snodgrass and Heller)
Carcharhinus longimanus (Poey, 1861)
Location: spiral valve Distribution: Recife Coast, Brazil REGO, A.A., 1977
Carcharias sp.
Location: stomach Distribution: Madras Coast, India SUBHAPRADHA, C.K., 1955
Prionace glauca (Linnaeus, 1758)
Location: spiral intestine
Distribution: Japan
IWATA, S., 1939
Location: spiral valve
Distribution: Juan Fernandez Archipelago
CATTAN, P.E., CARVAJAL, J., TORRES, D. AND YANEZ, J.L., 1979
Scoliodon walbeemi
Location: spiral intestine
Distribution: Japan
IWATA, S., 1939

Tentacularia coryphaenae Boas, 1882 (adult) syn. Tentacularia rugosa
(Leuckhart, 1858)
Host: Vertebrata
Selachii
Galeus glaucus Rondelet, 1554
Location: stomach mucosa
Distribution: Cape Verde Isles, Atlantic
GUIART, J., 1935a

Tentacularia coryphaenae Boas, 1882 (larva)
Host: Invertebrata
Cephalopoda
Cucitotheuthis unguiculatus Molina (1782)
Distribution: Newfoundland
DOLLFUS, R.P., 1967b
Ommastrephes bartramii LeSueur
Distribution: tropical zone, Atlantic Ocean
GAEVSKAYA, A.V., 1976
Sthenoteuthis pteropoe (Steenstrup, 1855)
Distribution: Atlantic Ocean
GAEVSKAYA, A.V. AND NIGMATULLIN, C.M., 1981
Location: ovary, coelomic, membrane, mantle, rectum
Distribution: Atlantic Ocean
GAEVSKAYA, A.V., 1977

Host: Vertebrata
Osteichthyes
Euthynnus yaito Kishinouye
Location: abdominal cavity
Distribution: Japan
IWATA, S., 1939
Gymnosarda pelamys
Location: musculature, under peritoneum
Distribution: Gibraltar
GUIART, J., 1935a
Merluccius gayi peruanus Ginsburg, 1954
Location: mesenteries
Distribution: Callao, Peru
DURAN, L.E. AND OLIVA, M., 1980
Salmo salar L.
Distribution: Greenland, west
PIPPY, J.H.C., 1980
Scomber japonicus Houttuyn
Location: muscle
Distribution: Japan
IWATA, S., 1939

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**Tentacularia coryphaenae** Bosc, 1802 (larva or post larva)

**Host:** Vertebrata **Osteichthyes**

Pelamys Bonapartei (Verany)
- Location: capsule in muscles
- Distribution: Azores, west of GUIART, J., 1935a

**Tentacularia coryphaenae** Bosc, 1802 (plerocercus)

**Host:** Vertebrata **Osteichthyes**

Xiphias gladius Linnaeus, 1758
- Location: stomach
- Distribution: Atlantic, north west

**Host:** Invertebrata **Cephalopoda**

Illex illecebrosus (LeSueur, 1821)
- Location: right oviduct
- Distribution: Daytona Beach, Florida

**Host:** Vertebrata **Osteichthyes**

Coryphaena hippurus Linnaeus
- Location: body cavity
- Distribution: Miami

**Host:** Vertebrata **Cephalopoda**

Illex illecebrosus (LeSueur, 1821)
- Location: right oviduct
- Distribution: Daytona Beach, Florida

**Host:** Vertebrata **Osteichthyes**

Coryphaena hippurus Linnaeus
- Location: visceral cavity, wall of
- Distribution: Concarneau, DOLLFUS, R.P., 1942

**Host:** Vertebrata **Osteichthyes**

Euthynnus alleteratus (Rafinesque, 1810)
- Location: cavit on intestine
- Distribution: Bermuda
- Distribution: Concarneau

Katsuwonus pelamys (L.)
- Location: musculature, peri-visceral
- Distribution: Concarneau
DOLLFUS, R.P., 1946b
Location: peritoneum, muscular wall of abdomen
Distribution: Atlantic

BUSSIÈRES, J. AND BAUDIN-LAURENCIN, F., 1973
Polyprion oxygeneios
Location: peritoneal cavity
Distribution: Juan Fernandez Archipelago

CATTAN, P.E., CARVAJAL, J., TORRES, D. AND YANEZ, J.L., 1979
Salmo salar L.
Location: body cavity
Distribution: Baie de Chaleur region, Canada

HELLER, A.F., 1949
Thunnus albacores
Location: viscera and muscle walls of the abdominal cavity
Distribution: Gulf of Guinea

BAUDIN-LAURENCIN, F., 1971
Thunnus albacores (Bonnaterre, 1788)
Location: peritoneum, muscular wall of abdomen
Distribution: Atlantic

BUSSIÈRES, J. AND BAUDIN-LAURENCIN, F., 1973
Tentacularia macropora (Shipley and Hornell, 1906) (adult)
Host: Vertebrata Selachii
Stegostoma tigrinum
Location: spiral valve
SUBRAMANIAM, M.K., 1948

Tentacularia rugosa (Leuckhart, 1850) SEE: Tentacularia coryphaenae
Bosc, 1802 (adult)

Tentacularia similis (Linton, 1909) Shuler, 1938 syn. Rhynchobothrium similis Linton, 1909
REMARKS: Yamaguti (1959) listed Rhynchobothrium similis under incertae sedis.
Host: Vertebrata Selachii
Ginglymostoma cirratum
Distribution: Tortugas, Florida
SHULER, R.H., 1938
SHULER, R.H., 1938

Tentacularia sp. (adult)
Host: Vertebrata Selachii
Myrmillo manazo (Bik.)
Location: intestine
Distribution: Karachi Coast
BILQEES, F.M. AND MUSLEHUDDIN, R., 1976

Tentacularia sp. (larva)
Host: Vertebrata Ostechthyes
Barracuda
Location: muscle
Distribution: Jamaica
YEH, L.S., 1956

Beryx splendens
Location: body cavity
Distribution: Sagami Bay, Japan
ICHIHARA, A., 1968

Chirocentrus dorab
Location: encysted in body cavity
Distribution: Madras, India
ANANTARAMAN, S., 1963

*Euthynnus pelamis*

*Location:* cysts in abdominal muscles

MARKOWSKI, S., 1971

*Trachurus trachurus capensis* Castelnau

*Distribution:* Namibia, Coast of, Atlantic, South

GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b

**Tentaculariidae sp.**

*Host:* Vertebrata

*Osteichthyes*

*Trachurus trachurus* (L.)

*Distribution:* Strait of Gibraltar

KOVALEVA, A.A., 1966

**Tentaculariidae sp.** (larva)

*Host:* Vertebrata

*Osteichthyes*

Horse mackerel

*Location:* gall bladder, intestine

*NIKOLAeva, V.M., 1963a*

*Trachurus mediterraneus ponticus* Aleev

KOVALEVA, A.A., 1970

*Distribution:* Black Sea

*NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966*

*Trachurus mediterraneus* (Steindachner)

KOVALEVA, A.A., 1975

*Location:* body cavity

*NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966*

*Trachurus trachurus capensis* Castelnau

*Distribution:* Africa, south west

KOVALEVA, A.A., 1968

*Trachurus trachurus* (L.)

KOVALEVA, A.A., 1975

KOVALEVA, A.A., 1975

KOVALEVA, A.A., 1975
PARASITE FAMILY  TETRARHYNCHOBOTHRIDAE

Tetrarhynchobothrium setiense Dollfus, 1969 (larva)
Host: Vertebrata  Selachii
  Mustelus canis (Mitchell, 1815)
  Distribution: Mediterranean
  DOLLFUS, R.P., 1969a
  Mustelus mustelus (Linnaeus, 1758)
  Distribution: Mediterranean
  DOLLFUS, R.P., 1969a

Tetrarhynchobothrium setiense Dollfus, 1969 (larva, adult)
Host: Vertebrata  Selachii
  Myliobatis aquila (Linnaeus, 1758)
  Location: spiral valve
  Distribution: Mediterranean, Sete
  DOLLFUS, R.P., 1969a

Tetrarhynchobothrium sp.
Host: Vertebrata  Osteichthyes
  Gobius barthacephalus Pallas
  NAIDENOVA, N.N., 1966
  Location: intestines
  NAIDENOVA, N.N., 1965
  Gobius niger L.
  NAIDENOVA, N.N., 1966
  Location: intestines
  NAIDENOVA, N.N., 1965
  Gobius ophiocephalus Pallas
  NAIDENOVA, N.N., 1966

Tetrarhynchobothrium sp. (larva)
Host: Invertebrata  Gastropoda
  Thais rudolphi (Lamarck)
  Distribution: Madras, India
  REIMER, L.W., 1975a
  Crustacea
  Euphausia similis Sars
  Distribution: Saruga Bay, Japan
  SHIMAZU, T., 1975a

Host: Vertebrata  Osteichthyes
  Scomber scombrus L.
  Location: body cavity
  Distribution: Nantucket
  RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972
  Trachurus tracae Cadenat
  Distribution: Cape Blanc, Mauritania
  RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972
  Zeus faber L.
  Location: intestine
  Distribution: Villa Cisneros, Mauritania
  RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972
Tetrarhynchobothrium tenuicolle Diesing, 1858 (adult)

REMARKS: Dollfus (1969a) examined Euzet's specimens and questioned whether they were T. tenuicolle.

Host: Vertebrata Selachii

Myliobatis aquila (Linnaeus, 1758)

Location: first tier of the spiral valve

Distribution: Sedet

Euzet, L., 1956
PARASITE FAMILY TRYPAHORNYCH GENERA AND SPECIES OF UNCERTAIN STATUS

**Clujia Racovitzae** Guiart, 1935 (larva)

**Remarks:** Dolifus (1942) was unable to decide on the position of **Clujia Racovitzae** based on Guiart's (1935) description.

**Host:** Vertebrata Selachii

*Galeus glaucus* Rondelet, 1554

Location: stomach mucous

Distribution: Cape Verde Isles

GUIART, J., 1935a

**Coenomorphy grossus**

**Host:** Vertebrata Osteichthyes

*Oncorhynchus keta* (Walbaum)

Distribution: Amour Basin

ZMEJEV, G.J., 1936

**Dibothriorhynchus dinoi** Mendes, 1944 (larva)

**Remarks:** Dibothriorhynchus dinoi Mendes, 1944 probably belongs to the genus Bombycirhynchus.

**Host:** Vertebrata Scyphozoa

*Lichnorhiza* sp.

Distribution: Brazil

MENDES, M.V., 1944

**Dibothriorhynchus monticellii** Moniez, 1940

**Host:** Vertebrata Osteichthyes

*Lophius piscatorius* Linnaeus, 1758

MONIEZ, R., 1940

**Dibothriorhynchus typ. grossus**

**Host:** Vertebrata Osteichthyes

*Gadus* sp.

Location: body cavity

Distribution: Atlantic, north, Atlantic, south

RADULESCU, I.I., 1969

**Diesingella Monticelli** (Moniez, 1892) (larva)

**Host:** Vertebrata Osteichthyes

*Lophius piscatorius* Linnaeus, 1758

Distribution: English Channel

GUIART, J., 1935a


**Host:** Vertebrata Selachii

*Rhinoptera bonasus* (Mitchell, 1815)

Distribution: Chesapeake Bay, Virginia

CAMPBELL, R.A. AND CARVAJAL, J., 1975
Microbothriorhynchus coelorhynchi Yamaguti, 1952 (larva)

REMARKS: Yamaguti (1952) did not place the genus Microbothriorhynchus in a family. He later (1959) included it in the genera incertae sedis.

Host: Vertebrata Osteichthyes

Coelorhynchus sp.
Location: body cavity
Distribution: Maisaka, Sikuoka Prefecture, Japan
YAMAGUTI, S., 1952

Oncomegas wageneri (Linton, 1890) (larva)

REMARKS: Dollfus (1942), Wardle and McLeod (1952) and Yamaguti (1959) included Oncomegas in the genera incertae sedis.

Host: Vertebrata Osteichthyes

Cepola schlegeli (Bleeker)
Location: body cavity
Distribution: Sea of Japan
YAMAGUTI, S., 1952

Conger myriaster
Location: body cavity
Distribution: Sea of Japan
YAMAGUTI, S., 1952

Oncomegas wageneri (Linton, 1890) (plero cercoid)

REMARKS: Dollfus (1942), Wardle and McLeod (1952) and Yamaguti (1959) all listed Oncomegas under genera incertae sedis.

Host: Vertebrata Osteichthyes

Lutjanus aya Bloch
Location: intestinal tract
Distribution: Gulf of Mexico, near Grand Isle
THATCHER, V.E., 1961

Rhopalothylax gymnorhynchoides Guiart, 1935 (larva)

REMARKS: Dollfus (1942) was unable to decide on the position of Rhopalothylax gymnorhynchoides based on Guiart's (1935) description.

Host: Vertebrata Selachii

Centroscymnus coelolepis Bocage and Capello, 1864
Location: liver
Distribution: Azores, Atlantic
GUIART, J., 1935a

Rhynchobothrium sp. Linton, 1899 (larva)

Host: Vertebrata Osteichthyes

Mola mola (L.)
Location: intestine wall
Distribution: Newfoundland
THRELFAil, W., 1967

Rhynchobothrium spinuliferus (Southwell, 1911) SEE: Trigonolobom sp.

Dollfus, 1929 (adult)

Symbothriorhynchus uranoscopi Yamaguti, 1952 (larva)

REMARKS: Yamaguti (1959) included Symbothriorhynchus in genera incertae sedis.

Host: Vertebrata Osteichthyes

Uranoscopus oligolepis Bleeker
Location: body cavity
Distribution: Tooa Bay, Japan
YAMAGUTI, S., 1952
**Syndesmobothrium filicolle**

**REMARKS:** Saxena (1980) commented that *Silondia silondia* was a true freshwater fish.

**Host:** Vertebrata Osteichthyes

*Silondia silondia*

- Location: mesentery
- Distribution: Varanasi, fish market, India

**SAXENA, S.K., 1980**

**Tetrarhynch sp. (larva)**

**Host:** Vertebrata Selachii

*Rhinobatos productus* (Ayres)

- Location: stomach
- Distribution: California, southern

**KUNNENKIERI, J.K. AND MARTIN, W.E., 1962**

*Urobatis helleri* (Cooper)

- Location: spiral valve
- Distribution: California, southern

**KUNNENKIERI, J.K. AND MARTIN, W.E., 1962**

**Osteichthyes**

*Atherinops californiensis*

- Location: mesentery, rectal
- Distribution: California, southern

**KUNNENKIERI, J.K. AND MARTIN, W.E., 1962**

*Bagre marina*

- Distribution: Galveston Bay, Texas

**CHANDLER, A.C., 1935a**

*Epiniphillus sp.*

- Location: muscle anterior to the caudal fin
- Distribution: Mediterranean Sea

**EL-AHWAL, A.A., 1970**

*Melanostigma pammelas* Gilbert

- Location: intestine, inside, stomach, outer surface
- Distribution: California, southern, bathypelagic waters off

**NOLBE, E.R. AND ORIAG, J.D., 1975**

*Synodus foetens*

- Location: intestine, body cavity
- Distribution: Biscayne Bay, Florida

**OVERSTREET, R.M., 1968**

**Tetrarhynchid sp. (larva)**

**Host:** Vertebrata Osteichthyes

*Spicara smaris* (L.)

- Location: intestine
- Distribution: Crimean coast and Caucasus coast, Black Sea

**NIKOLAEVA, V.M., 1963b**

*Trachurus trachurus trachurus* L.

- Distribution: Atlantic

**GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980a**

**Tetrarhynchus brevibothria* MacCallum 1921 (plerocercus)**

**Host:** Vertebrata Osteichthyes

*Lutianus sp.*

- Location: body cavity
- Distribution: Burma, Delta area

**KYAW-MYINT, 1968**
Tetrarhynchus fragilis Diesing

Host: Vertebrata Osteichthyes

Micropogon undulatus (Linnaeus)

Location: mesenteries

Distribution: Uruguay

BARATTINI, L.P., 1948

Tetrarhynchus fragilis (Diesing, 1855) (larva)

Host: Vertebrata Osteichthyes

Cynoscion sp.

Location: musculature

Distribution: Venezuela, Coast of

VOGELSANG, E.G. AND MAYAUDON, T.H., 1959

Epinephelus sp.

Location: musculature

Distribution: Venezuela, Coast of

VOGELSANG, E.G. AND MAYAUDON, T.H., 1959

Tetrarhynchus fragilis (larva)

Host: Vertebrata Osteichthyes

Macrodon ancylodae

Location: fillets

Distribution: Brazil, coastal waters of

SANTOS, L. DOS AND ZOGBI, E.P.V., 1971

Tetrarhynchus palaeceus

Host: Vertebrata Osteichthyes

Oncorhynchus keta (Walbaum)

Distribution: Amur Basin

ZMEJEV, G.J., 1936

Tetrarhynchus palaeceus Rud.

Host: Vertebrata Osteichthyes

Oncorhynchus gorbueche (Walbaum)

Distribution: Amur Basin

ZMEJEV, G.J., 1936

Tetrarhynchus sp.

Host: Vertebrata Osteichthyes

G. giuris (full name missing)

Location: muscle and ovary

Distribution: Chandpur, East Pakistan

ALI, M.Y., 1968

Thyrsites atun (Euphrasen, 1791)

Location: Trunk muscles, intestinal walls, mesentery

and peritoneum

Distribution: Australia

BLACKBURN, M., 1960

Trichinobom sp. Dollfus, 1929 (adult) syn. Rhynchobothrius spinuliferus

(Southwell, 1911)

REMARKS: Dollfus (1942) listed Rhynchobothrius spinuliferus as a member of the genus Trichinobom, belonging to the incertae

sedis.

Host: Vertebrata Selachii

Synias manazo

Location: spiral intestine

Distribution: Japan

IWATA, S., 1939

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PARASITE FAMILY
UNIDENTIFIED

Trypanorhynch larvae

REMARKS: Sey (1977) suggested that the larvae belong to genera Lacistorhynchus or Eutetrarhynchus on the basis of the larval anatomy.

Host: Vertebrata
Reptilia
Caretta caretta (L.)
Location: encysted in stomach serosa and outer surface of lungs
Distribution: Egypt, coast of SEY, O., 1977

Trypanorhynch sp.
Host: Invertebrata
Mollusca
Euclio pyramidata gen. sp.
Cephalopoda
Lepidoteuthis grimaldi Joubin, 1895
Location: mantle cavity
Crustacea
Crustacea sp.
Euphausia brevis
Euphausia diomedeae
Euphausia similis Sars
Euphausia sp.
Sergestes lucens
Sergestes sp.
Thysanopoda tricuspisida

Host: Vertebrata
Thaliacea
Salpae gen. sp.
Selachii
Hexanchus griseus (Gmelin)
Location: intestine
Distribution: Porcupine Bank REES, G. AND LLEWELLYN, J., 1941
Sphyra tiburo Linnaeus
Location: spiral valve
Distribution: Texas HENSON, R.N., 1975
Osteichthyes
Clupea harengus pallasi Valenciennes, 1847
Distribution: British Columbia
ARThUR, J.R. AND ARAI, H.P., 1980

Lepidopus lex Phillips, 1932
Distribution: New Zealand, Australia
KOROTAEVA, V. D., 1971

Ostorhinchus conwaii
Location: body cavity
Distribution: Great Australian Bight
KOROTAEVA, V. D., 1974a

Pleurogrammus azonus Jordan and Metz
Location: stomach, intestine
Distribution: Peter the Great Bay, Sea of Japan
BAEVA, O. M., 1968

Pomatomus saltatrix (L.)
Location: body cavity
Distribution: Rio de Janeiro

Psettodes erumei (Bloch and Schneider)
Distribution: South China Sea
PARUKHIN, A. M., 1967a

Rastrelliger kanagurta (Cuvier, 1829)
Location: body cavity, pyloric caeca
Distribution: Australia
KOROTAEVA, V. D., 1974b

Rexea solandri (Cuvier and Valenciennes, 1832)
Distribution: New Zealand, Australia
KOROTAEVA, V. D., 1971

Ruvettus tydemani Weber
Distribution: New Zealand, Australia
KOROTAEVA, V. D., 1971

Scomber australasicus (Cuvier et Valenciennes, 1832)
Location: body cavity
Distribution: Australia
KOROTAEVA, V. D., 1974b

Sebastodes alutus
Distribution: Pacific, north eastern
TKACHEV, V. A., 1976

Thyrsites atun (Euphrasen, 1791)
Distribution: New Zealand, Australia
KOROTAEVA, V. D., 1971

Trypanorhynch sp. (larva)
Host: Invertebrata Crustacea
Branchiostoma lanceolatum
Location: midgut
Distribution: Madras coast
AZARIAH, J., 1968

Host: Vertebrata Agnatha
Petromyzon sp.
REICHENBACH-KLINKE, H. AND ELKAN, E., 1965

Osteichthyes
Antimora rostrata
Distribution: New York Bight

Clupea harengus L., 1758
Distribution: Gulf of Mexico, southern
SINDERMANN, C. J., 1961a

Coryphaena equiseta Linnaeus, 1758
Location: stomach
Distribution: Atlantic Ocean

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GREER, J.K., 1976
Cymatogaster aggregata Gibbons
Distribution: California
ARAI, H.P., 1967
Dicrolene intronigra
Distribution: New York Bight
Echeneis naucrates L. 1758
Location: body cavity
Distribution: South China Sea
PARUKHIN, A.M., 1967b
Halosauropsis macrochir
Distribution: New York Bight
Nezumia bairdii (Goode and Bean, 1877)
Distribution: New York Bight
Pleuronectes platessa L.
Location: visceral cavity, gut wall
Distribution: Loch Ewe, Scotland
MACKENZIE, K. AND GIBSON, D.I., 1979
Pomatomus saltatrix (L.)
Location: intestine
Distribution: Guanabara State
GOMES GOMES, D., FABIO, S.P. DE AND TAYT-SON ROLAS, F., 1972
Sardinella sp.
Location: intestine
Distribution: Rio de Janeiro, Brazil
FEIJO, L.M.F., OLIVEIRA RODRIGUEZ, H. DE AND SORDRE RODRIGUEZ, S., 1979
Sciena aquilla (Loot)
Location: abdominal cavity wall, muscle
Distribution: Mediterranean
EL-AHWAL, A.A. AND EL-SHERIF, A.F., 1979
Scomber colias Gmelin
Location: intestine
Distribution: Africa, south west coast
SOLONCHENKO, A.I., 1968
Sebastes marinus (L.)
Location: stomach wall, mesenteries, adjacent
Distribution: Gulf of Maine, northern
SINDERMANN, C.J., 1961b
Snapper
Distribution: Persian Gulf
MOKHAYER, B., 1974
Stenobrachius leucopsarus Eigenman and Eigenman
Distribution: California, Basins off, Santa Cruz, Santa Barbara
COLLARD, S.B., 1979
Trachurus mediterraneus ponticus Aleev
KOVALEVA, A.A., 1979
Location: intestine, body cavity
Distribution: Black Sea
KOVALEVA, A.A., 1965
Trachurus trachurus trachurus L.
Distribution: North Sea, Atlantic, north
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Mammalia
Alepiaaurus aesculapius
Distribution: Kurile Island region
SKRYABIN, A.S., 1965
Balaenoptera acutorostrata
Distribution: Kurile Island region
SKRYABIN, A.S., 1965

Balaenoptera acutorostrata davidsoni
Distribution: Pacific, north
SKRYABIN, A.S., 1975

Balaenoptera borealis Lesson
Distribution: Kurile Island region
SKRYABIN, A.S., 1965

Cetomotopius jubatus Schr.
Distribution: Kurile Island region
SKRYABIN, A.S., 1965

Homo sapiens
Location: coughed up or vomited
Distribution: Hong Kong
GRIMMO, A.E.P. AND BUCKLEY, J.J.C., 1961

Physeter catodon L.
Distribution: Kurile Island region
SKRYABIN, A.S., 1965

Trypanorhynch sp. (plerocercoid)
Host: Invertebrata Crustacea
Penaeus indicus (Milne Edwards)
Location: musculature
Distribution: Mangalore, India
NATARAJAN, P., 1979

Penaeus sp.
Location: cephalothorax and digestive gland
Distribution: Mexico, north west coast
CRUZ-REYES, A., 1974b

Host: Vertebrata Osteichthyes
Clupea harengus pallasii Valenciennes, 1847
Location: encysted in liver and mesenteries
Distribution: California, Oregon
ARTHUR, J.R. AND ARAI, H.P., 1988

Cynoscion nebulosus (Cuvier)
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977

Micropogonias undulatus (Linnaeus)
Location: musculature
Distribution: Gulf of Mexico
OVERSTREET, R.M., 1977

Pleuronectes platessa L.
Location: kidney, liver
Distribution: Loch Ewe, Scotland
MACKENZIE, K., 1968

Trypanorhynch sp. (plerocercoids)
Host: Vertebrata Osteichthyes
Xiphias gladius Linnaeus, 1758
Location: muscles
Distribution: west coast of Africa
MUZYKOVSKII, A.M., 1972
Trypanorhynch sp. (plerocercus)
Host: Vertebrata  Osteichthyes
  *Platichthys flesus* (L.)
  Location: visceral cavity, gut wall
  Distribution: Ythan estuary, Loch Ewe, Aberdeen, Scotland
  MACKENZIE, K. AND GIBSON, D.I., 1976

*Scomber japonicus* Houttuyn
Location: stomach, body cavity
Distribution: Rio de Janeiro
REGO, A.A. AND SANTOS, C.P., 1983
Location: stomachs, intestines, caecae, abdominal cavities, mesenteries
DAILEY, M.D., 1969

Trypanorhynch sp. (plerocercus, two species)
Host: Vertebrata  Osteichthyes
  *Cynoacon striatus* (Cuvier)
  Location: body cavity
  Distribution: Rio de Janeiro
  REGO, A.A., SANTOS, J.C. AND SILVA, P.P., 1974

Trypanorhynch type 1 (plerocercoid)
Host: Vertebrata  Osteichthyes
  *Theragra chalcogramma* (Pallas, 1811)
  Location: mesenteries
  Distribution: West Coast, British Columbia, Pacific Ocean, north eastern
  ARTHUR, J.R., 1984

Trypanorhynch type 2 (plerocercoid)
Host: Vertebrata  Osteichthyes
  *Theragra chalcogramma* (Pallas, 1811)
  Location: headwash
  Distribution: Strait of Georgia, British Columbia, Pacific Ocean, north eastern
  ARTHUR, J.R., 1984
HOST-PARASITE LIST

INVERTEBRATA
SCYPHOZOA

Lichnorhiza sp.

Dibothriorchynchus dinoi Mendes, 1944 (larva)
MENDES, M.V., 1944

Stomolophus meleagris Agassiz
Dibothriorchynchus dinoi Mendes, 1944 (larva)
MENDES, M.V., 1944

MOLLUSCA

Euclio pyramidalis gen. sp.
Trypanorhynch sp.
SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

GASTROPODA

Bullia melanoides (Deshayes)
Christianella sp. (larva)
REIMER, L.W., 1975a

Busycon spiratum pyruloidea (Say)

Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977
Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1977

Cantharus cancellarius (Conrad)
Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

Crepidula fornicata (Linne)

Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1976
Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976

Fauciolaria lilium hunteria (Perry)

Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977
Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

Melongena corona (Gmelin)

Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1977
Pleuropleca gigantea (Kiener)
Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1977

Pleuropleca gigantea (Kiener)
Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1976

Polinices duplicatus (Say)
Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

Thais haematoma canaliculata (Gray)
Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

Thais rudolphi (Lamarck)
Christianella sp. (larva)
REIMER, L.W., 1975a
Tetrarhynchobothrium sp. (larva)
REIMER, L.W., 1975a

CEPHALOPODA

Architeuthis dux Steenstrup, 1857

Hepatoxylon trichiuri (Holten, 1882) (post-larva)

Cuc botoothus unguiculatus Molina (1782)
Tentacularia coryphaenae Bosc, 1802 (larva)
DOLLFUS, R.P., 1967b

Eledone Aldrovandi Rafin.

Nybelinia lingualia (Cuvier, 1817) (larva or post larva)
DOLLFUS, R.P., 1942

Eledone moschata (Lamarck, 1799)
Nybelinia lingualia (Cuvier, 1817) (post-larva)
DOLLFUS, R.P., 1958

Illex illecebrus illecebrosus (LeSueur, 1821)
Nybelinia sp. (post-larva)
BROWN, E.L. AND THRELFALL, W., 1968

Illex illecebrosus (LeSueur, 1821)
Tentacularia coryphaenae Bosc, 1802 (post-larva)
THRELFALL, W., LU, C. AND ALDRICH, F.A., 1971

Lepidoteuthis grimaldi Joubin, 1895

Nybelinia sp.

Trypanorhynch sp.

Loligo pealeii (LeSueur, 1821)

Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus) syn.
Lacistorhynchus tenuis (Van Beneden, 1858) Pintner, 1913
STUNKARD, H.W., 1977

Nybelinia biaulcata (Linton, 1889) Poche, 1926 (plerocercus)
STUNKARD, H.W., 1977

Nybelinia yamagutii Dollfus, 1960 (plerocercus)
STUNKARD, H.W., 1977

Otobothrium crenacolle Linton, 1899 (plerocercus)
STUNKARD, H.W., 1977

Octopus sp.

Nybelinia sp. (plerocercus)
ADAM, W., 1938

Ommastrephes bartramii LeSueur

Nybelinia lingualia (Cuvier, 1817) (larva)
GAEVKAYA, A.V., 1976
Tentacularia coryphaenae Bosc, 1802 (larva)
GAEVKAYA, A.V., 1976
Ommastrephes caroli Furtado, 1887
Tentacularia coryphaenae Bosc, 1802 (post-larva)
Threlfall, W., Lu, C. And Aldrich, F.A., 1971
Sthenoteuthis pteropus (Steenstrup, 1855)
Nybelinia lingualis (Cuvier, 1817) f. typica (larva)
Gaevskaya, A.V., 1977
Nybelinia lingualis (Cuvier, 1817) var. 1 (larva)
Gaevskaya, A.V., 1977
Nybelinia sp. (larva)
Gaevskaya, A.V., 1977
Nybelinia yamagutii Dollfus, 1960 (larva)
Gaevskaya, A.V., 1977
Tentacularia coryphaenae Bosc, 1802
Gaevskaya, A.V., 1978
Tentacularia coryphaenae Bosc, 1802 (larva)
Gaevskaya, A.V., 1977
Gaevskaya, A.V. And Nigmatullin, C.M., 1981
Todarodes pacificus Steenstrup
Nybelinia surmenicola Okada in Dollfus, 1929
Kurochkin, Y.V., 1972
Shimazu, T., 1975b

Pelecypoda
Anadara transversa (Say)
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1976
Argopecten irradians concentricus (Say)
Eutetrarhynchus sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977
Atrina rigida (Lightfoot)
Eutetrarhynchus sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977
Atrina seminuda (Lamarck)
Eutetrarhynchus sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977
Nybelinia sp. (larva)
Wardle, W.J., 1974
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977
Chione cancellata (Linne)
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1976
Chione cancellata (Linne) (sp.1)
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1977
Donax variabilis (Say)
Nybelinia sp. (larva) syn. "Scolex" sp. VIII
Wardle, W.J., 1974
Parachristianella sp. (plerocercoid)
Cake, E.W. Jr., 1976
Cake, E.W. Jr., 1977

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Dosinia discus (Reeve)

Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1976

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1977

Ensia sp.

Eutetrarhynchus sp. (plerocercoid)
CAKE, E.W. JR., 1977

Macrocallista maculata (Linne)

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

Macrocallista nebulosa (Lightfoot)

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1977

Macrocallista nimboea (Lightfoot)

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976

Noetia ponderosa (Say)

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

pelecypod

Eutetrarhynchus sp. (post-larva)
CAKE, E.W. JR., 1975

Parachristianella sp. (post-larva)
CAKE, E.W. JR., 1975

Raeta plicatella (Lamarck)

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976

Spisula solidissimae similis (Say)

Parachristianella sp. (plerocercoid)
CAKE, E.W. JR., 1976
CAKE, E.W. JR., 1977

CRUSTACEA

Acartia tonsa

Lecistorhynchus tenue (Van Beneden, 1858) syn. Lecistorhynchus
tenue (Van Beneden, 1858)
STUNKARD, H.W., 1981

Branchiostoma lanceolatum

Trypanorhynch sp. (larva)
AZARIAH, J., 1968

Callianassa sp.

Christianella trygonis-bucconis (Wagener, 1854) (larva)
YOUNG, R.T., 1954

Copepods (unspecified)

Prochristianella hiapida (Linton, 1899) Campbell and Carvajal,
1975 (oncosphere, procercoid, plerocercus)
OVERSTREET, R.M., 1983

Crustacea sp.

Trypanorhynch sp.

SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

Dilocarcinus (Dilocarcinus) pagei Stimson, 1861

Eutetrarhynchus arenys (Woodland, 1934) Yamaguti, 1959 (post-larva)
REGO, A.A., 1982

Euphausia brevis

Trypanorhynch sp.

SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

Euphausia diomedea

Trypanorhynch sp.

SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974
Euphausia pacifica Hansen
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
SHIMAZU, T., 1975c

Euphausia simulans Sara
Eutetrarhynchidae sp. (larva)
SHIMAZU, T., 1975a
Tetrarhynchobothrium sp. (larva)
SHIMAZU, T., 1975a
Trypanorhynch sp.
SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

Euphausia sp.
Trypanorhynch sp.
SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

Euphausiid sp.
Nybelinia surmenicola Okada in Dollfus, 1929
SHIMAZU, T., 1975b
SHIMAZU, T., 1975c

Hemigrapsus

Christianella trygonia-bucconis (Wagener, 1854) (larva)
YOUNG, R.T., 1954a

Macropipus depurator (L.)
Eutetrarhynchus ruficollis (Eyseenhardt, 1829) (larva)
VIVARES, C.P., 1971

Metapenaeus affinis (Milne Edwards) (larva)
Eutetrarhynchus leucomelanus (Shipley and Hornell, 1966) (larva)

Metapenaeus brevisornis (Milne Edwards) (larva)
Eutetrarhynchus leucomelanus (Shipley and Hornell, 1966) (larva)

Metapenaeus monoceros (Fabricius, 1788) (larva)
Eutetrarhynchus leucomelanus (Shipley and Hornell, 1966) (larva)

Parachristianella sp. (plerocercoid)
REIMER, L.W., 1984

Prochristianella sp. (plerocercoid)
REIMER, L.W., 1984

Pachygrapsus sp.
Christianella trygonia-bucconis (Wagener, 1854) (larva)
YOUNG, R.T., 1954a

Parapenaeus stylifera Alcock
Eutetrarhynchus leucomelanus (Shipley and Hornell, 1966) (larva)

Penaeus azteceus Ives

Parachristianella dimegacantha (larva)
CORKERN, C.C., 1978

Parachristianella monomegacantha (larva)
CORKERN, C.C., 1978

ALDRICH, D.V., 1965
KRUSE, D.N., 1959
RAGAN, J.C. AND ALDRICH, D.V., 1972
Prochristianella hipida (Linton, 1890) Campbell and Carvajal, 1975 (plerocercus) syn. Prochristianella sp. in Hutton et al. (1959)
HUTTON, R.F., SOGANDARES-BERNAL, F., ELDRED, B., INGLE, R.M. AND WOODBURN, K.D., 1959
Prochristianella penaei (larva)
CORKERN, C.C., 1978
Penaeus brasiliensis Latreille
Parachriatianella heteromegacanthus Feigenbaum, 1975
(plerocercoid)
COUCH, J.A., 1978
Parachriatianella heteromegacanthus Feigenbaum, 1975 (plerocercus)
FEIGENBAUM, D.L., 1975
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Parachriatianella monomegacantha Kruse, 1959 (plerocercus)
FEIGENBAUM, D.L., 1975
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (plerocercus)
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (plerocercus) syn. Rynchobothrium hispidum Linton, 1899
syn. Prochristianella penaei Kruse, 1959
FEIGENBAUM, D.L., 1975
Renibulbua penaeus Feigenbaum, 1975 (plerocercus)
FEIGENBAUM, D.L., 1975
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Penaeus duorarum Burkenroad
Parachristianella dimegacantha Kruse, 1959
KRUSE, D.N., 1959
Parachriatianella heteromegacanthus Feigenbaum, 1975 (plerocercus)
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Parachriatianella monomegacantha Kruse, 1959
KRUSE, D.N., 1959
Parachriatianella monomegacantha Kruse, 1959 (plerocercus)
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Parachriatianella monomegacantha Kruse, 1959 (plerocercus) syn. Prochristianella sp. of Villella, Iversen and Sindermann (1979)
VILLELLA, J.B., IVERSEN, E.S. AND SINDERMANN, C.J., 1979
COUCH, J.A., 1978
Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (plerocercus)
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
KRUSE, D.N., 1959
VILLELLA, J.B., IVERSEN, E.S. AND SINDERMANN, C.J., 1979
Prochristianella hispida (Linton, 1899) Campbell and Carvajal, 1975 (plerocercus) syn. Prochristianella sp. in Hutton et al. (1959)
HUTTON, R.F., SOGANDARES-BERNAL, F., ELDRED, B., INGLE, R.M. AND WOODBURN, K.D., 1959
Renibulbua penaeus Feigenbaum, 1975 (plerocercus)
FEIGENBAUM, D.L. AND CARNUCCIO, J., 1976
Penaeus indicus Edwards, 1837
Parachristianella sp. (plerocercoid)
REIMER, L.W., 1984
Prochristianella sp. (plerocercoid)
REIMER, L.W., 1984
Penaeus indicus (Milne Edwards)
Eutetrarhynchus leucomelanus (Shipley and Hornell, 1906) (larva)
CHANDRA, K.J., RAO, K.H. AND SHYAMASUNDARI, K., 1981
Gymnorhynchus malleus (larva)
CHANDRA, K.J. AND RAO, K.H., 1982
Trypanorhynch sp. (plerocercoid)
NATARAJAN, P., 1979
Penaeus japonicus Bate, 1888
Parachriatianella ap. (plerocercoid)
REIMER, L.W., 1984
Prochriatianella ap. (plerocercoid)
REIMER, L.W., 1984
Penaeus merguiensis de Man
Parachriatianella monomegacantha Kruse, 1959 (plerocercus)
OWENS, L., 1980
OWENS, L., 1981
Penaeus monodon Fabricius, 1798
Parachriatianella ap. (plerocercoid)
REIMER, L.W., 1984
Prochriatianella ap. (plerocercoid)
REIMER, L.W., 1984
Penaeus semisulcatus (de Haan)
Eutetrarhynchus leucomelanus (Shipley and Hornell, 1906) (larva)
CHANDRA, K.J., RAO, K.H. AND SHYamasundari, K., 1981

Penaeus setiferus L.
Prochriatianella hispida (Linton, 1890) Campbell and Carvajal, 1975 (plerocercus)
OVERSTREET, R.M., 1983
RAGAN, J.C. AND ALDRICH, D.V., 1972
Prochriatianella hispida (Linton, 1890) Campbell and Carvajal, 1975 (plerocercus) syn. Prochriatianella penaei Kruse, 1959
ALDRICH, D.V., 1965
Prochriatianella hispida (Linton, 1890) Campbell and Carvajal, 1975 (plerocercus) syn. Prochriatianella sp. in Hutton et al. (1959)
HUTTON, R.F., SOGANDARES-BERNAL, F., ELDRED, B., INGLE, R.M. AND WOODBURN, K.D., 1959

Penaeus setiferus (L.)
Prochriatianella hispida (Linton, 1890) Campbell and Carvajal, 1975 (larva) syn. Eutetrarhynchus sp. of Sparks and Mackin (1957)
SPARKS, A.K. AND MACKIN, J.G., 1957
Prochriatianella hispida (Linton, 1890) Campbell and Carvajal, 1975 (plerocercoid) syn. Prochriatianella penaei Kruse, 1959
SPARKS, A.K. AND FONTAINE, C.T., 1973
Prochriatianella hispida (Linton, 1890) Campbell and Carvajal, 1975 (plerocercus) syn. Prochriatianella penaei Kruse, 1959
KRUSE, D.N., 1959

Penaeus sp.
Trypanorhynch sp. (plerocercoid)
CRUZ-REYES, A., 1974b

Penaeus trispiculatus Leach
Eutetrarhynchus ruficollis (Eyesnhardt, 1829) (plerocercoid)
HELDT, J.H., 1949

Sergestes lucens
Trypanorhynch sp.
SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

Sergestes sp.
Trypanorhynch sp.
SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974

Thysanoessa inermis Krøyer
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
SHIMAZU, T., 1975c

Thysanoessa longipes Brandt
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
SHIMAZU, T., 1975c

Thysanoessa raschii (Sars)
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
SHIMAZU, T., 1975c
Thysanoessa sp.
Nybelinia sp.
   TSIMBALYUK, E.M., 1980
Thysanopoda tricuspidata
Trypanorhynch sp.
   SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974
Tigriopus californicus
   Laciatorhynchus tenuis (Van Beneden, 1858) (procercoid)
      MUDRY, D.R., DAILEY, M.D., 1971
      SAKANARI, J. AND MOSEY, M., 1985b
   Parachristianella monomegacantha Kruse, 1959 (procercoid)
      MUDRY, D.R., DAILEY, M.D., 1971
Tigriopus fulvus (Fisher)
   Laciatorhynchus tenuis (Van Beneden, 1858) (procercoid)
      RISER, N.W., 1951
      RISER, N.W., 1956
Trachypenaes constrictus (Stimpson)
   Prochristianella hispida (Linton, 1890) Campbell and Carvajal,
      1975 (plerocercus) syn. Prochristianella sp. in Hutton et al.
      (1959)
      HUTTON, R.F., SOGANDARES-BERNAL, F., ELDRED, B., INGLE, R.M.
      AND WOODBURN, K.D., 1959
Upogebia gracilipes De Man 1927
   Eutetrarhynchus carayoni Dollfus, 1942 (plerocercus-tentative
      identification)
      DOLLFUS, R.P., 1946b
Upogebia atellata (Montagu, 1808)
   Prochristianella trygonis Dollfus, 1946 (plerocercus)
      DOLLFUS, R.P., 1946b
   Prochristianella trygonicolor Dollfus, 1946 (plerocercus)
      DOLLFUS, R.P., 1946b
Valdivia serrata Bott, 1969
   Eutetrarhynchus araya (Woodland, 1934) Yamaguti, 1959 (post-larva)
      REGO, A.A., 1982

VERTEBRATA
THALIACEA
   Salpae gen. sp.
      Trypanorhynch sp.
         SLANKIS, A.Y. AND SHEVCHENKO, G.G., 1974
AGNATHA
   Geotria australis Gray
      Hepatoxylon trichiuri (Holten, 1882) (plerocercoid)
         LETHBRIDGE, R.C., POTTER, I.C., BRAY, R.A. AND HILLIARD, R.W.,
         1983
   Lampetra japonica (Martens)
      Nybelinia sp.
         STRELKOV, YU A. AND SHULMAN, S.S.
   Petromyzon sp.
      Trypanorhynch sp. (larva)
         REICHENBACH-KLINKE, H. AND ELKAN, E., 1985
SELACHII
   Acantias vulgaris Risso, 1826 SEE: Squalus acanthias (Rondelet,
      1554) L.1754
   Aetobatus tenuicaudatus (Hector)
      Prochristianella aetobatis Robinson, 1959
         ROBINSON, E.S., 1959b
   Aiptasia superciliosa (Lowe)
      Sphyriocephalus pelorosoma Heinz and Dailey, 1974 (adult)
         HEINZ, M.L. AND DAILEY, M.D., 1974
      Sphyriocephalus viridis (Wagener, 1854) Pintner, 1913
HEINZ, M.L. AND DAILEY, M.D., 1974
Alopias vulpinus (Bonnaterre)
Hepatoxyllon trichiuri (Holten, 1892) syn. Hepatoxyllon squali
(Martin, 1797) in Heinz and Dailey, 1974
HEINZ, M.L. AND DAILEY, M.D., 1974
Molicia uncinitus (Linton, 1924)
HEINZ, M.L. AND DAILEY, M.D., 1974
Bathyraja richardsoni (Garick, 1961)
Grillitosa (Paragrillitosa) rowei Campbell, 1977 (immature adult)
CAMPBELL, R.A., 1977
Carcharodon lamia
Gymnorhynchus gigas (Cuvier, 1817) (adult)
LOPEZ-NEYRA, C.R., 1947
Carcharhinus amblyrhynchos Bleeker
Dasyrhynchus giganteus (Diesing, 1859) Pintner, 1928 (immature adult)
Pseudogrillottia basipunctata Carvajal, Campbell and Cornford, 1976 (adult)
Carcharhinus galapagensis (Snodgrass and Heller)
Tentacularia coryphaenae Boas, 1892 (adult)
Carcharhinus japonicus
Floricope saccatus Cuvier, 1817 (adult) syn. Dasyrhynchus ingens
(Linton, 1921) (adult)
IWATA, S., 1939
Carcharhinus leucac (Moller and Henle, 1841)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
WATSON, D.E. AND THORSON, T.B., 1976
Dasyrhynchus giganteus (Diesing, 1859) Pintner, 1928 (adult)
BUTEAU, JR., G.H., SIMMONS, J.E., FAIRBAIRN, D., 1969
Dasyrhynchus variuncinatus (Pintner, 1913) Pintner, 1928
WATSON, D.E. AND THORSON, T.B., 1976
Eutetrarhynchid sp.
HENSON, R.N., 1975
Nybelinia biaulcata (Linton, 1889) Poche, 1926
WATSON, D.E. AND THORSON, T.B., 1976
Nybelinia linguale (Cuvier, 1817)
HENSON, R.N., 1975
Otobothrium penetrans Linton, 1907
WATSON, D.E. AND THORSON, T.B., 1976
Poecilanciatrium caryophyllum (Diesing, 1859) Dollfus, 1929 (adult)
BUTEAU, JR., G.H., SIMMONS, J.E., FAIRBAIRN, D., 1969
GOLDSTEIN, R.J., 1964
Poecilanciatrium robustum (Chandler, 1935) Dollfus, 1942 (adult)
GOLDSTEIN, R.J., 1962
Carcharhinus leucac (Moller and Henle, 1841) syn. Prionodon platydon
(Poey, 1861) syn. Carcharhinus commersoni Blainville, 1816
Dasyrhynchus giganteus (Diesing, 1859) Pintner, 1928 (adult)
DOLLFUS, R.P., 1961
Carcharhinus limbatus (Moller and Henle)
Otobothrium minutum Subhapradha, 1955 (adult)
SUBHAPRADHA, C.K., 1955
Otobothrium penetrans Linton, 1907
SHULER, R.H., 1930
Poecilanciatrium robustum (Chandler, 1935) Dollfus, 1942 (adult)
THATCHER, V.E., 1961
Carcharhinus limbatis (Valenciennes)

Dasyrhyynchus giganteus (Diesing, 1850) Pintner, 1928 (immature adult)


Floriceps saccatus Cuvier, 1817

HEINZ, M.L. AND DAILEY, M.D., 1974

Tentacularia coryphaenae Bosc, 1802

HEINZ, M.L. AND DAILEY, M.D., 1974

Carcharhinus longimanus (Poey, 1861)

Dasyrhyynchus talismani Dollfus, 1935

HEINZ, M.L. AND DAILEY, M.D., 1974

Tentacularia coryphaenae Bosc, 1802

HEINZ, M.L. AND DAILEY, M.D., 1974

Tentacularia coryphaenae Bosc, 1802 (adult)

REGO, A.A., 1977

Carcharhinus platyodon (Poey)

Grillotia perelica (Shuler, 1938) Dollfus, 1942 (adult)

REES, G., 1969

Carcharias acutus Muller and Henle

Nybelinia pinteri Yamaguti, 1934 (adult)

DESHMUKH, R.A., 1980

Carcharias (Galeus) glaucus (Rond., 1554) Rafinesque, 1813

Hepatoxylon trichiuri (Holten, 1802) (post-larva) syn.

Dibothriorynchus carchariae (Welch, 1876)

GUIART, J., 1935a

Carcharias platyodon (Poey)

Dasyrhyynchus insigne (Linton, 1924)

CHANDLER, A.C., 1942

Carcharias (Prionodon) glaucus (L.) Müller and Henle SEE: Galeus glaucus Rondelet, 1554

Carcharias sp.

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (adult)

syn. Tentacularia macfiei Southwell, 1929

SUBHAPRADHA, C.K., 1955

Dasyrhyynchus variouncinatus (Pintner, 1913) Pintner, 1928

SUBHAPRADHA, C.K., 1955

Floriceps saccatus Cuvier, 1817

SUBHAPRADHA, C.K., 1955

Grillotia perelica (Shuler, 1938) Dollfus, 1942

SUBHAPRADHA, C.K., 1955

Tentacularia coryphaenae Bosc, 1802 (adult)

SUBHAPRADHA, C.K., 1955

Carcharias walboehmi Bleeker

Otobothrium minutum Subhapradha, 1955 (adult)

SUBHAPRADHA, C.K., 1955

Carcharias walboehmi Bleeker

Nybelinia sp. (adult)

SUBHAPRADHA, C.K., 1955

Carcharias melanopterus (Quoy and Gaimard)

Nybelinia perideraeus (Shipley and Hornell, 1906) (adult)

DOLLFUS, R.P., 1942

Otobothrium cysticum (Mayer, 1842) (plerocercus)

DOLLFUS, R.P., 1942

Carcharodon carcharias (Linnaeus)

Hepatoxylon megacephalum (Rudolphi, 1819) (adult)

ROBINSON, E.S., 1959a

Centrophorus squamosus (Gmelin)

Grillotia erinaceus (Van Beneden, 1858) (larva)

REES, G. AND LLEWELLYN, J., 1949
Centroacuillum granulatum Günther, 1886
Gonther, 1886

Gilquinia squilla (Fabricius, 1794) (immature adult)
CARVAJAL, J., 1974

Centroacynus coelolepis Bocage and Capello, 1864
Grilliotia dolichocephala (Guiart, 1935) (larva)
GUIART, J., 1935a
Grilliotia acolecina (Rudolphi, 1819) (larva)
GUIART, J., 1935a
Rhopalothylax gymnorrhynchoidea Guiart, 1935 (larva)
GUIART, J., 1935a

Sphyriaccephalus viridis (Wagener, 1854) Pintner, 1913 (post-larva)
syn. Sphyriaccephalus Alberti Guiart, 1935
GUIART, J., 1935a

Sphyriaccephalus viridis (Wagener, 1854) (post-larva) syn.
Sphyriaccephalus alberti Guiart, 1935
BUSSIERAS, J., 1974

Cetrina vulpecula Cuv
Gymnorhynchus gigas (Cuvier, 1817) (adult)
LOPEZ-NEYRA, C.R., 1947

Chiloscyllium griseum Müller and Henle
Eulacistorhynchus chiloscylliua Subhapradha, 1955 (adult)
SUBHAPRADHA, C.K., 1955

Daenina kioakurai Whitley
Hepatoxylon trichiuri (Holten, 1882) (post-larva)
ROBINSON, E.S., 1959a

Dasystis akajii
Pterobothrium malleum (Linton, 1924) (adult)
IWATA, S., 1939

Dasystis americana Hildebrand and Shroeder
Parachristianella monomacanthe Kruse, 1959 (adult)
CAMPBELL, R.A. AND CARVAJAL, J., 1975
Prochristianella hispida (Linton, 1899) Campbell and Carvajal,
Prochristianella penaei Kruse, 1959
CAMPBELL, R.A. AND CARVAJAL, J., 1975

Dasystis centrura
Pterobothrium lintonii (MacCallum, 1916)
SIMMONS, J.E., 1961

Dasystis lata (Garman)
Parachristianella monomacanthe Kruse, 1959 (adult)
CAMPBELL, R.A. AND CARVAJAL, J., 1975
Prochristianella microcantha Carvajal, Campbell and Cornford, 1976
(immature adult)
CAMPBELL, R.A. AND CORNFORD, E.M., 1976
Pterobothrium hawaiians Carvajal, Campbell and Cornford, 1976
(adult)
CAMPBELL, R.A. AND CORNFORD, E.M., 1976

Dasystis pastinaca L.
Christianella minuta (Van Beneden, 1849) (adult)
KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978
Eutetrarhynchus sp. (adult)
CHAUDHURY, A. AND ROY, A., 1982

Dasystis sabine Le Sueur
Prochristianella hispida (Linton, 1899) Campbell and Carvajal,
1975 (pre adult and adult) syn. Prochristianella penaei Kruse,
1959
ALDRICH, D.V., 1965
Prochristianella hispida (Linton, 1899) Campbell and Carvajal,
1975 syn. Prochristianella penaei Kruse, 1959
HENSON, R.N., 1975
Prochristianella tenuiapine (Linton, 1899)
HENSON, R.N., 1975

Dasyatis uarnak
Eutetrarhynchus sp. (adult)
CHOU DHURY, A. AND ROY, A., 1982
Pterobothrium sp. (plerocercus)
TANDON, R.S., 1972

Dasyatis violacea Bonaparte
Nybelinia sp.
DOLLFUS, R.P., 1969a
Progrillotia louiaeuzati Dollfus, 1969 (immature adult)
DOLLFUS, R.P., 1969a

Dasybatis sp.

Eutetrarhynchus lineatus (Linton, 1899) syn. Tentacularia lineata (Linton, 1909) Shuler, 1938
SHULER, R.H., 1938

Grillotia (Paragrillotia) simonsi Dollfus, 1969 (adult)
BUTEAU, JR., G.H., SIMMONS, J.E., FAIRBAIRN, D., 1969

Eugaleus galeus (L., 1758) Gill, 1864
Laciatorhynchus tenuis (Van Beneden, 1858) (adult) syn.
Laciatorhynchus bulbifer (Linton, 1899)
GIUART, J., 1935a

Euprotomicrus bispinatus (Quoy and Gaimard, 1842)
Sphyriocephalus tergestinus Pintner, 1913 (adult)
DOLLFUS, R.P., 1967a

Galeocerdoxus makey Macleay
Hepatoxy1on megacephalum (Rudolphi, 1819) (post-larva)
ROBINSON, E.S., 1959a
Laciatorhynchus tenuis (Van Beneden, 1858) (adult)
ROBINSON, E.S., 1959a

Galeoidea polydactylus
Nybelinia africana Dollfus, 1969 (post-larva)
DOLLFUS, R.P., 1969b

Galeus canis (Rondelet, 1554) syn. Squalus galeus L., 1758 syn.
Eugaleus galeus (L., 1758) Gill, 1864 syn. Galeocerdoxus galeus (L., 1758) Blainville, 1816
Laciatorhynchus tenuis (Van Beneden, 1858) (adult)
DOLLFUS, R.P., 1942

Galeus glaucus Rondelet, 1554
Chuia Racovitzai Guiart, 1935 (larva)
GIUART, J., 1935a
Tentacularia coryphaenae Bosc, 1802 (adult) syn. Tentacularia rugosa (Leuckhart, 1859)
GIUART, J., 1935a

Galeus glaucus Rondelet, 1554 syn. Carcharias (Prionodon) glaucus (L.) Møller and Hanke

Galeus glaucus telianum Dollfus, 1935 (adult)
DOLLFUS, R.P., 1942

Hepatoxy1on trichiuri (Holten, 1892) (post-larva)
DOLLFUS, R.P., 1942

Ginglymostoma cirratum
Eutetrarhynchus lineatus (Linton, 1909) syn. Tentacularia lineata (Linton, 1909) Shuler, 1938
SHULER, R.H., 1938

Grillotia (Paragrillotia) simonsi Dollfus, 1969 (adult)
BUTEAU, JR., G.H., SIMMONS, J.E., FAIRBAIRN, D., 1969
Tentacularia similis (Linton, 1909) Shuler, 1938 syn. Rhynchobothrium similis Linton, 1909
SHULER, R.H., 1938

Ginglymostoma cirratum (Bonnaterre)
Eutetrarhynehus lineatus (Linton, 1909) syn. Tentacularia lineata
(Linton, 1909) (adult)
DOLLFUS, R.P., 1942

Ginglymostoma cirratum (Gmelin, 1788)
Grillotia (Paragrillotia) simoni Dollfus, 1969 (adult)
DOLLFUS, R.P., 1969b

Heterodontus francisci (Girard)
Nybelinia anticosum Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974

Hexanchus griseus (Bonnaterre, 1788)
Grillotia heptanchi (Vaullegeard, 1899) (adult)
CARVAJAL, J., 1971
CARVAJAL, J., 1974
Grillotia megabothridia (Hart, 1936) (adult) syn. Tentacularia megabothridia Hart, 1936 syn. Grillotia heptanchi (Vaullegeard, 1899)
HART, J.F., 1936
Grillotia spinosissima Dollfus, 1969 (larva, immature adult, adult)
DOLLFUS, R.P., 1969a

Nybelinia sp.
DOLLFUS, R.P., 1969a
Nybelinia surmenicola Nagoda in Dollfus, 1929 (larva) syn.
Nybelinia sp. of Wardle (1932) syn. Tetrarhynehus sp. of Hart (1936)
HART, J.F., 1936

Hexanchus griseus (Gmelin)
Grillotia acanthoscolex Rees, 1944 (adult)
REES, G., 1944
Trypanorhynch sp.
REES, G. AND LLEWELLYN, J., 1941

Hypoprion brevirostris Poey
Callitetrarhynehus gracilis (Rudolphi, 1819) Pintner, 1931 syn. Tentacularia pseudodore Shuler, 1938
SHULER, R.H., 1938
Dasyrhynehus variouncinatus (Pintner, 1913) Pintner, 1928 syn. Tentacularia insignis (Linton, 1819) Shuler, 1938
SHULER, R.H., 1938
Grillotia perelica (Shuler, 1938) Dollfus, 1942 (adult) syn. Tentacularia perelica Shuler, 1938
SHULER, R.H., 1938

Hypoprion brevirostris Poey SEE: Negaprion brevirostris (Poey, 1868)

Isurus glaucus
Gymnochonexus (Malicola) horridus Goodir, 1841 (adult)
IWATA, S., 1939
Hepatoxylon trichiuri (Holten, 1862) (adult) syn.
Dibothriophyoneus equili La Martinère, 1797
IWATA, S., 1939
Sphyriocephalus viridis (Wagener, 1854) Pintner, 1913 (adult)
IWATA, S., 1939

Isurus glaucus (Müller and Henle)
Gymnochonexus ieuiri Robinson, 1959 (adult)
ROBINSON, E.S., 1959b
Hepatoxylon trichiuri (Holten, 1862) (post-larva)
ROBINSON, E.S., 1959b
LUMSDEN, R.D., 1965
LUMSDEN, R.D., 1966a
LUMSDEN, R.D., 1966b
LUMSDEN, R.D., 1967
OAKS, J.A. AND LUMSDEN, R.D., 1971
Laciatorhynchus tenuis (Van Beneden, 1858) (adult) syn.
Laciatorhynchus tenuis (Van Beneden, 1858)
STUNKARD, H.W., 1981
Mustelicola woodaholei Dollfus, 1969 (adult)
DOLLFUS, R.P., 1969b
Nybelinis eurei Dollfus, 1969 (post-larva)
DOLLFUS, R.P., 1969b
Tetrarhynchobothrium setiensae Dollfus, 1969 (larva)
DOLLFUS, R.P., 1969a
Mustelus henlei (Gill)
Laciatorhynchus tenuis (Van Beneden, 1858)
HEINZ, M.L. AND DAILEY, M.D., 1974
Mustelus manazo Bleeker
Nybelinis manazo Yamaguti, 1952 (adult)
YAMAGUTI, S., 1952
Mustelus mento Cope, 1877
Prochristianella mustelis Carvajal, 1974 (adult)
CARVAJAL, J., 1974
Mustelus mustelus (Linnaeus, 1758)
Eutetrarhynchus ruficollis (Eysenhardt, 1829) (adult)
DOLLFUS, R.P., 1969a
Laciatorhynchus tenuis (Van Beneden, 1858) (adult)
DOLLFUS, R.P., 1969a
Tetrarhynchobothrium setiensae Dollfus, 1969 (larva)
DOLLFUS, R.P., 1969a
Myliobatis aquila (Linnaeus, 1758)
Eutetrarhynchus glaber Dollfus, 1969 (adult)
DOLLFUS, R.P., 1969a
Eutetrarhynchus spinifer Dollfus, 1969 (larva, adult)
DOLLFUS, R.P., 1969a
Parachristianella trygonis Dollfus, 1945 (adult) syn.
Christianella trygon-brucco of Euzet, 1956
EUZET, L., 1956
Parachristianella trygonis Dollfus, 1946 (immature adult)
DOLLFUS, R.P., 1969a
Tetrarhynchobothrium setiensae Dollfus, 1969 (larva, adult)
DOLLFUS, R.P., 1969a
Tetrarhynchobothrium tenuicolle Diesing, 1859 (adult)
EUZET, L., 1956
Myliobatis californica
Neotetrahynchus myliobati Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974
Myrtillo manazo (Bik.)
Myrtillochrynsus pearsoni (Southwell, 1929) Bilqees, 1988 (adult)
syn. Tetrarhynchus pearsoni Southwell, 1929
BILQES, F.M., 1988
Otobothrium karachiensis Bilqees and Muslehuddin, 1976 (adult)
BILQES, F.M. AND MUSLEHUDDIN, R., 1976
Tentacularia sp. (adult)
BILQES, F.M. AND MUSLEHUDDIN, R., 1976
Negaprion brevirostris (Poeay, 1868)
Floriceps caballeroi Cruz-Reyes, 1977 (adult)
CRUZ-REYES, A., 1977
Floriceps acanthus Cuvier, 1817 (adult)
CRUZ-REYES, A., 1977b
Poecilancistrum caryophyllum (Diesing, 1859) Dollfus, 1929 (adult)
GOLDSTEIN, R.J., 1963
Poecilanciatrium robustum (Chandler, 1935) Dollfus, 1942 (adult)
GOLDSTEIN, R.J., 1962
Negaprion brevirostris (Poey, 1868) syn. Hypoprion brevirostris Poey
Dasyrhynchus giganteus (Diesing, 1859) Pintner, 1928 (adult)
DOLLFUS, R.P., 1969b
Notorhynchus maculatus Ayres, 1855
Floriceps aequatus Cuvier, 1817
HEINZ, M.L. AND DAILEY, M.D., 1974
Nybelinia sp.
PAPPAS, P.W., 1970
Notorhynchus pectorosus (Garman)
Grillotia heptanchi (Vaulgeard, 1889) (adult)
ROBINSON, E.S., 1959a
Hepatoxylon megacephalum (Rudolphi, 1819) (poath-larva)
ROBINSON, E.S., 1959a
Oxyrhina PallanZanii (Rafinesque, 1818) Bonaparte, 1841 SEE:
Isurus oxyrinchus Rafinesque, 1818
Oxyrhina pallanZanii Bonaparte
Gymnorrhynchus gigas (Cuvier, 1817) (adult)
LPEZ-NEYRA, C.R., 1947
Paratrygon hystrix (Moller and Henle)
Eutetrarhynchus areya (Woodland, 1934) Yamaguti, 1959
REGO, A.A., 1979
Paratrygon motoro (Moller and Henle)
Eutetrarhynchus areya (Woodland, 1934) Rego and Dias, 1976
REGO, A.A., 1979
Eutetrarhynchus areya (Woodland, 1934) Yamaguti, 1959 (adult) syn.
Eutetrarhynchus baeri Lopez-Neyra and Diaz-Ungria, 1958
REGO, A.A. AND DIAS, A.P.L., 1976
Platyrhinoidia triseriata (Gordon and Gilbert)
Prochristianella minima Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974
Platysqualus tudes (Cuvier)
Diplometobothrium springeri Chandler, 1942 (adult)
CHANDLER, A.C., 1942
Potamotrygon falkneri
Eutetrarhynchus areya (Woodland, 1934) Rego and Dias, 1976 (adult)
syn. Eutetrarhynchus baeri Lopez-Neyra and Diaz-Ungria, 1958
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981
Potamotrygon hyestrix (Moller and Trochel)
Eutetrarhynchus areya (Woodland, 1934) Yamaguti, 1959 (adult)
LPEZ-NEYRA, C.R. AND DIAZ-UNGRIA, C., 1958
Eutetrarhynchus areya (Woodland, 1934) Yamaguti, 1959 (adult) syn.
Eutetrarhynchus baeri Lopez-Neyra and Diaz-Ungria, 1958
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981
Potamotrygon motoro (Moller and Henle)
Eutetrarhynchus areya (Woodland, 1934) Yamaguti, 1959 (adult) syn.
Eutetrarhynchus baeri Lopez-Neyra and Diaz-Ungria, 1958
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981
Potamotrygon reticulatus (Gunther)
Eutetrarhynchus areya (Woodland, 1934) Yamaguti, 1959 (adult) syn.
Eutetrarhynchus baeri Lopez-Neyra and Diaz-Ungria, 1958
BROOKS, D.R., MAYES, M.A. AND THORSON, T.B., 1981
Prionace glebta (Linnaeus, 1758)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
HEINZ, M.L. AND DAILEY, M.D., 1974
Floriceps aequatus Cuvier, 1817 (adult) syn. Dasyrhynchus ingens
(Linton, 1921) (adult)
IWATA, S., 1939
Hepatoxylon trichiuri (Holten, 1802) (larva) syn.
Dibothriohynchus aquilae (Le Martinere, 1797)
IWATA, S., 1939
Hepatoxyylon trichiuri (Holten, 1802) (plerocercoid) syn. Dibothriorynchus grossum (Rudolphi, 1819)
YANEZ, A.P., 1959
Hepatoxyylon trichiuri (Holten, 1802) (plerocercus)
CARVAJAL, J., 1974
Hepatoxyylon trichiuri (Holten, 1802) (post-larva)
CATTAN, P.E., CARVAJAL, J., TORRES, D. AND YANEZ, J.L., 1979
ROBINSON, E.S., 1959a
Hepatoxyylon trichiuri (Holten, 1802) (post-larva) syn. Hepatoxyylon squamli (?) Martiniere, 1797
THRELFALL, W., 1969
Hepatoxyylon trichiuri (Holten, 1802) (post-larva) syn. Hepatoxyylon squamli Bosch, 1811
PAPPAS, P.W., 1976
Nybelinia pintneri Yamaguti, 1934 (adult)
IWATA, S., 1939
Tentacularia corphænae Bosch, 1802 (adult)
CATTAN, P.E., CARVAJAL, J., TORRES, D. AND YANEZ, J.L., 1979
IWATA, S., 1939
Prionodon platydon (Poey, 1861) syn. Carcharinus commersoni
Blainville, 1816 SEE: Carcharhinus leucas (Müller and Henle, 1841)
Pseudotriakis micrura Capello, 1867
Grillotia dolichocephala (Guiart, 1935) (larva)
GUIART, J., 1935a
Sphyriocephalus viridis (Wagener, 1854) Pintner, 1913 (post-larva)
syn. Sphyriocephalus Alberti Guiart, 1935
GUIART, J., 1935a
Pteroplatea micrura Day
Halyiorynchus macrocephalus (Shipley and Hornell, 1906) (adult)
ZAIDI, D.A. AND KHAN, D., 1976
Raja batie L.
Grillotia erinaceus (Van Beneden, 1858)
WILLIAMS, H.H., 1966
Raja binoculata
Gilquinia squamli (Fabricium, 1794) (adult)
Nybelinia riseri Dollfus, 1966 (post-larva)
DOLLFUS, R.P., 1966b
Raja brechynira Lafont
Grillotia erinaceus (Van Beneden, 1858)
WILLIAMS, H.H., 1966
Raja chileniana Guichenot, 1848
Grillotia dolfulsi Carvajal, 1971
WHITTAKER, F.H., CARVAJAL, J.G. AND APKARIAN, R., 1982
Grillotia dolfulsi Carvajal, 1971 (adult)
CARVAJAL, J., 1971
Raja clavate L.
Christianella minuta (Van Beneden, 1849) (adult)
KORNUSCHIN, V.V. AND SLOLCHENKO, A.I., 1978
Grillotia erinaceus (Van Beneden, 1858)
REES, G. AND LLEWELLYN, J., 1941
WILLIAMS, H.H., 1966
Grillotia erinaceus (Van Beneden, 1858) (adult)
BAYLIS, H.A., 1939
KORNUSCHIN, V.V. AND SLOLCHENKO, A.I., 1978
Grillotia erinaceus (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1942
Grillotia recurvipepinia Dollfus, 1969 (immaure adult)
DOLLFUS, R.P., 1969a
Grillotia sp.
Laverack, M.S. and Blackler, M., 1974

*Raja diaphanes* Garman, 1913  **SEE:**  *Raja ocellata* Mitchell, 1815

*Raja fullonica* L.
- *Grillotia erinaceus* (Van Beneden, 1858)
  - WILLIAMS, H.H., 1966

*Raja kincaidii*
- *Dasyrhynchus* sp. (adult)
  - DOUGLAS, L.T., 1959

*Raja laevis* Mitchell, 1817  **syn.**  *Raja etabuliformis* Garman, 1913
- *Grillotia erinaceus* (Van Beneden, 1858)
  - MYERS, B.J., 1959

*Raja maculata* Montagu 1815  **Raja montagui** Fowler 1916
- *Grillotia erinaceus* (Van Beneden, 1858)  **(plerocercus)**
  - DOLLFUS, R.P., 1942

*Raja micro-ocellata* Montagu
- *Grillotia erinaceus* (Van Beneden, 1858)
  - WILLIAMS, H.H., 1966

*Raja miraletus* L. 1758
- *Grillotia erinaceus* (Van Beneden, 1858)
  - DOLLFUS, R.P., 1946

*Raja neevus* Müller and Henle
- *Grillotia erinaceus* (Van Beneden, 1858)  **(larva)**
  - REES, G. AND LLEWELLYN, J., 1941

*Raja neevus* Müller and Henle, 1841
- *Grillotia erinaceus* (Van Beneden, 1858)
  - MCVICAR, A.H., 1977
  - MCVICAR, A.H., 1979
  - WILLIAMS, H.H., 1966
- *Grillotia erinaceus* (Van Beneden, 1858)  **(plerocercus)**
  - DOLLFUS, R.P., 1942

*Grillotia* sp.
- WILLIAMS, H.H., 1968

*Raja ocellata* Mitchell, 1815
- *Grillotia erinaceus* (Van Beneden, 1858)
  - SIMMONS, J.E., 1961

*Raja ocellata* Mitchell, 1815  **syn.**  *Raja diaphanes* Garman, 1913
- *Grillotia erinaceus* (Van Beneden, 1858)
  - MYERS, B.J., 1959

*Raja oxyrhynchus* L.
- *Grillotia erinaceus* (Van Beneden, 1858)
  - REES, G. AND LLEWELLYN, J., 1941
  - WILLIAMS, H.H., 1966
- *Grillotia pseuderinaceus* Dollfus, 1969  **(immature adult)**
  - DOLLFUS, R.P., 1969

*Raja radiata* Donovan
- *Grillotia erinaceus* (Van Beneden, 1858)
  - BAER, J.G., 1962
- *Grillotia* sp. (adult)

*Raja rhina* (Jordan and Gilbert)
- *Grillotia musculata* (Hart, 1936)  **Dollfus, 1942**  **(adult)**  **syn.**  *Tentacularia musculata* Hart, 1936
  - HART, J.F., 1936

*Raja scabrata*
- *Grillotia* ap.
  - HELLER, A.F., 1949

*Raja sp.*
- *Grillotia erinaceus* (Van Beneden, 1858)  **(plerocercus)**
  - DOLLFUS, R.P., 1942
Raja stabuliformis Garman, 1913  SEE:  Raja laevia Mitchell, 1817

Ray

Grillotia erinaceus (Van Beneden, 1858)

HALTON, D.W. AND MCKERR, G., 1979

Ray sp.

Pterobothrium sp. (plerocercus)

REGO, A.A., SANTOS, J.C. AND SILVA, P.P., 1974

Rhina squatina (L.)  SEE: Squatina squatina (L.)

Rhinobatos planiceps Garman, 1888

Parachristianella monomegacantha Kruse, 1959

DAILEY, M.D. AND CARVAJAL, J., 1976

Prochristianella heteracantha Dailey and Carvajal, 1976 (adult)

DAILEY, M.D. AND CARVAJAL, J., 1976

Rhinobatos productus (Ayres)

Eutetrarhynchus schmidtii Heinz and Dailey, 1974 (adult)

HEINZ, M.L. AND DAILEY, M.D., 1974

Lacistorhynchus tenuis (Van Beneden, 1858) (adult)

VOGE, M., EDMONDS, H., 1969

Rhincobotrium breviapine (Linton, 1897) Campbell and Carvajal, 1977 (adult), Rhynchobothrium breviapine Linton, 1897, Rhynchobothrium agile Linton, 1897

CAMPBELL, R.A. AND CARVAJAL, J., 1975

Rhinopterica megacantha Carvajal and Campbell, 1975 (adult)

CARVAJAL, J. AND CAMPBELL, R.A., 1975

Rhinotriakia henlei

Lacistorhynchus tenuis (Van Beneden, 1858)


Lacistorhynchus tenuis (Van Beneden, 1858) (adult)

VOGE, M., EDMONDS, H., 1969

Rhynchobatus djeddensis (Forsk) Bleeker

Otocobothrium linstowi Southwell, 1912 (adult)

SUBHAPRADHA, C.K., 1955

Scoliodon palasooreh (Cuvier)

Hormellia palasooreh Zaidi and Khan, 1976 (adult)

ZAIIDI, D.A. AND KHAN, D., 1976

Scoliodon sorraikowah

Nybelinia robusta (Linton, 1896) (adult)

KYAW-MYINT, 1968

Scoliodon terra-novae (Richardson)

Otocobothrium penetrans Linton, 1907

SHULER, R.H., 1938

Scoliodon walbemi

Callitetrarhynchus nipponica Nakajima and Egusa, 1973 (adult)

NAKAJIMA, K. AND EGUSA, S., 1972a

Tentacularia coryphaenae Bosc, 1802 (adult)

IWATA, S., 1939

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Scyliorhinus canicula (L.)  
Nybelinia sp.  
DOLLFUS, R.P., 1969a

Scymnorhinus licha (Bonnaterre)  
Sphyriocephalus viridus (Wagener, 1854) Pintner, 1913  
WILLIAMS, H.H., 1968  
Sphyriocephalus viridus (Wagener, 1854) Pintner, 1913 (adult)  
DOLLFUS, R.P., 1946b

Somniosus pacificus  
Hepatoxyyn trichiuri (Holten, 1862) (post-larva)  
REYES PIRIANO, X, 1982

Sphyraena diptana Springer  
Nybelinia edwinlintoni Dollfus, 1966 (post-larva)  
DOLLFUS, R.P., 1966b  
Nybelinia (Syngenes) goreensis Dollfus, 1966 (adult)  
DOLLFUS, R.P., 1966b

Sphyraena lewini  
Otobothrium kuriei Shields, 1985 (adult)  
SHIELDS, J.D., 1985

Sphyraena tiburo Linnaeus  
Trypanorhynch sp.  
Hensus, R.N., 1975

Sphyraena zygaarda (L.)  
Calitetrarhynchusniponica Nakajima and Egusa, 1973 (adult)  
NAKAJIMA, K. AND EGUSA, S., 1972a  
Nybelinia palliata (Linton, 1924) (adult)  
CHANDLER, A.C., 1942  
Nybelinia (Syngenes) sphyrae Yamaguti, 1952 (adult)  
YAMAGUTI, S., 1952  
Otobothrium pephrikos Dollfus, 1969 (adult)  
DOLLFUS, R.P., 1969a  
Otobothrium propectysticum Dollfus, 1969 (adult)  
DOLLFUS, R.P., 1969a

Spinax spinax (L.)  
Aporhynchus norvegicus (Olsens, 1868) Nybelin, 1918  
REES, G. AND LLEWELLYN, J., 1941  
Aporhynchus norvegicus (Olsens, 1868) Nybelin, 1918 (adult)  
REES, G., 1941b

Squalius acanthius (L.)  
Christianella minuta (Van Beneden, 1849) (adult)  
KORYUSHIN, V.V. AND SOLOCHENKO, A.I., 1978

Gilquinia squali (Fabricius, 1794)  
DOLLFUS, R.P., 1969a  
HEINZ, M.L. AND DAILEY, M.D., 1974  
MANGER, B.R., 1972  
PAPPAS, P.W., 1970  
WILLEMSE, J.J., 1968  
WILLIAMS, H.H., 1968  
Gilquinia squali (Fabricius, 1794) (adult)  
MCCULLOUGH, J.S. AND FAIRWEATHER, I., 1983  
ORLOWSKA, K., 1979  
THRELFAI, W., 1969  
Hepatoxyyn trichiuri (Holten, 1862) (post-larva)  
GOTTO, R.Y., 1955

Squalius acanthius (Rondelet, 1554) L.1754 syn. Acanthias vulgaris  
Risso, 1826

Hepatoxyyn trichiuri (Holten, 1862) (post-larva)  
DOLLFUS, R.P., 1942

Squalius ferdinandina Molina  
Gilquinia squali (Fabricius, 1794)  
DOLLFUS, R.P., 1969a
Squalus galeus L., 1758 syn. Eugaleus galeus (L., 1758) Gill, 1864
syn. Galeorhinus galeus (L., 1758) Blainville, 1816 SEE:
Galeus canis (Rondelet, 1554)
Squalus glaucus L. 1758 SEE: Galeus glaucus Rondelet, 1554
Squalus lebruni (Vaillant)
Hepatoxylon trichiuri (Holten, 1802) (post-larva)
ROBINSON, E.S., 1959a
Squalus suckleyi
Gilquinia aquali (Fabricius, 1794) (adult)
Squalus suckleyi (Girard)
Gilquinia anteropus (Hart, 1936) (adult) syn. Tetrarhynchus
anteropus Hart, 1936 syn. Gilquinia aquali (Fabricius, 1794) syn.
Gilquinia tetrabothrium (Van Beneden, 1894) in Wardle (1933) syn.
Gilquinia aquali (Fabricius, 1793) in Wardle (1933)
HART, J.F., 1936
Squalus suckleyi
Grillotia amaris-gora (Wagener, 1854)
HEINZ, M.L. AND DAILEY, M.D., 1974
Squatina aquatina (L.)
Christianella minuta (Van Beneden, 1849) (adult)
DOLLFUS, R.P., 1942
Grillotia angeli Dollfus, 1969 (immature adult)
DOLLFUS, R.P., 1969a
Grillotia amaris-gora (Wagener, 1854) Dollfus, 1946 (adult)
DOLLFUS, R.P., 1946b
Squatina aquatina (L.) syn. Rhina aquatina (L.)
Christianella minuta (Van Beneden, 1849) (adult) syn.
Tetrarhynchus minutus Van Beneden, 1849 (in Nybelin, 1946) syn.
Wageneria parrae Lühe, 1902
NYBELIN, O., 1946
Stegostoma tigrinum
Hornelliella annandalei (Hornell, 1912) Yamaguti, 1954 (adult)
syn. Tetrarhynchus annandalei, Hornell, 1912
YAMAGUTI, S., 1954
Tentacularia macropora (Shipley and Hornell, 1906) (adult)
SUBRAMANIAM, M.K., 1946
Synias manazo
Trigonolobus sp. Dollfus, 1929 (adult) syn. Rhynchobothrium
spinaliferus (Southwell, 1911)
IWATA, S., 1939
Torpedo fairchildi Hutton
Hepatoxylon trichiuri (Holten, 1802) (post-larva)
ROBINSON, E.S., 1959a
Torpedo nobiliana Bonaparte
Grillotia microthrix Dollfus, 1969 (plerocercus)
DOLLFUS, R.P., 1969a
Triakies henlei (Gill, 1862)
Lacistorhynchus tenuis (Van Beneden, 1858)
PAPPAS, P.W., 1972
Triakies maculata Kner and Steinachner, 1867
Lacistorhynchus tenuis (Van Beneden, 1858) (adult)
CARVAJAL, J., 1974
Triakies acuilla Müller and Henle
Callitetrarhynchus nipponica Nakajima and Egusa, 1973 (adult)
NAKAJIMA, K. AND EGUSA, S., 1972d
NAKAJIMA, K. AND EGUSA, S., 1973
Callitetrarhynchus nipponica Nakajima and Egusa, 1973
(plerocercus)
NAKAJIMA, K. AND EGUSA, S., 1972b
Callitetrarhynchus nipponica Nakajima and Egusa, 1973
(plerocercus, adult)
NAKAJIMA, K. AND EGUSA, S., 1972c

Triakia semi-fasciata Girard, 1854

Eutetrarhynchus litocephalus Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974

Laciatorhynchus tenuis (Van Beneden, 1858)
HEINZ, M.L. AND DAILEY, M.D., 1974

PAPPAS, P.W., 1976

Laciatorhynchus tenuis (Van Beneden, 1858) (adult)
MUDRY, D.R., DAILEY, M.D., 1971
RISER, N.W., 1956
SAKANARI, J. AND MOSER, M., 1985b
VOGE, M., EDMONDS, H., 1969

YOUNG, R.T., 1954a

Laciatorhynchus tenuis (Van Beneden, 1858) (immature adult)
SAKANARI, J. AND MOSER, M., 1985b

Laciatorhynchus tenuis (Van Beneden, 1858) (immature adult)
(experimental infection)

YOUNG, R.T., 1954b

Trygon imbricata (Bloch and Schneider)

Christianella minuta (Van Beneden, 1849) (adult)
SUBHAPRADHA, C.K., 1955

Trygon pastinace (L.)

Grillotia (Progrillotia) pastinace Dollfus, 1946 (adult)
DOLLFUS, R.P., 1946b

Parachristianella trygonia Dollfus, 1946 (adult)
DOLLFUS, R.P., 1946b

Prochristianella trygonica Dollfus, 1946 (adult)
DOLLFUS, R.P., 1946b

Trygon sp.

Tentacularia arayae Woodland, 1934
DOLLFUS, R.P., 1975b

Urobatis hallieri (Cooper)

Christianella sp. (adult)
YOUNG, R.T., 1954a

Parachristianella trygonia Dollfus, 1946 (adult)
YOUNG, R.T., 1954a

sp. (larvae)


Urobatis hallieri (Cooper) (?)

Christianella trygonia-bucconis (Wagner, 1854) adult
YOUNG, R.T., 1954a

Urolophus hallieri

Eutetrarhynchus schmidtii Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974

Heciatobothrium myliobati Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974

Prochristianella minima Heinz and Dailey, 1974 (adult)
HEINZ, M.L. AND DAILEY, M.D., 1974

Urolophus jamaicensis (Cuvier, 1817)

Eutetrarhynchus caribbensis Kovacs and Schmidt, 1986 (adult)
KOVACS, K.J. AND SCHMIDT, G.D., 1986

Eutetrarhynchus thesaiusi Kovacs and Schmidt, 1986 (adult)
KOVACS, K.J. AND SCHMIDT, G.D., 1986

Urolophus testaceus (Müller and Henle)

Eutetrarhynchus geraschmidtii Dollfus, 1974 (pre-adult)
DOLLFUS, R.P., 1974a
Vulpecula marina Valmont
Molicola uncinatus (Linton, 1924) (adult) syn. Rhynchobothrium uncinatum Linton, 1924 syn. Floriceps uncinatum (Linton, 1924)
Yamaguti, 1952
YAMAGUTI, S., 1952

OSTEICHTHYES
Acanthocybium solanderi (Cuvier and Valenciennes, 1831)
Tentacularia cyrophanae Bosc, 1802 (post-larva)
DOLLFUS, R.P., 1968

Acanthocephala nadezhnyi
Nybelinia surmenicola Okada in Dollfus, 1929
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Acanthurus caeruleus Bloch and Schneider
Otobothrium crenacolle Linton, 1896 (plerocercus)
REES, G., 1969

Agnostomus forsteri (Cuvier and Valenciennes)
Lecithorhynchus tenuis (Van Beneden, 1858) (plerocercus)
ROBINSON, E.S., 1959a

Alohestes afer
Callitetetralynynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
REES, G., 1969

Anguilla japonica
Nybelinia anguillicola Yamaguti, 1952 (larva)
YAMAGUTI, S., 1952

Antimora rostrata
Trypanorhynch sp. (larva)

Aprodon cortezi anus Gilbert
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
ARAI, H.P., 1969

Argentina elongata
Hapatoxylon trichiuri (Holten, 1862) (larva)
POIS, N.V., 1975

Argentina kagoshimae Jordan and Snyder
Nybelinia nipponica Yamaguti, 1952 (larva)
YAMAGUTI, S., 1952

Arius gagora
Pterobothrium lintoni (MacCallum, 1916)
KYAW-MYINT, 1968

Arius platystomus
Pterobothrium lintoni (MacCallum, 1916) (larva)
KYAW-MYINT, 1968

Arius serratus (Day)
Otobothrium erii Bilqees and Shaukat, 1976 (plerocercoid)
BILQEES, F.M. AND SHAUKAT, N., 1976

Arripia trutta (Bloch and Schneider)
Nybelinia sp. (larva)
BAKER, A.N., 1971

Atheresthes evermanni Jordan et Starks
Nybelinia surmenicola Okada in Dollfus, 1929
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1968

Atherinops californiensis
sp. (larva)

Bagre bahiensis
Otobothrium crenacolle Linton, 1896 (larva)
PALACIOS, N.M., 1963
PALACIOS, N.M. AND BARROETA, L.F., 1967

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Bagre marina
Callitetrarhynchus lepidus (Chandler, 1935) Chandler, 1942 (larva)
syn. Tentacularia lepide Chandler, 1935
CHANDLER, A.C., 1935a
sp. (larva)
CHANDLER, A.C., 1935a

 Bairdiella chrysura (Lacépède)
Poecilancistrum caryophyllum (Diesing, 1858) Dollfus, 1929
(plerocercoid)
OVERSTREET, R.M., 1977
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Balistes capriacus L.
Nybelinia lingualis (Cuvier, 1817) (larva or post larva)
DOLLFUS, R.P., 1942

Balistes polypleia Steindachner, 1876
Otobothrium (Pseudotobothrium) dipseum (Linton, 1897) Dollfus, 1942
syn. Otobothrium (Pseudotobothrium) insigne (Linton, 1903)
Dollfus, 1942
CRUZ-REYES, A., 1974a

Barreuda
Tentacularia sp. (larva)
YEH, L.S., 1956

Belone belone (L.)
Lacistorhynchus tenuis (Van Beneden, 1858)
WILLEMSE, J.J., 1968
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1969a
GRABDA, J., 1981

Belone belone (L.) syn. Belone vulgaris Flem.
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1942

Belone vulgaris Flem. SEE: Belone belone (L.)

Beryx splendens
Tentacularia sp. (larva)
ICHIHARA, A., 1968

Box boops (L. 1758)
Nybelinia estigmata Dollfus, 1968 (var. 2) (post-larva)
DOLLFUS, R.P., 1968b

Brama raii (Bloch, 1791)
Gymnorhynchus gigas (Cuvier, 1817)
LOPEZ-NEYRA, C.R., 1947
WILLIAMS, H.H., 1968
Gymnorhynchus gigas (Cuvier, 1817) (plerocercus)
SEYDA, M., 1976

Brama raii Schneid.
Gymnorhynchus gigas (Cuvier, 1817) (plerocercus)
BRIAN, A., 1952

Caran sp.
Dasyrhynchus varioucincatus (Pintner, 1913) Pintner, 1928
(plerocercus)
DOLLFUS, R.P., 1942

Caranx affinis
Pterobothrium sp. (plerocercoid)

Caranx armatus (Forskal)
Dasyrhynchus varioucincatus (Pintner, 1913) Pintner, 1928
(plerocercus)
DOLLFUS, R.P., 1942

Caranx crysos (Mitchill)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
REES, G., 1969
Caranx rhonchus Saint-Hilaire, 1889
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
Dollfus, R.P., 1942
Nybelinia senegalensis Dollfus, 1960
Dollfus, R.P., 1960b

Caranx ruber
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
Rees, G., 1969

Caranx sp.
Pterobothrium sp. (plerocercus)
Mizayans, A., 1970

Caranx trachurus (L.)
Grillotia bothridiopunctata Dollfus, 1969 (larva)
Dollfus, R.P., 1969a

Careproctus sp.
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
Strelkov, J.A., 1960

Centropomus undecimalis Lacépède
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
Dollfus, R.P., 1942

Cephalopholis fulvus
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
Rees, G., 1969

Cepola schlegeli (Bleeker)
Oncomemas wageneri (Linton, 1896) (larva)
Yamaguti, S., 1952

Ceratoscopelus maderensis (Lowe, 1839)
Gilquinia sp. (plerocercoid)
Reimer, L.W., 1975b

Cerberus rhynchos
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercoid)
Chaeturichthys hexanemus (Bleeker)
Pterobothrium chaeturichthydis Yamaguti, 1952 (larva)
Yamaguti, S., 1952

Chiascanopsetta lugubris Alcock
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
Reimer, L.W., 1984
Nybelinia sp. (larva)
Reimer, L.W., 1984
Parachristianella sp. (larva)
Reimer, L.W., 1984

Cheilodactylus macropterus (Bloch and Schneider)
Hepatoxylon trichiuri (Holten, 1892) (post-larva)
Vooren, C.H. AND Tracey, D., 1976

Nybelinia sp. (post-larva)
Vooren, C.H. AND Tracey, D., 1976

Chelidonichthys kumu Lesseun and Garnot
Otobothrium (Pseudotobothrium) dipaeum Linton, 1897 syn.
Otobothrium dipaeum Linton, 1897
Yamaguti, S., 1952

Chirocentrus dorab
Tentacularia sp. (larva)
Anantaraman, S., 1963
Chlorophthalmus agassizi Bonaparte
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
REIMER, L.W., 1984

Clevelandia iom (Jordan and Gilbert)
Callitetrarhynchus sp. (larva)
BROOKS, D.R. AND BROTHERS, E.B., 1974

Clibanarius missanthropus Risso
Eutetetrarhynchus carayoni Dollfus, 1942 (plerocercus)
DOLLFUS, R.P., 1942

Clupea harengus L., 1758
Grillotia erinaceus (Van Beneden, 1858) (larva)
SINDERHANN, C.J., 1957
Grillotia erinaceus (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1956
Lacistorhynchus sp.
MACKENZIE, K., 1985
Lacistorhynchus tenuis (Van Beneden, 1858)
MACKENZIE, K., 1978
Lacistorhynchus tenuis (Van Beneden, 1858) (larva)
SINDERHANN, C.J., 1957
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1956
Trypanorhynch sp. (larva)
SINDERHANN, C.J., 1961a

Clupea harengus pallasi Valenciennes, 1847
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercoid)
SAKANARI, J. AND MOSER, M., 1985a
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
ARTHUR, J.R. AND ARAI, H.P., 1980
Trypanorhynch sp.
ARTHUR, J.R. AND ARAI, H.P., 1980
Trypanorhynch sp. (plerocercoid)
ARTHUR, J.R. AND ARAI, H.P., 1980

Coelorhynchus parallelus (Gunther)
Nybelinia sp. (larva)
REIMER, L.W., 1984
Pseudogrillotia sp. (larva)
REIMER, L.W., 1984

Coelorhynchus sp.
Microbothriophynchus coelorhynchi Yamaguti, 1952 (larva)
YAMAGUTI, S., 1952

Conger conger
Grillotia erinaceus (Van Beneden, 1858) (larva)
BAYLIS, H.A., 1939

Conger myriaster
Oncomaeas wageneri (Linton, 1890) (larva)
YAMAGUTI, S., 1952

Congrid sp.
Nybelinia eurasia Dollfus, 1965 (post-larva)
DOLLFUS, R.P., 1965b
Coridodax pulchus (Bloch and Schneider, 1801)
Gymnorhynchus sp.
RITCHIE, L.D., 1969
Lacistorhynchus tenuis (Van Beneden, 1858)
RITCHIE, L.D., 1969

Coris julis
Floriceps oxneri Guiart, 1938 (larva)
GUIART, J., 1938

Corvina nigrae Cuvier
Otobothrium cysticum (Mayer, 1842) (plerocercus)
DOLLFUS, R.P., 1942
Coryphaena equisetis Linnaeus, 1758
Nybelinia alloloptica Dollfus, 1968 (var.) (post-larva)
DOLLFUS, R.P., 1968b
Trypanorhynch sp. (larva)
GREER, J.K., 1976

Coryphaena hippurus Linnaeus
Hepatoxylon trichiuri (Holten, 1832) (post-larva) syn.
Dibothriorynchus attenuatus (Rudolphi, 1819)
GUIART, J., 1935a
Nybelinia bisulcata (Linton, 1889) Poche, 1926 (plerocercus)
WARD, H.L., 1954
Tentacularia coryphaenae Bosc, 1802 (plerocercus)
WARD, H.L., 1954
Tentacularia coryphaenae Bosc, 1802 (post-larva)
DOLLFUS, R.P., 1946b

Coryphaena sp.
Hepatoxylon trichiuri (Holten, 1832) (post-larva) syn.
Dibothriorynchus attenuatus (Rudolphi, 1819)
GUIART, J., 1935a
Hepatoxylon trichiuri (Holten, 1832) (post-larva) syn.
Dibothriorynchus claviger (Leuckart, 1819)
GUIART, J., 1935a
Hepatoxylon trichiuri (Holten, 1832) (post-larva) syn.
Dibothriorynchus stenocephale Guiart, 1935
GUIART, J., 1935a
Tentacularia coryphaenae Bosc, 1802
JOYEUX, C. AND BAER, J.G., 1954

Coryphaenoides (Chalinura) carapinus (Goode and Bean, 1883)
Grillotia (Paragrillotia) rowei Campbell, 1977 (larva)

Coryphaenoides (Chalinura) leptolapsa Gunther, 1877
Grillotia (Paragrillotia) rowei Campbell, 1977 (plerocercus)
CAMPBELL, R.A., 1977

Coryphaenoides (Coryphaenoides) rupestris Gunnerus, 1765
Nybelinia sp. (larva)

Coryphaenoides hippurus
Floriceps saccatus Cuvier, 1817 (plerocercus)
DOLLFUS, R.P., 1946b

Coryphaenoides (Lionura) carapinus Goode and Bean, 1883
Grillotia (Paragrillotia) rowei Campbell, 1977 (plerocercus)
CAMPBELL, R.A., 1977

Coryphaenoides (Nematonurus) armatus (Hector, 1875)
Grillotia (Paragrillotia) rowei Campbell, 1977 (larva)
Grillotia (Paragrillotia) rowei Campbell, 1977 (plerocercus)
CAMPBELL, R.A., 1977

Coryphaenoides cornuta (Kaup)
Otocotobrium (Pseudocotobrium) linstowi (Southwell, 1912)
(plerocercoid)
REIMER, L.W., 1980

Cottus bubalis Euphrasen
Grillotia erinaceus (Van Beneden, 1858) (larva)
REE, G., 1945

Cubiceps natalensis Gilchrist and Von Bonde
Christianella sp. (larva)
REIMER, L.W., 1984

Cybiull guttatum
Gymnorhynchus cybiull Chincholikar and Shinde, 1977 (larva)
CHINCHOLIKAR, L.N. AND SHINDE, G.B., 1977
Cymatogaster aggregata Gibbons
   Lactotrynorhynchus tenuis (Van Beneden, 1858) (plerocercoid)
   YOUNG, R.T., 1954a
   YOUNG, R.T., 1954b
   Trypanorhynch sp. (larva)
   ARAI, H.P., 1967
Cynoglossus macrolepidotus (Bleeker)
   Nybelinia bengalensis Reimer, 1980 (plerocercoid)
   REIMER, L.W., 1980
Cynoglossus sp.
   Nybelinia bengalensis Reimer, 1980 (plerocercoid)
   REIMER, L.W., 1980
   Nybelinia jayapaulazaris Reimer, 1980 (plerocercoid)
   REIMER, L.W., 1980
Cynoglossus sunua-arabici Chabanaud
   Nybelinia erythraea Dollfus, 1960 (post-larva)
   DOLLFUS, R.P., 1960b
Cynoglossus arenarius Ginsberg
   Poecilancistrium caryophyllum (Diesing, 1858) Dollfus, 1929
   (plerocercoid)
   OVERSTREET, R.M., 1977
   SCHLICHT, F.G. AND MCFARLAND, W.N., 1967
Cynoglossus leiauruchus (Cuvier and Valenciennes)
   Plerobothrium sp. (plerocercus)
   REGO, A.A., SANTOS, J.C. AND SILVA, P.P., 1974
Cynoglossus nebulosus (Cuvier)
   Grillotia sp. (identified as G. heptanchi group by Dollfus, 1942)
   CHANDLER, A.C., 1954
   Poecilancistrium caryophyllum (Diesing, 1858) Dollfus, 1929
   (plerocercoid)
   OVERSTREET, R.M., 1977
   OVERSTREET, R.M., 1978b
   SCHLICHT, F.G. AND MCFARLAND, W.N., 1967
   Poecilancistrium caryophyllum (Diesing, 1858) Dollfus, 1929
   (plerocercus)
   GOLDSTEIN, R.J., 1963
   Poecilancistrium robustum
   GUEST, W.C. AND GUNTER, G., 1958
   Trypanorhynch sp. (plerocercoid)
   OVERSTREET, R.M., 1977
Cynoglossus nebulosus (Cuvier and Valenciennes)
   Poecilancistrium robustum (Chandler, 1935) Dollfus, 1942
   (plerocercoid)
   BOERTJE, S.B., 1976
Cynoglossus nothus
   Poecilancistrium caryophyllum (Diesing, 1858) Dollfus, 1929
   (plerocercoid)
   SCHLICHT, F.G. AND MCFARLAND, W.N., 1967
Cynoglossus regalis
   Nybelinia sp. (encysted plerocercoid)
   MEYERS, T.R., 1978
   Poecilancistrium caryophyllum (Diesing, 1858) Dollfus, 1929
   (plerocercus)
   GOLDSTEIN, R.J., 1963
Cynoglossus sp.
   Tetrarhynchus fragilis (Diesing, 1858) (larva)
   VOGELSANG, E.G. AND MAYAUDON, T.H., 1959
Cynoglossus striatus (Cuvier)
   Progrillotia dollfusi Carvajal and Rego, 1983
   CARVAJAL, J. AND REGO, A.A., 1983
   Trypanorhynch sp. (plerocercus, two species)
Cyttus novae-zealandiae (Arthur)
   Hepatoxylyn trichiuri (Holten, 1882) (post-larva)
   Robinson, E.S., 1959a
Doradichthys vacca (Girard, 1855)
   Lecithorhynchus tenuis (van Beneden, 1858) (plerocercoid)
   Sakaranari, J. and Moser, M., 1985a
Dentex macrophthalmus Cuvier and Valenciennes
   Otophrynum cysticum (Mayer, 1842) (plerocercus)
   Dollfus, R.P., 1942
Dicrolene intronigra
   Trypanorhynch sp. (larva)
   Campbell, R.A., Haedrich, R.L. and Munroe, T.A., 1988
Diodon holacanthia Linnaeus, 1758
   Floriceps aaccatus Cuvier, 1817 (plerocercus)
   Dollfus, R.P., 1975
Diodon hystrix l. 1758
   Gymnorhynchus gigas (Cuvier, 1817) (plerocercoid)
   Radhakrishnan, S. and Nair, N.B., 1980
Nybelinia sp. (plerocercoid)
   Radhakrishnan, S. and Nair, N.B., 1981
Pseudogrillotia basipunctata Carvajal, Campbell and Cornford, 1976
   (plerocercus)
Echeneis naucrates L. 1758
   Nybelinia punctatissima Dollfus, 1960 (var.) (post-larva)
   Dollfus, R.P., 1960b
Trypanorhynch sp. (larva)
   Parukhin, A.M., 1967b
Eleginus gracilis (Tilesius)
   Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
   Strelekova, J.A., 1960
Engraulia japonica (Houttuyn)
   Callitetrarhynchus nipponica Nakajima and Egusa, 1973 (procercoid)
   Nakajima, K. and Egusa, S., 1969a
   Nakajima, K. and Egusa, S., 1969b
   Nakajima, K. and Egusa, S., 1971a
   Nakajima, K. and Egusa, S., 1971b
   Nakajima, K. and Egusa, S., 1972b
Enophrys diceraus
   Nybelinia surmenicola Okada in Dollfus, 1929
   Korotaeva, V.D., 1968a
Epinephelus adacsensionis
   Callitetrarhynchus gracilis (Rudolfi, 1819) Pintner, 1931
   (plerocercus)
   Rees, G., 1969
Epinephelus aequus (Et. Geoff. St-Hil)
   Callitetrarhynchus gracilis (Rudolfi, 1819) Pintner, 1931
   (plerocercus)
   Dollfus, R.P., 1942
Epinephelus akaara
   Grillotia musculicola (Yamaguti, 1934) (larva) syn. Pintneriella
   musculicola Yamaguti, 1934
   Yamaguti, S., 1952
Epinephelus alexandrinus (Cuvier and Valenciennes, 1828)
   Nybelinia cadenati Dollfus, 1960 (post-larva)
   Dollfus, R.P., 1960b
Epinephelus guttatus
   Callitetrarhynchus gracilis (Rudolfi, 1819) Pintner, 1931
   (plerocercus)
   Rees, G., 1969
Epinephelus morio Valenciennes, 1824
   Callitetrarhynchus sp. (plerocercoid)
      FEJER, E., VALDES, R. AND BARRERA, M., 1979
Epinephelus sp.
   Tetrahrynchus fragilis (Diesing, 1859) (larva)
      VOGELSANG, E.G. AND MAYAUDON, T.H., 1959
Epinephelus striatus (Bloch)
   Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
      REES, G., 1969
Epiniphillus sp.
   sp. (larva)
      EL-AHWAL, A.A., 1970
Erethestis elongata
   Nybelinia elongata Shah and Bilqees, 1979 (plerocercoid)
      BILQEEs, F.M., 1981
Eriscon nebulosus
   Otobothrium robustum Chandler, 1935 (larva)
      CHANDLER, A.C., 1935b
Euthynnus aleteratus (Rafinesque, 1819)
   Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
      BUSSIERAS, J. AND BAUDIN-LAURENCIN, F., 1973
   Otobothrium crenacolle Linton, 1898 (plerocercus)
      REES, G., 1969
   Tentacularia coryphaenae Bosc, 1802 (post-larva)
      REES, G., 1969
Euthynnus pelamis
   Tentacularia sp. (larva)
      MARKOWSKI, S., 1971
Euthynnus pelamys (Linne)
   Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)
      YAMAGUTI, S., 1952
Euthynnus sp. (Cuvier and Valenciennes)
   Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
      (plerocercus)
      WARD, H.L., 1954
Euthynnus yaito Kishinouye
   Damyrhynchus variouccinatus (Pintner, 1913) Pintner, 1928
      (plerocercus)
      DOLLFUS, R.P., 1942
   Tentacularia coryphaenae Bosc, 1802 (larva)
      IWATA, S., 1939
Fishballs
   Nybelinia sp. (plerocercoid)
      KOYAMA, T. AND KOMIYA, Y., 1964
Fistularia tabaccaria L. 1758
   Nybelinia cadenati Dollfus, 1969
      DOLLFUS, R.P., 1969b
G. giuris (full name missing)
   Tetrahrynchus sp.
      ALI, M.Y., 1968
Gadus aeglefinus L.
   Hepatoxylon trichiuri (Holten, 1802) (larva)
      BAER, J.G., 1962
Gadus callarias L.
   Hepatoxylon trichiuri (Holten, 1802) (larva)
      BAER, J.G., 1962
   Hepatoxylon trichiuri (Holten, 1802) (plerocercoid)
      REES, G., 1953
Gadus luscus L.
   Laciatorhynchus tenuis (Van Beneden, 1858) (plerocercus)
   DOLLFUS, R.P., 1942

Gadus merlangus L.
   Gilquinia squall (Fabricius, 1794) (plerocercoid)
   MACKENZIE, K., 1965
   Grillotia erinaceua (Van Beneden, 1858) (larva)
   BAYLIS, H.A., 1939
   REES, G. AND LLEWELLYN, J., 1941

Gadus morhua L.
   Grillotia erinaceua (Van Beneden, 1858) (plerocercoid)
   LUBIENIECKI, B., 1976
   Grillotia erinaceua (Van Beneden, 1858) (plerocercus)
   APPY, R.G. AND BURT, M.D.B., 1982
   Tentacularia coryphaenae Bosc, 1802
   APPY, R.G. AND BURT, M.D.B., 1982

Gadus morhua macrocephalua (Tilesius)
   Nybelinia sp.
   TKACHEV, V.A., 1976
   Nybelinia surmanicola Okada in Dollfus, 1929 (larva)
   STREKLKOV, J.A., 1968

Gadus pollachiua L.
   Laciatorhynchus tenuis (Van Beneden, 1858) (plerocercus)
   DOLLFUS, R.P., 1942

Gadus (Pollachiua) virena L.
   Hepatoxylon trichiuri (Holten, 1882) (post-larva)
   DOLLFUS, R.P., 1942

Gadus sp.
   Dibothriorynchus typ. grossus
   RADULESCU, I.I., 1969

Gadus virens L.
   Hepatoxylon trichiuri (Holten, 1882)
   WILLIAMS, H.H., 1968
   Hepatoxylon trichiuri (Holten, 1882) (larva)
   BAER, J.G., 1962
   Hepatoxylon trichiuri (Holten, 1882) (larva) syn.
   Dibothriorynchus grossus (Rudolphi, 1819)
   REES, G. AND LLEWELLYN, J., 1941
   Hepatoxylon trichiuri (Holten, 1882) (plerocercoid) syn.
   Dibothriorynchus grossus (Rudolphi, 1819)
   REES, G., 1941a

Gadus virens SEE: Pollachiua virens (L.)

Galeichthys felis
   Callitararhynchus lepidus (Chandler, 1935) Chandler 1942 (larva)
   CHANDLER, A.C., 1935a
   Pterobothrium filicolle (Linton, 1889) (larva) syn. Gymnorhynchus gigas (Cuvier, 1817) of Chandler (1935a)
   CHANDLER, A.C., 1935a
   Pterobothrium lintoni (MacCallum, 1916) (larva) syn. Pterobothrium malleus (Linton, 1924) syn. Gymnorhynchus malleus (Linton, 1924) of Chandler, 1942
   CHANDLER, A.C., 1935a

Gambusia affinis
   Laciatorhynchus tenuis (Van Beneden, 1858) (metacestode)
   SAKANARI, J. AND MOSER, M., 1985b

Gazza minuta
   Pterobothrium hira Yamaguti, 1952 (plerocercoid)

Genyoneus lineatus Ayres, 1855
   Laciatorhynchus tenuis (Van Beneden, 1858) (metacestode)
   SAKANARI, J. AND MOSER, M., 1985b
   Laciatorhynchus tenuis (Van Beneden, 1858) (plerocercoid)
SAKANARI, J. AND MOSER, M., 1985a

**Genypterus blacodea**

*Grillotia sp.* (larva)

GRABDA, J. AND SLOSARCZYK, W., 1981

**Hepatoxylon trichiuri** (Holten, 1802) (larva)

POIS, N.V., 1975

**Hepatoxylon trichiuri** (Holten, 1802) (plerocercoid)

GRABDA, J. AND SLOSARCZYK, W., 1981

**Genypterus blacodea** (Bloch and Schneider)

**Hepatoxylon trichiuri** (Holten, 1802) (post-larva)

ROBINSON, E.S., 1959a

**Genypterus blacodea** Schneider

**Hepatoxylon trichiuri** (Holten, 1802) (post-larva)

CATTAN, P.L., 1977

**Genypterus chilensis** (Guichenot, 1848)

*Grillotia heptanich* (Vaulegaerd, 1899) (plerocercus)

CARVAJAL, J. AND CAMPBELL, R.A., 1979

**Hepatoxylon trichiuri** (Holten, 1802)

VERGARA, L.A. AND GEORGE-NASCIMENTO, M., 1982

**Cerco elongata** (Gmelin)

**Hepatoxylon trichiuri** (Holten, 1802) (post-larva)

DOLLFUS, R.P., 1942

**Glyptocephalus cyanoglossus** (L.)

*Grillotia erinacea* (Van Beneden, 1858) (larva)

REESS, G. AND LLEWELLYN, J., 1941

**Glyptocephalus atletleri** (Schmidt)

**Floriceps sacculus** Cuvier, 1817 (larva)

TSIMBALYUK, E.M., 1978a

TSIMBALYUK, E.M., 1978b

**Nybelinia sp.** (larva)

TSIMBALYUK, E.M., 1978a

**Glyptocephalus zachirus**

**Nybelinia sp.**

TACHEV, V.A., 1976

**Gobius betrachocephalus** Pallas

**Tetrarhynchobothrium** sp.

NAIDENNOVA, N.N., 1965

NAIDENNOVA, N.N., 1966

**Gobius niger** L.

**Tetrarhynchobothrium** sp.

NAIDENNOVA, N.N., 1965

NAIDENNOVA, N.N., 1966

**Gobius ophiacephalus** Pallas

**Tetrarhynchobothrium** sp.

NAIDENNOVA, N.N., 1966

**Gonorrhynchus gonorrhynchus** (L.)

**Nybelinia sp.** (larva)

REIMER, L.W., 1984

**Gymnocenthus detriaus** Gilbert

**Nybelinia surmanicola** Okada in Dollfus, 1929 (larva)

STRELECIKOV, J.A., 1969

**Gymnopharynx pellum**

**Tentacularia coryphaenae** Bosc, 1802 (larva)

GUIART, J., 1935a

**H. illisca** (full name missing)

**Gonorrhynchus sp.**

ALI, M.Y., 1968

**Halloaeropus macrochin**

**Trypanorhynch sp.** (larva)

Harpodon nehereus (Ham-Buch)

Otobothrium harpodoni Kotwal and Masurekar, 1978 (encysted larva)

KOTWAL, V.P. AND MASUREKAR, V.B., 1978

Hemilepidotus jordani Bean

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

STRELKOV, J.A., 1969

Herring

Lecistorhynchus sp. (larva)

MACKENZIE, K., 1982

Hexagrammos asterleri

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SKRIABINA, E.S., 1963

Hilse hilsa

Otobothrium ilisha (Southwell and Prashad, 1918) Goldstein, 1963 (plerocercus) syn. Poecilancistrum ilisha (Southwell and Prashad, 1918) Dollfus, 1942

GOLDSTEIN, R.J., 1963

Hilse hilsa

Otobothrium mugilis Hiscock, 1954

RIZVI, S.S.H., 1971

Poecilancistrum ilisha (Southwell and Prashad, 1918) Dollfus, 1942

RIZVI, S.S.H., 1971

Pterobothrium heteracanthum Diesing, 1850

RIZVI, S.S.H., 1971

Pterobothrium heteracanthum Diesing, 1850 (plerocercoid) syn. Syndesmobothrium filicolle Linton, 1892

PAL, R.N., 1963

Pterobothrium heteracanthum Diesing, 1850 syn. Syndesmobothrium filicolle Linton, 1892

GOPALAKRISHNAN, V. AND PAL, R.N., 1964

Syndesmobothrium filicolle

PAL, R.N., 1963

Hippoglossoides elassodon

Nybelinia sp.

TKACHEV, V.A., 1976

Nybelinia surmenicola Okada in Dollfus, 1929

MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SKRIABINA, E.S., 1963

Hippoglossoides elassodon elassodon Jordan et Gilbert

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

STRELKOV, J.A., 1969

Hippoglossus hippocampus (L.)

Grillotia erinacea (Van Beneden, 1858) (plerocercoid)

RAE, B.B., 1958

Hepatoxylon trichiuri (Holten, 1862)

WILLIAMS, H.H., 1962

Hepatoxylon trichiuri (Holten, 1862) (plerocercoid)

RAE, B.B., 1958

Hippoglossus hippocampus stenolepis Schmidt

Nybelinia sp.

TKACHEV, V.A., 1976

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

STRELKOV, J.A., 1969

Hippoglossus maximus Hilses

Hepatoxylon trichiuri (Holten, 1862) (larva)

BAER, J.G., 1962

Hoplostethus

Nybelinia sp.

REIMER, L.W., 1974
Hoplosteuthus mediterraneus (Val., 1928)

Nybelinia rougetcampanae Dollfus, 1960 (plerocercoid)

REIMER, L.W., 1975b

Horse mackerel

Tentaculariidae sp. (larva)

NIKOLAeva, V.M., 1963a

Hynnis goreensis (Valenciennes, 1846)

Nybelinia cadenati Dollfus, 1960

DOLLFUS, R.P., 1960b

Nybelinia estigmata Dollfus, 1960 (var. 1) (post-larva)

DOLLFUS, R.P., 1960b

Nybelinia punctatissima Dollfus, 1960

DOLLFUS, R.P., 1960b

Nybelinia senegalensis Dollfus, 1960 (post-larva)

DOLLFUS, R.P., 1960b

Icelus spiniger

Nybelinia surmenicola Okada in Dollfus, 1929

KOROTAEVA, V.D., 1960a

Illeisha elongata (Bennett)

Pterobothrium hira YamaGuti, 1952 (larva)

YAMAGUTI, S., 1952

Illyonus gilberti (Eigenmann and Eigenmann)

Callitetrrhynchus sp. (larva)

BROOKS, D.R. AND BROTHERS, E.B., 1974

Johnius ruber (Bloch-Schott)

Otobothrium harpodoni KOTWAL and MASUREKAR, 1978 (encysted larva)

KOTWAL, V.P. AND MASUREKAR, V.B., 1978

Katsuwonus pelamys (L.)

Hepatoxylon trichiuri (Holten, 1882) (post-larva)

BUSSIERAS, J. AND BAUDIN-LAURENCIN, F., 1973

Tentacularia coryphaenae Bosc, 1882 (post-larva)

BUSSIERAS, J. AND BAUDIN-LAURENCIN, F., 1973

DOLLFUS, R.P., 1946b

Labrax lupus Cuvier SEE: Morone labrax (L.)

Leiostomus xanthurus Lacépède

Poecilancistrum caryophyllum (Diesing, 1859) Dollfus, 1929

(plerocercoid)


SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Poecilancistrum caryophyllum (Diesing, 1859) Dollfus, 1929 syn.

Poecilancistrum gangeticum (Shipley and Hornell, 1906) syn.

Otobothrium robustum (Chandler, 1935)

GOLDSTEIN, R.J., 1963

Lepidopus bilineata (Ayers)

Nybelinia surmenicola Okada in Dollfus, 1929

MAMAev, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

STRELKOY, J.A., 1960

Lepidopus caudatus (Euphrasen)

Hepatoxylon trichiuri (Holten, 1882) (post-larva)

ROBINSON, E.S., 1959a


KOROTAEVA, V.D., 1971

Lepidopus lex Phillips, 1932

Hepatoxylon trichiuri (Holten, 1882)

KOROTAEVA, V.D., 1971

Trypanorhynch sp.

KOROTAEVA, V.D., 1971
Lepidorhinchus squamosus (Bonnaterre, 1788)  
Grillotia minor Guiart, 1935 (larva)  
GUIART, J., 1935a

Lepidorynchus denticulatus  
Hepatoxylen trichiuri (Holten, 1882) (larva)  
POIS, N.V., 1975

Lepidotrigla natalensis Gilchrist and Thompson  
Otobothrium cranacolle Linton, 1896 (larva)  
REIMER, L.W., 1984

Limanda aspera (Pallas)  
Grillotia erinaceus (Van Beneden, 1858)  
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963
Nybelinia sp. (larva)  
TSIMBALLYK, E.M., 1978a  
TSIMBALLYK, E.M., 1978b

Nybelinia surmenicola Okada in Dollfus, 1929  
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)  
STRELKOV, J.A., 1968

Limanda punctatissima  
Nybelinia surmenicola Okada in Dollfus, 1929  
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Limanda yokohamae (Gunther)  
Nybelinia sp. (larva)  
TSIMBALLYK, E.M., 1978a  
TSIMBALLYK, E.M., 1978b

Liosaccus cutaneus (Günther, 1876)  
Nybelinia rosgatcampanae Dollfus, 1962 (post-larva)  
DOLLFUS, R.P., 1962b
Nybelinia strongyla Dollfus, 1962 (post-larva)  
DOLLFUS, R.P., 1962b
Nybelinia yamagutii Dollfus, 1962 (post-larva)  
DOLLFUS, R.P., 1962b

"Loche saumonée"  
Dasyrynchus variounicinatus (Pintner, 1913) Pintner, 1928  
(plerocercus)  
DOLLFUS, R.P., 1942

Lophius piscatorius Linnaeus, 1758  
Dibothriorynchus monticelli Moniez, 1945  
MONIEZ, R., 1945
Dieingella Monticelli (Moniez, 1892) (larva)  
GUIART, J., 1935a
Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tetrahyrynchus erinaceus  
TESTI, F., 1966
Grillotia sp. (plerocercus)  
DOLLFUS, R.P., 1942

Lutjanus griseus (L.)  
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931  
(plerocercus)  
REES, G., 1969

Lutjanus sp.  
Tetrahyrynchus brevibothria MacCallum 1921 (plerocercus)  
KAYAW-HYINT, 1968

Lutjanus aya Bloch  
Oncomias wageneri (Linton, 1896) (plerocercoid)  
THATCHER, V.E., 1961

Lutjanus guineensis Bleeker  
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931  
(plerocercus)  
DOLLFUS, R.P., 1942
Macropod ancylostomae
Tetrahyrchnus fragilis (larva)
SANTOS, L. DOS AND ZOGBI, E.P.V., 1971
Macrophurus megellanicus
Grillotia heptanchi (Vaullegerard, 1899) (plerocercus)
CARVAJAL, J. AND CAMPBELL, R.A., 1979
Macrophurus novae-zealandiae (Hector)
Grillotia sp. (larva)
GRABDA, J. AND SLOSARCZYK, W., 1981
Hepatoxyton trichiuri (Holten, 1882) (plerocercoid)
GRABDA, J. AND SLOSARCZYK, W., 1981
Hepatoxyton trichiuri (Holten, 1882) (post-larva)
ROBINSON, E.S., 1959a
Macrurus australis
Hepatoxyton trichiuri (Holten, 1882) (larva)
POIS, N.V., 1975
Mene amare
Nybelinia lingula (Cuvier, 1817)
PAPOUTSOGLOU, S.E., 1976
Malacocephalus laevis (Lowe)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
REIMER, L.W., 1984
Nybelinia sp. (larva)
REIMER, L.W., 1984
Masturus oxyuropterus (Bleeker)
Molnica horridus (Goadair, 1841)
Magalaspis cordyla (L.)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercoid)
REIMER, L.W., 1986
Melanogaster ventralis Barnard, 1941
Grillotia erinaceus (Van Beneden, 1858) (plerocercus) tentative identification
DOLFFUS, R.P., 1986
Melanogrammus aeglefinus (L.)
Grillotia erinaceus (Van Beneden, 1858)
SCOTT, J.S., 1981
Grillotia erinaceus (Van Beneden, 1858) (plerocercoid)
LUBIENIECKI, B., 1976
Grillotia erinaceus (Van Beneden, 1858) (plerocercus)
LUBIENIECKI, B., 1977
Nybelinia sp. (larva)
RADULESCU, I.I., 1969
Melanocestidae pammelae Gilbert sp. (larva)
NOBLE, E.R. AND QVARIS, J.D., 1975
Melilea papilio Bean
Nybelinia emarginata Okada in Dollfus, 1929 (larva)
ZHUKOV, E.V., 1963
Manticorhiza americanus (Linnaeus)
Posilacinistrium caryophyllum (Dissing, 1856) Dollfus, 1929
(plerocercoid)
OVERSTREET, R.W., 1977
Pterobothrium lanti (MacCallum, 1916) (plerocercoid)
OVERSTREET, R.W., 1977
Pterobothrium sp. (plerocercoid)
SCHLICH, F.G. AND MCFARLAND, W.N., 1967
Merlangius merlangus (L.)
Gilquinia equina (Fabricius, 1794) (plerocercoid)
MACKENZIE, K., 1975
Gilquinia equina (Fabricius 1794) (plerocercus)
Grillotia erinaceus (Van Beneden, 1858) (plerocercoid)

SHOTTER, R.A., 1976

Merluccius australis

Hepatoxyron trichiuri (Holten, 1882) (plerocercoid)

GRABDA, J. AND SLOSARCZYK, W., 1981

Merluccius bilinearis

Grillotia erinaceus (Van Beneden, 1858) (larva)

GAEVSKAYA, A.V. AND UMNOVA, B.A., 1977

Grillotia sp. (encysted plerocercoid)

MEYERS, T.R., 1978

Nybelinia lingualis (Cuvier, 1817) (larva)

GAEVSKAYA, A.V. AND UMNOVA, B.A., 1977

Merluccius capensis Castelnau

Hepatoxyron trichiuri (Holten, 1882) (larva)

KRZEPTOWSKI, H., 1980 [1982]

Merluccius gayi (Guichenot, 1848)

Grillotia dollfusi Carvajal, 1971 (plerocercus)

CARVAJAL, J. AND CATTAN, P.E., 1978

CARVAJAL, J., CATTAN, P., CASTILLO, C. AND SCHATTE, P., 1979

Merluccius gayi peruanus Gingaburg, 1934

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)

DURAN, L.E. AND OLIVA, M., 1980

Lactistorhynchus tenuis (Van Beneden, 1858) (larva)

DURAN, L.E. AND OLIVA, M., 1980

Nybelinia sp. (larva)

DURAN, L.E. AND OLIVA, M., 1980

Tentacularia coryphaenae Bosc, 1802 (larva)

DURAN, L.E. AND OLIVA, M., 1980

Merluccius merluccius capensis Castelnau

Nybelinia sp. (larva)

REIMER, L.W., 1984

Merluccius merluccius (L.)

Grillotia heptanchi (Vaullegeard, 1899) (plerocercoid)

REES, G., 1953

Hepatoxyron trichiuri (Holten, 1882)

WILLIAMS, H.M., 1969

Merluccius merluccius parasoxus (Franca, 1960)

Nybelinia sp. (larva)

REIMER, L.W., 1984

Merluccius polyplepsis

Grillotia heptanchi (Vaullegeard, 1899) (plerocercus)

CARVAJAL, J. AND CAMPBELL, R.A., 1979

"merluza"

Grillotia heptanchi (Vaullegeard, 1899) (larva)

TAGELE, L., 1951

Hepatoxyron trichiuri (Holten, 1882) (larva)

TAGELE, L., 1951

Micromesistius australis

Hepatoxyron trichiuri (Holten, 1882) (plerocercoid)

GRABDA, J. AND SLOSARCZYK, W., 1981

Micromesistius poutassou (Risso)

Grillotia sp. (plerocercoid)

MACKENZIE, K., 1979

Micropogon opercularis (Desmarest)

Gilquinia sp. (larva)

SURIANO, D.M., 1966

Micropogon undulatus (Linnaeus)

Poecilancistrum caryophyllum (Diesing, 1853) Dollfus, 1929

(plerocercoid)

SCHLICH, F.G. AND MCFARLAND, W.N., 1967

Poecilancistrum caryophyllum (Diesing, 1853) Dollfus, 1929
GOLDSTEIN, R.J., 1963
Pterobothrium filicoile (Linton, 1889) (larva) syn. Gymnorhynchus gigae (Cuvier, 1817) of Chandler (1935a)

CHANDLER, A.C., 1935a

Tetrarhynchus fragilis Diesing

BARATTINI, L.P., 1948

Micropogonias undulatus (Linnaeus)
Pacilancistrium caryophyllum (Diesing, 1859) Dollfus, 1929

(plerocercoid)
OVERSTREET, R.M., 1977

Pterobothrium lintoni (MacCallum, 1916) (plerocercoid)
OVERSTREET, R.M., 1977

Trypanorhynch sp. (plerocercoid)
OVERSTREET, R.M., 1977

Mola mola (L.)
Floriceps saccatus Cuvier, 1817 (larva)

GUIART, J., 1935c

Floriceps saccatus Cuvier, 1817 (plerocercoid)

HILLIS, J.P. AND O'RIORDAN, C.E., 1961

Floriceps saccatus Cuvier, 1817 (plerocercus)

DOLLFUS, R.P., 1942

DOLLFUS, R.P., 1969a

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (larva)

GUIART, J., 1935a

IWATA, S., 1939

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (larva) syn. Tetrarhynchus elongatus Wagener, 1901

THRELFAEl, W., 1967

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (plerocercus)

DOLLFUS, R.P., 1942

DOLLFUS, R.P., 1969a

ROBINSON, E.S., 1959a

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (plerocercus) syn. Tetrarhynchus elongatus Wagener, 1901

THRELFAEl, W., 1967

Rhynchobothrium sp. Linton, 1899 (larva)

THRELFAEl, W., 1967

Mola mola (L.) syn. Orthagoriscus mola (L.)
Floriceps saccatus Cuvier, 1817 (plerocercus)

DOLLFUS, R.P., 1946a

Gymnorhynchus (Molicola) horridus Goodsir, 1841 (plerocercus)

DOLLFUS, R.P., 1946a

Molva dipterygia (Pennant, 1784)
Grillotia heptanchi (Vaullegeard, 1899) (larva)

DOLLFUS, R.P., 1975b

Morone labrax
Cellitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (plerocercus)

DOLLFUS, R.P., 1942

Morone labrax (L.) syn. Labrax lupus Cuvier
Lecistorhynchus tenuis (Van Beneden, 1858) (plerocercus)

DOLLFUS, R.P., 1942

Morone saxatilis (Walbaum, 1792)
Lecistorhynchus sp.

HENSLEY, G.H. AND NAHHAS, F.M., 1975

Lecistorhynchus tenuis (Van Beneden, 1858) (metacestode)

MOSER, M., SAKANARI, J., WELLINGS, S. AND LINDSTROM, K., 1984


Lecistorhynchus tenuis (Van Beneden, 1858) (plerocercoid)

SAKANARI, J. AND MOSER, M., 1985a

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*Hugil cephalus* L.

*Otobothrium mugilis* Hiscock, 1954 (plerocercus)

HISCOCK, I.D., 1954

*Mullus barbatus* L.

*Callitetrarhynchus gracilis* (Rudolphi, 1819) Pintner, 1931

(Dollfus, R.P., 1942)

*Nybelinia africana* Dollfus, 1966 (plerocercus, post-larva)

Dollfus, R.P., 1966

*Nybelinia sp.* syn. *Pleronybelinia* sp. (plerocercoid)

SEZEN, Y. AND PRICE, C.E., 1969

*Mullus barbatus ponticus* Essipov

*Christianella minuta* (Van Beneden, 1849) (larva)

KORNYUSHIN, V.V. AND SOLOCHENKO, A.I., 1978

*Mullus barbatus* Rondelet

*Nybelinia lingualis* (Cuvier, 1817) (larva or post larva)

Dollfus, R.P., 1942

*Mullus surmuletus* L.

*Grillotia erinaceus* (Van Beneden, 1858) (plerocercus)

Dollfus, R.P., 1942

*Nybelinia lingualis* (Cuvier, 1817)

PAPOUTSOGLOU, S.E., 1976

*Muranox cinereus* (Forskal)

*Callitetrarhynchus gracilis* (Rudolphi, 1819) Pintner, 1931 (larva)

YAMAGUTI, S., 1952

*Mysteropecra bonaci* (Poey)

*Callitetrarhynchus gracilis* (Rudolphi, 1819) Pintner, 1931

(plerocercus)

Rees, G., 1969

*Mysteropecra falcata*

*Callitetrarhynchus gracilis* (Rudolphi, 1819) Pintner, 1931

(plerocercus)

Rees, G., 1969

*Mysteropecra tioris*

*Callitetrarhynchus gracilis* (Rudolphi, 1819) Pintner, 1931

(plerocercus)

Rees, G., 1969

*Mysteropecra venenosa* (L.)

*Callitetrarhynchus gracilis* (Rudolphi, 1819) Pintner, 1931

(plerocercus)

Rees, G., 1969

*Myxocephalus jaok* Cuvier et Valenciennes

*Nybelinia surmenicola* Okada in Dollfus, 1929 (larva)

STRELKOV, J.A., 1966

*Myxocephalus verrucosus*

*Nybelinia surmenicola* Okada in Dollfus, 1929 (larva)

ZHUKOV, E.V., 1963

*Naucrates ductor* Linnaeus

*Nybelinia sp.* (larva)

RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972

*Neoobythites macrops* Günther

*Nybelinia nipponica* Yamaguti, 1952 (larva)

YAMAGUTI, S., 1952

*Neooscobrops annectens* Gilchrist

*Otobothrium cranacolle* Linton, 1899

Reimer, L.W., 1984

*Netuma australis* (Gunther)

*Otobothrium mugilis* Hiscock, 1954 (plerocercus)

HISCOCK, I.D., 1954
Nezumia bairdii (Goode and Bean, 1877)
Trypanorhynch ap. (larva)

Ocyurus chrysurus Bloch
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
REES, G., 1969

Odonotogadus merlangus euxinus (Nordman)
Grillotia erinaceus (Van Beneden, 1858) (larva)
KORNYUSHIN, V.V. AND SOLOCHENKO, A.I., 1978

Odonotogadus merlangus L.
Grillotia erinaceus (Van Beneden, 1858) (plerocercoid)
SHOTTER, R.A., 1972
SHOTTER, R.A., 1973

Oncorhyncus gorbuscha (Walbaum)
Nybelinia surmenicola Okada in Dollfus, 1929
BOGDANOVA, E.A., 1963
TSIMBALYUK, E.M. AND SEMISHKO, N.N., 1971
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1960
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
AKHMEROV, A.K., 1963
Tetrarhynchus palaeeceus Rud.
ZMEJEV, G.J., 1936

Oncorhyncus keta (Walbaum)
Coenomorphus grossus
ZMEJEV, G.J., 1936
Nybelinia surmenicola Okada in Dollfus, 1929
STRELKOV, YU A. AND SHULMAN, S.S.
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
BOGDANOVA, E.A., 1963
STRELKOV, J.A., 1960
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
AKHMEROV, A.K., 1963
Tetrarhynchus palaeeceus
ZMEJEV, G.J., 1936

Oncorhyncus kisutch (Walbaurn)
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1960

Oncorhyncus masu (Brewoort)
Nybelinia surmenicola Okada in Dollfus, 1929
STRELKOV, YU A. AND SHULMAN, S.S.

Oncorhyncus nero (Walbaum)
Nybelinia surmenicola Okada in Dollfus, 1929
SHIMAZU, T., 1975b
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1960

Oncorhyncus tachawytche (Walbaum)
Hepatoxyylon trichiuri (Holten, 1892) (post-larva)
REYES PIRIANO, X, 1982
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1960
Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)
KUPERMAN, B.I., 1980

Ophidium rochei Heller
Christianella minute (Van Beneden, 1849) (larva)
KORNYUSHIN, V.V. AND SOLOCHENKO, A.I., 1978

Ophiodon elongatus Girard
Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tentacularia
sp. of Hart 1936
HART, J.F., 1936
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

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Orthogoniscus mola (L.)  SEE: Mola mola (L.)
Osteolaemus tetraspis Cope
   Otobothrium cysticum (Mayer, 1842) (plerocercus)
      DOLLFUS, R.P., 1942
Ostorhinchus conwaili
   Hepatoxyxon trichiuri (Holten, 1882)
      KOROTAEVA, V.D., 1974a
   Trypanorhynch sp.
      KOROTAEVA, V.D., 1974a
Otolithus argentatus (C.V.)
   Gymnorhynchus gigas (Cuvier, 1817) (larva)
      BILQEES, F.M. AND KAZMI, F.S., 1974
   Myxirhynchus pearsoni (Southwell, 1929) Bilqees, 1980 (larva)
      syn. Tetrarhynchus pearsoni Southwell, 1929
   BILQEES, F.M. AND KAZMI, F.S., 1974
Otolithus senegalensis Valenciennes
   Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
      (plerocercus)
      DOLLFUS, R.P., 1942
Otoperca aurita (Valenciennes)
   Otobothrium (Pseudotobothrium) dipacum Linton, 1897 (plerocercus)
      DOLLFUS, R.P., 1942
   P. pengeniun (full name missing)
      Gymnorhynchus sp.
      ALI, M.Y., 1968
Palameton
   Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
      (plerocercus)
      DOLLFUS, R.P., 1942
Pama pame
   Gymnorhynchus sp. (larva)
      RAHMAN, A.K.A., 1971
   Paralepis elongata (Brauer, 1906)
   Gilquinia sp. (plerocercoid)
      REIMER, L.W., 1975b
Paralichthys dentatus
   Dasyrhynchus sp. (encysted plerocercoid)
      MEYERS, T.R., 1978
   Nybelinia sp. (encysted plerocercoid)
      MEYERS, T.R., 1978
Paralichthys olivaceus
   Nybelinia pintneri Yamaguti, 1934 (larva)
      IWATA, S., 1939
Parapeneus multifasciatus Quoy and Gaimard
   Nybelinia basimagacantha Carvajal, Campbell and Cornford, 1976
      (post-larva)
Pelamys Bonapartei (Verany)
   Tentacularia coryphaenae Bosc, 1802 (larva or post larva)
      GUIART, J., 1935a
Peliona elongata
   Nybelinia elongata Shah and Bilqees, 1979 (plerocercoid)
      SHAH, M. AND BILQEES, F.M., 1979
Periaredion adeni (Lloyd)
   Nybelinia sp. (larva)
      REIMER, L.W., 1984
Periaredion cataphractum
   Nybelinia sp. (larva)
      RADULESCU, I.I., 1969
Phycis bilennioides
Nybelinia lingualis (Cuvier, 1817)
PAPOUTSGLOU, S.E., 1976

Physiculus bacchus
Nybelinia sp. (larva)
POIS, N.V., 1975

Plethsea quadrituberculata (Pallas)
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1966

Platichthys fleusus (L.)
Grillotia sp. (larva)
GIBSON, D.I., 1972
Trypanorhynch sp. (plerocercus)
MACKENZIE, K. AND GIBSON, D.I., 1976

Platichthys fleusus lucius (Pallas)
Christianella minuta (Van Beneden, 1849) (larva)
KORNUSHIN, V.V. AND SOLONCHENKO, A.I., 1978

Platichthys stellatus (Pallas)
Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercoid)
ORCUTT, H.G., 1958

Platyccephalus basensiae
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (plerocercus)
PRUDHOE, S., 1969

Platyccephalus indicus (Linné)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)
YAMAGUTI, S., 1952

Platyccephalus punctatus Cuvier and Valenciennes
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)
YAMAGUTI, S., 1952

Platyccephalus scaber (L.)
Neogymanorhynchus platycephali Bilqees and Shah, 1982 (plerocercus)
BILQees, F.H. AND SHAH, M., 1982

Pleurogrammus azonus Jordan and Metz
Trypanorhynch sp.
BAEVA, O.M., 1968

Pleurogrammus monopterigius (Pallas)
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1966

Pleuronectes platessa L.
Grillotia erinacea (Van Beneden, 1858) (larva)
REES, G. AND LLEWELLYN, J., 1941
Trypanorhynch sp. (larva)
MACKENZIE, K. AND GIBSON, D.I., 1976
Trypanorhynch sp. (plerocercoid)
MACKENZIE, K., 1968

Pleuronectes stellatus Pallas
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1966

Podothecus acipenserinus (Pallas)
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1966

Pogonias cromis (L., 1766)
Pseudogrillotia pleistacantha Dollfus, 1969 (post-larva)
DOLLFUS, R.P., 1969b

Pogonias cromis (Linnaeus)
Diplootobothrium springeri Chandler, 1942 (plerocercoid)
SCHLICHT, F.C. AND MCFARLAND, W.N., 1967
Poseilancistrum caryophyllum (Diesing, 1858) Dollfus, 1929 (plerocercoid)
OVERSTREET, R.M., 1977
Poecilanistrium robustum (Chandler, 1935) Dollfus, 1942
CHANDLER, A.C., 1954
Pseudogrillotia pleistacantha Dollfus, 1969 (plerocercoid)
OVERSTREET, R.M., 1977
Pollachius virens (L.)
Grillotia erinacea (Van Beneden, 1858) (plerocercoid)
LUBIENIECKI, B., 1976
Pollachius virens (L.) syn. Gadus virens
Hepatoxylon trichiuri (Holten, 1882) (plerocercoid)
HEINRICH, L., 1975
Polymixia nobilis (Lowe)
Nybelinia sp. (larva)
REIMER, L.W., 1984
Polyneus quadrifilium Cuvier
Dasyrhyynchus variouuncinatus (Pintner, 1913) Pintner, 1920
(Dollfus, R.P., 1942)
Polyprion oxygeneios
Tentacularia coryphaenae Bosc, 1802 (post-larva)
CATTAN, P.E., CARVAJAL, J., TORRES, D. AND YANEZ, J.L., 1979
Psammodus olivaceus Day
Pseudogilquinia karachiense Bilqees and Khatoon, 1980
(Pintner, 1931)
CARVAJAL, J. AND REGO, A.A., 1985
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)
CARVAJAL, J. AND REGO, A.A., 1985 (larva)
Dasyrhyynchus sp. (plerocercoid)
MEYERS, T.R., 1978
Trypanorhynch sp.
Trypanorhynch sp. (larva)
GOMES GOMES, D., FABIIO, S.P. DE AND TAYT-SON ROLAS, F., 1972
Pristipoma bennetti Lowe, 1837
Nybelinia oodes Dollfus, 1966 (post-larva)
DOLLFUS, R.P., 1966b
Promethichthys prometheus
Nybelinia sp. (larva)
ICHIHARA, A., 1968
Pseudes rotundatus Smith
Nybelinia sp. (larva)
REIMER, L.W., 1984
Psettodes erumei (Bloch and Schneider)
Dasyrhyynchus pillerei (Southwell, 1929) (larva)
REIMER, L.W., 1984
Trypanorhynch sp.
PARUKHIN, A.M., 1967a
Pseudes rotundatus Smith
Nybelinia nipponica Yamaguti, 1952 (larva)
YAMAGUTI, S., 1952
Pteroplatea micrura
Pterobothrium sp. (larva)
ANANTARAMAN, S., 1963

Quietula y-cauds (Jenkins and Evermann)
Callitetrarhynchus sp. (larva)
BROOKS, D.R. AND BROTHERS, E.B., 1974

Rachycentron canadum (L.)
Callitetrarhynchus gracilis (Rudophi, 1819) Pintner, 1931
(plerocercus)
DOLFFUS, R.P., 1942

Rastrelliger kanagurta (Cuvier, 1829)
Trypanorhynch sp.
KOROTAEVA, V.D., 1974b

Rastrelliger kanagurta (Russeb)
Pterobothrium rubromaculatum (Diesing, 1863) (plerocercoid)
REIMER, L.W., 1988

Reinhardtius hippoglossoides
Nybelinia surmenicola Okada in Dolfus, 1929
MAMAEV, Y.L., PARUKHIN, A.M. AND BAEVA, O.M., 1963

Rexea solandri (Cuvier and Valenciennes, 1832)
Trypanorhynch sp.
KOROTAEVA, V.D., 1971

Ruvettus tydemani Weber
Tentacularia coryphaenae Bosc, 1822
KOROTAEVA, V.D., 1971

S. pama (full name missing)
Gymnorhynchus sp.
ALI, H.Y., 1968

S. silondia (full name missing)
Gymnorhynchus sp.
ALI, H.Y., 1968

Salmo salar L.
Hepatoxylon trichiuri
PIPPY, J.H.C., 1969

Hepatoxylon trichiuri (Holten, 1802)
HICKS, F.J. AND THRELFAI, W., 1913
KANE, M.B., 1966

Hepatoxylon trichiuri (Holten, 1802) (metacestode)
CHUBB, J.C., 1965

Nybelinia sp. (larva)
ALVAREZ, PELLITERO, M.P., 1973

Tentacularia coryphaenae Bosc, 1802
PIPPY, J.H.C., 1969

Salmon

Hepatoxylon trichiuri (Holten, 1802) (plerocercus)
HEALY, A., 1956

Hepatoxylon trichiuri (Holten, 1802) (plerocercus)
HALE, P.A., 1959

Salmon, pink
Nybelinia surmenicola Okada in Dolfus, 1929
MARGOLIS, L., 1956
Salvelinus alpinus (L.)
Nybelinia surmenicola Okada in Dollfus, 1929
KONOVLOV, S.M., 1975
RUDMINAITEN, A.F. and RUDMINAITIS, E.A., 1979

Salvelinus leucomaenis (Pallas)
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1968

Salvelinus malma (Walbaum)
Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
STRELKOV, J.A., 1968

Sarda aardv (Bloch)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)
DOLLFUS, R.P., 1942

Sardinella sp.
Trypanorhynch sp. (larva)
FEIJO, L.M.F., OLIVEIRA RODRIGUEZ, H. DE AND SORDRE RODRIGUEZ, S., 1979

Saurida undosquamis (Richardson)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
REIMER, L.W., 1984
Dasyrhynchus pilleris (Southwell, 1929)
REIMER, L.W., 1984
Nybelinia sp. (plerocercoid)
REIMER, L.W., 1984

Sciaena albisflora (Richardson)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)
YAMAGUTI, S., 1952

Sciaena antarctica Castelnau
Dasyrhynchus pacificus Robinson, 1965 (larva)
ROBINSON, E.S., 1965
Poeelaniaciatrium carophyllum (Diesing, 1858) Dollfus, 1929 (larva)
ROBINSON, E.S., 1965

Sciaena aquila (Lacépède)
Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (plerocercus)
DOLLFUS, R.P., 1942

Sciaena coiter
Gillotia heptanchi (Vaullageard, 1899) (larva)
KYAW-MYINT, 1968
Nybelinia robusta (Linton, 1899) (larva)
KYAW-MYINT, 1968
Pterobothrium lintoni (MacCallum, 1916) (larva)
KYAW-MYINT, 1968

Sciaenops ocellata (Linnaeus)
Poeelaniaciatrium carophyllum (Diesing, 1858) Dollfus, 1929 (plerocercoid)
OVERSTREET, R.M., 1977
SCHLICHT, F.G. AND MCFARLAND, W.N., 1967

Sciana equilla (Loot)
Trypanorhynch sp. (larva)
EL-AHWAL, A.A. AND EL-SHERIF, A.F., 1978

Scardus colias Cuvier et Valenciennes, 1832
Nybelinia sp.
KOROTAEVA, V.D., 1974b
Trypanorhynch sp.
KOROTAEVA, V.D., 1974b

Scomber scombrus Cuvier (larva)
SOLONCHENKO, A.I., 1968

Trypanorhynch sp. (larva)
SOLONCHENKO, A.I., 1968

Scomber japonicus Houttuyn

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)

YAMAGUTI, S., 1952

Tentacularia coryphaenae Bosc, 1802 (larva)

IWATA, S., 1939

Trypanorhynch sp. (plerocercus)

DAILEY, M.D., 1969

REGO, A.A. AND SANTOS, C.P., 1983

Scomber scomber (L.)

Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)

DOLLFUS, R.P., 1942

Scomber scombrus L.

Grillotia angeli Dollfus, 1969 (larva)

MACKENZIE, K., 1982

Grillotia angeli Dollfus, 1969 (plerocercus)

MACKENZIE, K., 1980

Lacistorhynchus sp.

DOLLFUS, R.P., 1969a

Tetraphaenobothrium sp. (larva)


Scomberomorus cavalla (Cuvier and Valenciennes)

Tentacularia coryphaenae Bosc, 1802 (plerocercus)

WARD, H.L., 1954

Scomberomorus commersoni (Lacépède)

Grillotia branchii Shaharom and Lester, 1982 (metacestode)

SHAHAROM, F.M. AND LESTER, R.J.G., 1982

Scophthalmus aquosus

Dasyrhynchus sp. (encysted plerocercoid)

MEYERS, T.R., 1978

Scophthalmus rhombus

Grillotia erinacea (Van Beneden, 1858) (larva)

BAYLIS, H.A., 1939

Scorpaena porcus L.

Christianella minuta (Van Beneden, 1849) (larva)

KORNYUSHIN, V.V. AND SOLONCHENKO, A.I., 1978

Sebastes aleutianus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes alutus Gilbert, 1898

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SEKERAK, A.D. AND ARAI, H.P., 1973

SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes borealis

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes brevispiris

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes caurinus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes ciliatus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

SEKERAK, A.D. AND ARAI, H.P., 1977
Sebastes crameri

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes diploprora

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes elongatus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes entomelas

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes flavidus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes maliger

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes marinus (L.)

Grillotia erinaceus (Van Beneden, 1858) (?) (tentative identification) syn. Tetrarhynchus erinaceus Van Beneden
KAHL, W., 1937

Grillotia erinaceus (Van Beneden, 1858) (larva) syn. Tetrarhynchus erinaceus
LULING, K.H., 1951
LULING, K.H., 1952
Trypanorhynch sp. (larva)
SINDERMANN, C.J., 1961b

Sebastes mentella Travin

Grillotia erinaceus (Van Beneden, 1858) (larva ; tentative identification)
JONES, D.H., 1970

Sebastes nigrocinctus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes pinniger

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes poly-spinias

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes protiger

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes reedi

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes ruberrimus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes variegatus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastes zacentrus

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)
SEKERAK, A.D. AND ARAI, H.P., 1977

Sebastodes alutus

Nybelinia sp.
TKACHEV, V.A., 1976
Trypanorhynch sp.
TKACHEV, V.A., 1976

TKACHEV, V.A., 1976
Sebastodes brevispinus

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes crameri

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes diploproa

Lacistorhynchus sp.

TKACHEV, V.A., 1976

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes flavidus

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes gooden

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes jordani

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes melanops

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes mystenos

Nybelinia sp.

TKACHEV, V.A., 1976

Sebastodes proriger

Nybelinia sp.

TKACHEV, V.A., 1976

Secutor ruconius Buchanan-Hamilton

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931

(plerocercoid)

REIMER, L.W., 1980

Diplootobothrium tamilnadensis Reimer, 1980 (plerocercoid)

REIMER, L.W., 1980

Nybelinia dakari Dollfus, 1960 (plerocercoid)

REIMER, L.W., 1980

Seriola kelli (Cuvier and Valenciennes)

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931

(plerocercoid)

REIMER, L.W., 1980

Sericola maculata Steindachner, 1876

Floreopsis maculata Cuvier, 1817 (plerocercus)

SOTO, J. AND CARYAJAL, J., 1979

Seriola dumerili Risso, 1819

Dasyrhyphus variuncinatus (Pintner, 1913) Pintner, 1928

(plerocercus)

WARD, H.L., 1954

Nybelinia punctatissima Dollfus, 1960

DOLFFUS, R.P., 1960b

Seriola purpurascens Temmick and Schlegel

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)

YAMAGUTI, S., 1952

Seriola quinquergadiata Temmick and Schlegel

Callitetrarhynchus nipponica Nakajima and Egusa, 1973

(plerocercus)

NAKAJIMA, K. AND EGUSA, S., 1969c

NAKAJIMA, K. AND EGUSA, S., 1972b

NAKAJIMA, K. AND EGUSA, S., 1972c

NAKAJIMA, K. AND EGUSA, S., 1973

Callitetrarhynchus nipponica Nakajima and Egusa, 1973 (plerocercus) syn. Callitetrarhynchus sp. Nakajima and Egusa,
NAKAJIMA, K. AND EGUSA, S., 1968

Serranus cabrilla L. 1758

Nybelinia africana Dollfus, 1966 (post-larva)

DOLLFUS, R.P., 1966b

Sillago sp.

Pterobothrium lintoni (MacCallum, 1916)

KYAW-MYINT, 1968

Silondia silondia

Syndesmobothrium filicolle

SAXENA, S.K., 1986

Smaris sp.

Christianella minuta (Van Beneden, 1849) (plerocercus) syn.

Lacistorhynchus sp. in Pintner, 1893 syn. Grillotia sp. in

Dollfus, 1942

NYBELIN, O., 1946

Snapper

Trypanorhynch sp. (larva)

MOKHAYER, B., 1974

Sockeye salmon

Nybelinia surmenicola Okada in Dollfus, 1929

MARGOLIS, L., 1956

Solea lascaria nasutan (Pallas)

Christianella minuta (Van Beneden, 1849) (larva)

KORNYUSHIN, V.V. AND SOLOCHENKO, A.I., 1978

Solea solea

Grillotia erinaceus (Van Beneden, 1858)

PAPOUTSOGLOU, S.E. AND PAPAPARASKEVA-PAPOUTSOGLOU, E.G., 1977

Sparidae gen. spec.

Nybelinia anantaramanorum Reimer, 1908 (plerocercoid)

REIMER, L.W., 1908

Spheroidae borealis

Floriceps saccatus Cuvier, 1817 (larva)

TSIMBALYUK, E.M., 1978b

Sphyraena barracuda (Walbaum)

Otobothrium (Pseudotobothrium) dipsacum (Linton, 1897)

(plerocercus) syn. Pseudotobothrium dipsacum (Linton, 1897) in

Ward (1954)

WARD, H.L., 1954

Sphyraena guachancho Cuvier, 1829

Nybelinia alloiotica Dollfus, 1966 (forma typica) (post-larva)

DOLLFUS, R.P., 1966b

Nybelinia punctatissima Dollfus, 1966 (forma typica) (post-larva)

DOLLFUS, R.P., 1966b

Spicara smaris (L.)

sp. (larva)

NIKOLAEVA, V.M., 1963b

Stenobrachiua leucoperaeus Eigenman and Eigenman

Trypanorhynch sp. (larva)

COLLARD, S.B., 1978

Synaphobranchus pinnatus (Gronnovius) (tentative identification)

Nybelinia congri Guiart, 1935 (larva)

GUIART, J., 1935a

Synaphobranchus sp.

Sphyriocephalus viridis (Wagener, 1854) Pintner, 1913 (post-larva)

syn. Sphyriocephalus Richardi Guiart, 1935

GUIART, J., 1935a

Synodus foetens

sp. (larva)

OVERSTREET, R.M., 1968
Synodus lucioceps

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercoid)


Grillotia amia-gora (Wagner, 1854) (plerocercoid)


Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercoid)


Temnodon saltator (L.)

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)

DOLLFUS, R.P., 1942

Tetraprusus Lessonae Caneatini

Tentacularia coryphaenae Bosc, 1802 (larva or post larva)

DOLLFUS, R.P., 1942

Theragra chalcogramma (Pallas, 1811)

Grillotia erinacea (Van Beneden, 1858) (larva)

MAMAEV, Y.L. AND BAEVA, O.M., 1963

Grillotia heptanchi (Vaulleagaed, 1899) (plerocercoid)

ARTHUR, J.R., 1984

Nybelinia surmenicola Okada in Dollfus, 1929

GUSEV, A.V., ZHUKOV, E.V. AND STRELKOV, YU.A., 1959

SHIMAZU, T., 1975b

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

ARAI, H.P., 1969

GRABDA, J., 1977

MAMAEV, Y.L. AND BAEVA, O.M., 1963


SASAKI, M., 1973

SKRIABINA, E.S., 1963

STRELKOV, J.A., 1968

Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid)

ARTHUR, J.R., 1984


Trypanorhynchus type 1 (plerocercoid)

ARTHUR, J.R., 1984

Trypanorhynchus type 2 (plerocercoid)

ARTHUR, J.R., 1984

Thunnus albacares

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (?)
(cysta) (tentative identification)

BANE, G.W., 1969

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(post-larva)

BAUDIN-LAURENCIN, F., 1971

Daeyryhynchus talismani Dollfus, 1935 (post-larva)

BAUDIN-LAURENCIN, F., 1971

Thunnus albacares

Tentacularia coryphaenae Bosc, 1802 (post-larva)

BAUDIN-LAURENCIN, F., 1971

Thunnus albacares (Bonnaterre, 1788)

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931
(plerocercus)

BUSSIERSAS, J. AND BAUDIN-LAURENCIN, F., 1973

Daeyryhynchus talismani Dollfus, 1935 (plerocercus)

BUSSIERSAS, J. AND ALDRIN, J.F., 1965

BUSSIERSAS, J. AND BAUDIN-LAURENCIN, F., 1973

Hepatoxylon trichiuri (Holten, 1802) (post-larva)

BUSSIERSAS, J. AND BAUDIN-LAURENCIN, F., 1973

Tentacularia coryphaenae Bosc, 1802 (post-larva)
**Thunnus obesus** (Lowe, 1839)

- *Dasyrhyynchus talemani* Dollfus, 1935 (plerocercus)
- *Bussieras*, J. AND ALDRIN, J.F., 1965
- *Bussieras*, J. AND BAUDIN-LAURENCIN, F., 1973

**Sphyriocephalus dollfusii** Bussieras and Aldrin, 1968 (post-larva)

- *Bussieras*, J. AND BAUDIN-LAURENCIN, F., 1973

**Thunnus thynnus**

- *Gymnorhynchus* (*Molicola*) *thyraitae* Robinson, 1959
  - KOROTAEVA, V.D., 1971
  - MEHL, J.A.P., 1979
  - ROBINSON, E.S., 1959
  - VALOVA, V.N., 1976
  - KAGEI, N., KIHATA, M. AND ASANO, K., 1977
  - Hepatoxyloïdus trichiuri (Holten, 1862) (post-larva)
  - KAGEI, N., KIHATA, M. AND ASANO, K., 1977
  - *Lacistorhynchus* *tenius* (Van Beneden, 1858) (plerocercus)
  - ROBINSON, E.S., 1959
  - Nybelinia (?) *Syngenes* sp. (post-larva)
  - ROBINSON, E.S., 1959
  - Nybelinia *thyraitae* (Leiper and Atkinson, 1915) Korotaeva, 1971
  - GIRARD, V.D., 1971
  - Tetrarhynchus sp.
    - BLACKBURN, M., 1969
    - Trypanorhynch sp.
    - KOROTAEVA, V.D., 1971
  - Gromorhynchus (*Molicola*) *horridus* Goodsir, 1841
    - JOYEUX, C. AND BAER, J.G., 1954
  - Thyridtoides *marleyi* Fowler
  - Nybelinia sp. (larva)
  - REIMER, L.W., 1984
  - *Torpedo* *marmorata* Risso
  - *Grillotia* *erinaceus* (Van Beneden, 1858) (adult)
    - DOLLFUS, R.P., 1942

**Trachinotus goodes**

- *Callitetrarhynchus* *gagascar* (Rudolphi, 1819) Pintner, 1931
  - (plerocercus)
  - REES, G., 1969

**Trachurus* *mediterraneus* *ponticus* Aleev

- *Nybelinia* sp. (larva)
  - NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966
  - Tentaculariidae sp. (larva)
  - KOVALEVA, A.A., 1979
  - NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966
  - Trypanorhynch sp. (larva)
  - KOVALEVA, A.A., 1969
  - KOVALEVA, A.A., 1979

**Trachurus* *mediterraneus* (Steindachner)

- *Nybelinia* sp. (larva)
  - KOVALEVA, A.A., 1979
  - NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966
  - Tentaculariidae sp. (larva)
  - KOVALEVA, A.A., 1979
  - NIKOLAeva, V.M. AND KOVALEVA, A.A., 1966
Trachurus murphyi Nichols, 1928
Nybelinia sp. (plerocercus)
SOTO, J. AND CARVAJAL, J., 1979
Tentacularia coryphaenae Bosc, 1802 (plerocercus)
SOTO, J. AND CARVAJAL, J., 1979
Trachurus nevzealandicus Richardson
Nybelinia (? Syngenea sp.) (post-larva)
ROBINSON, E.S., 1959a
Trachurus symmetricus (Ayres)
Dasyrhynchus sp. (plerocercus)
DAILEY, M.D., 1969
Trachurus trachelus
Nybelinia sp. (larva)
KOVALEVA, A.A., 1978
Trachurus trachelus Cadenat
Tetrarhynchobothrium sp. (larva)
RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972
Trachurus trachurus capensis Castelnau
Gilquinia sp. (larva)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
KOVALEVA, A.A., 1978
Gilquinia sp. (larvae)
KOVALEVA, A.A., 1968
Nybelinia lingualis (Cuvier, 1817) (larva)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Nybelinia sp. (larva)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
KOVALEVA, A.A., 1978
Nybelinia sp. (larvae)
KOVALEVA, A.A., 1968
Tentacularia sp. (larva)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Tentaculariidae sp. (larva)
KOVALEVA, A.A., 1968
Trachurus trachurus (L.)
Grillotia sp. (plerocercus)
DOLLFUS, R.P., 1942
Laciatorhynchus tenuis (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1942
Nybelinia lingualis (Cuvier, 1817)
PAPOUTSOGLIOU, S.E., 1976
Nybelinia sp.
KOVALEVA, A.A., 1966
Nybelinia sp. (larva)
KOVALEVA, A.A., 1978
Tentaculariidae sp.
KOVALEVA, A.A., 1966
Tentaculariidae sp. (larva)
KOVALEVA, A.A., 1978
Trachurus trachurus trachurus L.
Christianella minute (Van Beneden, 1849)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980a
Christianella minute (Van Beneden, 1849) larva
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Grillotia erinaceus (Van Beneden, 1858)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980a
Grillotia erinaceus (Van Beneden, 1858) (larva)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Laciatorhynchus tenuis (Van Beneden, 1858)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980a
Laciatorhynchus tenuis (Van Beneden, 1858) (larva)
GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1980b
Nybelinia lingualis (Cuvier, 1817)

GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1986

Nybelinia lingualis (Cuvier, 1817) (larva)

GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1986b

sp. (larva)

GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1986

Trypanorhynch sp. (larva)

GAEVSKAYA, A.V. AND KOVALEVA, A.A., 1986b

Trachynotus sp.

Otobothrium sp. (larva)

ANANTARAMAN, S., 1963

Trichiurus haemoele

Nybelinia sp. (larva)

ANANTARAMAN, S., 1963

Trichiurus japonicus

Oloriceps scacatus Cuvier, 1817 (larva)

TSIMBALYUK, E.M., 1978b

Trichiurus japonicus (Temmick and Schlegel)

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931 (larva)

YAMAGUTI, S., 1952

Trichodon trichodon (Tilesius)

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

STRELOK, J.A., 1966

Trigla gurnardus (L.)

Grillotia erinaceus (Van Beneden, 1858) (plerocercoid)

DUNIEC, H., 1986

Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)

DOLLFUS, R.P., 1942

Nybelinia lingualis (Cuvier, 1817) (larva or post larva)

DOLLFUS, R.P., 1942

Trigla lucerna L.

Callitetrarhynchus gracilis (Rudolphi, 1819) Pintner, 1931

(DOLLFUS, R.P., 1942

Trigla lyre L.

Nybelinia lingualis (Cuvier, 1817) (larva or post larva)

DOLLFUS, R.P., 1942

Trigla sp.

Grillotia erinaceus (Van Beneden, 1858) (plerocercus)

DOLLFUS, R.P., 1942

Grillotia sp. (plerocercus)

DOLLFUS, R.P., 1942

Nybelinia africana Dollfus, 1968 (post-larva)

DOLLFUS, R.P., 1968b

Triglopa pingeli Reinhardt

Nybelinia surmenicola Okada in Dollfus, 1929 (larva)

ARAI, H.P., 1969

Umbrina coroides (Cuvier)

Poecilancistrium ceryophyllum (Diesing, 1855) Dollfus, 1929

(plerocercoid)


Undetermined gadoid

Lacistorhynchus tenuis (Van Beneden, 1858) (plerocercus)

DOLLFUS, R.P., 1942

Uranoscopus oligolepis Bleeker

Symbathriorchus uranoscopi Yamaguti, 1952 (larva)

YAMAGUTI, S., 1952

Vorner (Argyrofouus) setipinnus (Mitchell, 1815)

Nybelinia dakari Dollfus, 1968 (post-larva)

DOLLFUS, R.P., 1968b

Nybelinia estigmata Dollfus, 1968 (post-larva) (forma typica)

DOLLFUS, R.P., 1968b
Wallagonia attu
Otobothrium crenacolle Linton, 1899 (larva)
KYAW-HYINT, 1968

Grillotia erinaceus (Van Beneden, 1858) (plerocercoid)
MCKERR, G., 1978

Xiphias gladius Linnaeus, 1758
Daasyrhynchus varioucinatus (Pintner, 1913) Pintner, 1928
(plerocercoid)

Hepatoxylon attenuatus (Rudolphi, 1819) (plerocercoid)

Hepatoxylon trichiuri (Holten, 1802) (plerocercoid) syn.
Dibothriorhynchus attenuatus (Rudolphi, 1819)
NIGRELLI, R.F., 1938

Hepatoxylon trichiuri (Holten, 1802) (post-larva) syn. Hepatoxylon groasum (Rudolphi)
RASCHUSEN, E., 1973

Nybelinia lamontae Nigrelli, 1938
NIGRELLI, R.F., 1938

Nybelinia lamontae Nigrelli, 1938 (plerocercoid)

Tentacularia coryphaenae Bosc, 1802 (plerocercoid)

Trypanorhynch sp. (plerocercoids)
MUZYKOVSII, A.M., 1972

Xystrias grigorjewi (Herzenstein)
Nybelinia nipponica Yamaguti, 1952 (larva)
YAMAGUTI, S., 1952

Zenopaia nebulosa (Schlegel)
Laciatorhynchus tenuis (Van Beneden, 1858) (plerocercus)
ROBINSON, E.S., 1959a

Zeaus faber L.
Laciatorhynchus tenuis (Van Beneden, 1858) (plerocercus)
DOLLFUS, R.P., 1942

Nybelinia (? Syngenese sp.) (post-larva)
ROBINSON, E.S., 1959a

Tetrahyynchobothrium sp. (larva)
RADULESCU, I.I., NALBANT, T.T. AND ANGELESCU, N., 1972

OSTECHITYYES FOOD FISHES INCLUDING
Cynoscion regalia, Micropogon undulatus and Leiostomus xanthurus
Nybelinia pisulcata (Linton, 1899) Poche, 1926 (larva)
O'ROURKE, A.E., 1949

Otobothrium crenacolle Linton, 1899 (larva)
O'ROURKE, A.E., 1949

REPTILIA
Caretta caretta (L.)
Trypanorhynch larvae
SEY, O., 1977

Chelone mydas L.
Otobothrium cyaticum (Mayer, 1842) (plerocercus)
DOLLFUS, R.P., 1942

Hydrodynastes bicinctus bicinctus
Pterobothrium sp. (plerocercus)
REGO, A.A., 1988
MAMMALIA

_Alepisaurus aesculapius_
Trypanorhynch sp. (larva)
SKRYABIN, A.S., 1965

_Balaenoptera acutorostrata_
Trypanorhynch sp. (larva)
SKRYABIN, A.S., 1965

_Balaenoptera acutorostrata davidoni_
Trypanorhynch sp. (larva)
SKRYABIN, A.S., 1975

_Balaenoptera borealis Lesson_
Trypanorhynch sp. (larva)
SKRYABIN, A.S., 1965

_Eumetopias jubatus Schr._
Trypanorhynch sp. (larva)
SKRYABIN, A.S., 1965

_Homo sapiens_

_Hepatoxylon trichiuri (Holten, 1882) (larva) syn._
_Dibothriorchis grossum (Rudolphi, 1819)_
HEINZ, H.J., 1954

_Hepatoxylon trichiuri (Holten, 1882) (post-larva)_
FRIPP, P.J. AND HASON, P.R., 1983

_Nybelinia surmenicola Okada in Dollfus, 1929 (larva)_
KIKUCHI, Y., TAKEUCHI, T., KAMIYA, M. AND OZAKI, H., 1981
Trypanorhynch sp. (larva)
GRIMMO, A.E.P. AND BUCKLEY, J.J.C., 1961

_Phoca vitulina largha Pallas_

_Nybelinia sp. (larva)_
POPOV, V.N. AND GOL'TSEV, V.N., 1975

_Phystegopterus catodon L._
Trypanorhynch sp. (larva)
SKRYABIN, A.S., 1965
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SECTION TWO

TAXONOMIC STUDIES ON LITTLE-KNOWN TRYpanorhynchs
According to Schmidt (1986) about 60,000 species of vertebrate exist, and each species that has been examined has been shown to host one or more cestode species. Fewer than 4,000 species of tapeworm have been recorded, so a large number of species remain to be found. The cestodes (with the exception of Archigetes, which matures in the coelom of annelids) all inhabit the gut of their vertebrate definitive hosts. There are twelve main orders of Eucestoda, including the Trypanorhyncha Diesing 1863, which mature in elasmobranchs. Clearly much work remains to be done on this order, as less than 200 species have been recorded from the 3-4,000 species of elasmobranch known to exist.

The terminology associated with the Trypanorhyncha is complex, involving a number of specialised terms (Yamaguti, 1959; Schmidt 1986). Here I shall briefly summarise the main characters used to distinguish species of trypanorhynch.

The trypanorhynchs are divided into two suborders. In the Acystidea Guiart 1927, the blastocyst of larval trypanorhynchs is either missing or greatly reduced, and the scolex has a pars bothridialis that extends to cover the pars vaginalis (i.e. the bothridia reach down past the sheaths to the bulbs). This suborder contains the homeoacanthous families (Hepatoxylyidae Dollfus 1940; Tentaculariidae Poche 1926; Sphyriocephalidae Pintner 1913) whose tentacle armature consists of hooks of similar shape and size distributed in continuous spiral rows or quincunaxes over the metabasal portion of the tentacle e.g. Hepatoxylyn trichiuri (Holten, 1802) (Plate 1, Figs. 1-2).

In the Cystidea the plerocerci possess well developed blastocysts, and
Plate 1: Tentacle armatures of homeoacanth, poeciloacanth and heteroacanth trypanorhynchs

Hepatoxylon trichiuri (Holten, 1802)
Fig. 1 external face
Fig. 2 internal face (scale bar Figs. 1-2: 0.4 mm)

Grillotia erinaceus (van Beneden, 1858)
Fig. 3 external face
Fig. 4 internal face (scale bar Figs. 3-4: 50 μm)

Gilquinia squall Fabricius, 1794
Fig. 5 external face
Fig. 6 internal face (scale bar Figs. 5-6: 25 μm)
the pars vaginalis extends well below the pars bothridialis. The poeciloacanthous families (Dasyrhyynchidae Dollfus, 1942; Gymnorhynchidae Dollfus, 1942; Lacistorhynchidae Guiart, 1927; Pterobothriidae Pintner, 1931) have several hook types. Oblique lines of hooks run from the middle of the internal face (nearest the scolex) of the tentacle across the bothridial and antibothridial surfaces to end on the external face (furthest away from the scolex), with subsidiary or satellite groups of hooks between them. The middle of the external face is occupied either by a "chainette"—a single or double row of large hooks, or a band of small hooks (e.g. Grillotia erinaceus (van Beneden, 1858) (Plate 1, Figs. 3-4). The heteroacanthous families (Eutetrarhynchidae Guiart, 1927; Gilquinii- dae Dollfus, 1942; Hornelliellidae Yamaguti, 1959; Otobothriidae Dollfus, 1942; Rhinoptericolidae Carvajal and Campbell, 1975) possess hooks of varying size and shape, forming oblique rows that run from the internal face alternately over the bothridial and antibothridial surfaces to meet on the external face where they form an inverted V, without a chainette, e.g. Gilquinia squali Fabricius, 1794 (Plate 1, Figs. 5-6). One family, the Mixodigmatidae Dailey and Vogelbein, 1982, from a deep sea planktivorous shark, appears to contain both poeciloacanthous and heteroacanthous elements in its tentacle armature.

Features of the reproductive system may be used to identify detached proglottids as trypanorhynchans: (1) the sleeve-like distribution of the vitellaria, breaking only at the genital atrium and ovary; (2) the extension of the testes into the post-ovarian space; (3) the position of the vagina ventral to the uterus and vas deferens and opening ventral to or slightly behind that of the cirrus; (4) the vas deferens penetrating the cirrus pouch without crossing the vagina; (5) the muscular genital atrium; (6) the delayed development of the eggs, which do not reach the oncosphere stage within the uterus.)
A Redescription of *Grillotia smaris-gora* and an Assessment of the Taxonomy of Trypanorhynchs Found in Monkfish, *Squatina squatina* (L.) and Mackerel, *Scomber scombrus* L.

**Introduction**

Plerocerci of *Grillotia angeli* Dollfus, 1969 were first described by MacKenzie (1980) from mackerel *Scomber scombrus* L. landed at Mevagissey Bay, Cornwall and compared well with Dollfus' (1969) original description of adults of this species from a monkfish, *Squatina squatina* (L.) caught at Sète. Subsequently MacKenzie (1981) and MacKenzie and Mehl (1984) investigated the potential of *G. angeli* as a biological tag for mackerel and at the same time drew attention to the need for a reassessment of the taxonomy of the trypanorhynchs found in the spiral valves of monkfish, and also in the visceral cavities of mackerel. I, therefore, carried out this research, partly under the guidance of Dr. K. MacKenzie, who was recognised during the 6th International Congress of Parasitology, Queensland, Australia 1986, as one of the world's leading experts on the use of parasites, especially tapeworms, as biological indicators.

My aims were to provide the first good description of the species and to ensure that in future it would not be identified as or confused with *Grillotia angeli*, *Christianella minuta* or any other parasite recorded as *C. minuta* or one of its synonyms.
Materials

The type specimens of *Grillotia angeli* Dollfus 1969, and adult trypanorhynchs identified by Dollfus as *G. smaris-gora* (Wagener, 1854) Dollfus, 1946 from monkfish, *Squatina squatina* were borrowed from the Museum National d'Histoire Naturelle, Paris, and examined. Further adult trypanorhynchs from *S. squatina* were obtained from west of the British Isles for comparison. Plerocerci of *G. smaris-gora* (Wagener, 1854) recovered from the California lizardfish, *Synodus lucioceps*, by Jensen, Moser and Heckmann, (1979) were borrowed from the U.S. National Helminthological Collection, Beltsville, USA and compared with plerocerci of *G. angeli* from *Scomber scombrus* described by MacKenzie (1980). Further plerocerci were examined from scad, *Trachurus trachurus* L. and red sea bream, *Pagellus bogaraveo* (Brünnich, 1768) from British waters. Specimen preparation and examination followed the procedures described in the methodology section (pp. 3-15).

Results

General Features

Trypanorhynchs belonging to the family Lacistorhynchidae, sub-family Grillotiinae, up to 5 mm long with two bothridia. Pars vaginalis region longer than pars bothridialis. Tentacles armed with transverse half rows of 4-6 hooks. No hooks along the middle of the internal surface. Groups of small hooks interpolated between half row of major hooks, and a band of small hooks along the middle of external surface. Distinctive basal armature found. Body euapolytic, genital atria marginal and post equatorial.
Description of adult G. smaris-gora from S. squatina (measurements from ten specimens).

1. General Appearance

Total length 2.3-4.5 mm for specimens with immature proglottids (Plate 2; Fig. 1A). The acraspedote scolex, from the anterior end of the bothridia to the posterior end of the pars bulbosa, measures 0.94-1.5 mm. The two unnotched bothridia are 0.23-0.29 mm long and 0.19-0.24 mm wide. The pars vaginalis containing the sinuous tentacle sheaths is 0.53-0.59 mm long and 0.138-0.149 mm wide, the pars bulbosa is 0.43-0.52 mm long and 0.138-0.149 mm wide. The bulbs taper posteriorly, and are 0.045 mm wide at their widest point with the tentacle retractor muscle inserted into the base of the bulb cavity. There is no pars post-bulbosa, the tentacle bulbs appearing to extend into the proliferation zone of the proglottids (Plate 2; Fig. 2). The pars bothridialis : pars vaginalis : pars bulbosa ratio is 1:2:2.

2. Tentacle armature

Each tentacle measures 0.8-0.9 mm long when fully extended, with a diameter of about 0.025 mm. The metabasal tentacle armature (Plate 3; Figs. 2 and 3: Plate 4; Figs. 1A, 1B) is poeciloacanthous and consists of a repeating pattern of two transverse half-turns of four large hooks. Following the conventional numbering system (Dollfus, 1942) hooks 1(1') are set in the internal face of the tentacles, are rose-thorn shaped and 9-10 μm long. Hooks 2(2') are more slender and
Plate 2: *Grillotia smaris-gora* (Wagener, 1854) from *Squatina squatina*

Fig. 1A Whole adult specimen (scale bar = 0.2 mm)

Fig. 1B Detached mature proglottid (scale bar = 0.4 mm)

Fig. 2 Zone of proliferation (scale bar = 0.2 mm)

Fig. 3 Schematic diagram of the reproductive system of *G. smaris-gora*
Plate 3: Scanning electron micrographs of the tentacle armature of Grillotia smaris-gora from Squatina squatina

Fig. 1 Tip of tentacle (scale bar = 100 μm)
Fig. 2 Metabasal armature, external face (scale bar = 10 μm)
Fig. 3 Metabasal armature, antibothridial face (scale bar = 10 μm)
taller (10-11 μm long). Hooks 3(3') and 4(4') cross over the anti-bothridial (bothridial) sides of the tentacle to reach the external face, which is occupied by a thin band or chainette of small hooks (4-5 μm long). Interpolated between consecutive rows of the large, major hooks are groups of smaller hooks (3-7 μm long), varying in number along the length of the tentacle, from five to seven at the metabasal region, gradually reducing in size and number towards the tentacle apex, where only one small subsidiary hook is found. The size and shape of the major hooks alters markedly towards the tentacle apex, where they are smaller and more similar in shape (Plate 3; Fig. 1).

The distinctive basal armature is composed (Plate 4; Figs 2a, 2b) of several rows of large hooks, measuring up to 30 μm long, and a wide band of small hooks 5-10 μm long, which quickly decreases in number from 7 to 3 hooks wide with increasing distance from the tentacle base.

3. Strobila

The acraspedote strobila is characterised by a small number of proglottids, up to a maximum of eight to ten. The strobila is hyperapolytic, with only the most rudimentary development of the reproductive system in any of the attached proglottids. In a typical specimen the smallest proglottid found posterior to the pars bulbosa measured 0.0450 mm long and 0.108 mm wide, the second 0.0585 by 0.108 mm, third 0.103 by 0.112 mm, fourth 0.166 by 0.117 mm, fifth 0.234 by 0.130 mm, sixth 0.370 by 0.148 mm and the seventh and last proglottid 0.606 by 0.171 mm.
Plate 4: Tentacle armature of adult *G. smaragdina* from *S. squatina*

Fig. 1A Metabasal armature, bothridial face
Fig. 1B Metabasal armature, antithridial face
Fig. 2A Basal armature, bothridial face
Fig. 2B Basal armature, antithridial face
Detached gravid proglottids measuring up to 5.5 mm long and 1.5 mm wide were found in the most anterior tier of the valve in two monkfish caught in Cardigan Bay in August (Plate 2; Fig. 1b). The proglottids show typical trypanorhynchian organisation, with a muscular genital atrium opening at the lateral margin in the posterior third of the segment (Plate 2; Fig. 3). The testes number between 80 and 120 and are found throughout the proglottid, extending posterior to the ovary. The vitellaria are circumcortical and almost continually distributed, with gaps occurring only around the biwinged ovary. The vagina opens ventrally to the cirrus pouch. The uterus occupies about three quarters of the proglottid, with no visible preformed uterine pore.

**Description of Plerocercus** (Measurements from Ten Specimens from Mackerel)

Plerocerci were found encysted within mackerel, horse mackerel and red sea bream, most frequently on the outer surfaces of the pyloric caeca (Plate 5; Fig. 2) and in the stomach wall. The encysted plerocerci (Plate 5; Fig. 3) were in white or faintly yellow oval capsules measuring 1-2.5 mm long by 0.7-1.3 mm wide. When dissected out plerocerci with fully developed scoleces could extend their tentacles under coverslip pressure (Plate 5; Fig. 1). The scolex measures 1.1-1.6 mm long. The bothridia are 225-310 μm long, and the pars bothridialis measures 230-300 μm across at its widest points. The pars vaginalis containing sinuous tentacle sheaths is 590-630 μm long and up to 195 μm wide, depending on the state of contraction. The pars bulbosa measures 450-475 μm long and up to 250 μm wide. There is a pars post-bulbosa measuring up to 150 μm long. The blastocyst measures
Plate 5: The plerocercus of C. smaris-gora from Scomber scombrus (L.) and Trachurus trachurus (L.)

Fig. 1 Plerocercus dissected out from a cyst on the pyloric caeca of S. scombrus (scale bar = 0.2 mm)

Fig. 2 Encysted plerocerci on the pyloric caeca of T. trachurus (scale bar = 2 mm)

Fig. 3 Encysted plerocerci from T. trachurus (scale bar = 0.2 mm)
approximately 1.1-1.25 mm long by 0.85-0.95 mm wide and is easily detached during dissection. Encysted plerocerci from horse mackerel and red sea bream had measurements which were amongst the range displayed by specimens from mackerel.

The tentacle armature (Plate 6; Figs. 1-2b) was very similar to that described above for adult _G. smaris-gora_, consisting of oblique transverse half turns of 4 major hooks, interpolated with 1-5 small hooks depending upon the distance along the tentacle and a band of small hooks occupying the middle of the external face.

**Discussion**

The Status of _Grillotia_ spp. from _Squatina squatina_

My literature survey relative to the foregoing description revealed many references to adult trypanorhynchids from the monkfish _Squatina squatina_, with larval forms occurring in a variety of teleosts in European waters. Unfortunately, I was unable to obtain many of the original specimens because they had been either lost or destroyed, and the descriptions available are often brief and generalised and accompanied by ambiguous drawings, which give little information about the parasites.

From the descriptions alone, however, the specimens could be
Plate 6: Tentacle armature of *G. smaris-gora* from *S. scombrus*

Fig. 1 Scanning electron micrograph of metabasal tentacle armature (scale bar = 10 μm)

Fig. 2A Basal armature: bothridial face

Fig. 2B Basal armature: antibothridial face
allocated to either Grillotia smaris-gora (Wagener, 1854) Dollfus, 1946, belonging to the poeciloacanthous family, the Lacistorhynchidae, or to the heteroacanthous family, the Eutetrarhynchidae, distinguished principally by the scolex length, tentacle armature and, in adult specimens, the anatomy of the proglottids.

Grillotia smaris-gora

Table 4: Records of Grillotia smaris-gora (Wagener, 1854) Dollfus, 1946

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<tr>
<th>Specimen</th>
<th>Host and Locality</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>Tetrarhynchus smaris-gora</td>
<td>Spicara smaris (= Smaris gora Risso)</td>
<td>Wagener (1854)</td>
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<tr>
<td>Wagener (plerocercus)</td>
<td>Spicara maena (= Maena vulgaris C.V.)</td>
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<tr>
<td>Tetrarhynchus smaridis</td>
<td>Previous record</td>
<td>Diesing (1863)</td>
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<td>Gorae Wagener</td>
<td></td>
<td></td>
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<tr>
<td>Tetrarhynchus smaridis</td>
<td>Previous record</td>
<td>Diesing (1863)</td>
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<td>Maenae Wagener</td>
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<tr>
<td>Tetrarhynchus smaridium</td>
<td>Smaris sp.</td>
<td>Pintner (1893)</td>
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<td>Pintner (plerocercus)</td>
<td>Maena sp.</td>
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<td></td>
<td>Trieste I-V,</td>
<td></td>
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<td>Wageneria porrecta Lühe</td>
<td>Rhina squatina L.</td>
<td>Lühe (1902)</td>
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<td>(free proglottid)</td>
<td>Trieste</td>
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<tr>
<td>Tetrarhynchus minutus</td>
<td>Squatina angelus</td>
<td>Scott (1909),</td>
</tr>
<tr>
<td>van Beneden (adult)</td>
<td></td>
<td>Scotland</td>
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<tr>
<td>Tetrarhynchus smaridium</td>
<td>Maena vulgaris C.V.</td>
<td>Joyeux and Baer (1936)</td>
</tr>
<tr>
<td>(Pintner, 1893) (plerocercus)</td>
<td>and Smaris vulgaris</td>
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</tr>
<tr>
<td></td>
<td>C.V. Nice</td>
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contd.
The poeciloacanthous specimens (Table 4) all agreed with the detailed description of *Tetrarhynchus smaridum* by Pintner (1893) from plerocerci encysted in the body cavities of *Smaris* and *Maena* from Naples and Trieste. Wagener (1854), however, had already briefly described and illustrated these plerocerci from *Smaris Gora* Risso and *Maena vulgaris* C.V. from Nice as *Tetrarhynchus Smaris Gora*. Wagener's figures showed a plerocercus with many calcareous corpuscles.

Lühe (1902) described a proglottid from the spiral valve of

<table>
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<tr>
<th>Specimen</th>
<th>Host and Locality</th>
<th>Reference</th>
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<tr>
<td><em>Christianella minuta</em></td>
<td><em>Squatina squatina</em> L. Roscoff, France, Skagerack</td>
<td>Nybelin (1940)</td>
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<td><em>(van Beneden)</em> (adult)</td>
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<td><em>Grillotia smaris-gora</em></td>
<td><em>Squatina squatina</em> L. Arcachon, France</td>
<td>Dollfus (1946)</td>
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<tr>
<td><em>(Wagener, 1854)</em> (adult)</td>
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<td></td>
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<tr>
<td><em>Grillotia angeli</em> Dollfus</td>
<td><em>Squatina squatina</em> L. Sète, France</td>
<td>Dollfus (1969)</td>
</tr>
<tr>
<td>1969 (adult)</td>
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<td><em>Grillotia smaris-gora</em></td>
<td><em>Squatina californica</em> Ayres, Catalina Island, California</td>
<td>Heinz and Dailey (1974)</td>
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<td><em>(Wagener, 1854)</em> (adult)</td>
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<td></td>
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<tr>
<td><em>Grillotia smaris-gora</em></td>
<td><em>Cynoscion nobilis</em> Sebastes paucispinis Synodus lucioceps Southern California</td>
<td>Jensen, 1977</td>
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<td><em>(Wagener, 1854)</em> Dollfus</td>
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<td></td>
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<tr>
<td><em>Grillotia angeli</em> Dollfus</td>
<td><em>Scomber scombrus</em> L. Mevagissey Bay, England</td>
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<tr>
<td>1969 (plerocercus)</td>
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<td>Jensen, Moser and Heckman (1979)</td>
</tr>
<tr>
<td><em>Grillotia smaris-gora</em></td>
<td><em>Synodus lucioceps</em> Los Angeles, California</td>
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</table>
Squatina squatina at Trieste as Wageneria porrecta Lühe, without recognising it as the detached proglottid of a trypanorhynch. This was later identified by Nybelin (1940) as a trypanorhynch proglottid.

The adult of G. smaris-gora was first described by Scott (1909) from Squatina angelus in the Firth of Clyde, although he identified it as a heteroacanth, Tetrarhynchus minutus van Beneden, it is clearly a poeciloacanth. Scott quoted van Beneden's description of 1850, but showed, in his illustrations, a band of small hooks running one to two longitudinally along the tentacle, and small, subsidiary hooks beneath the half turns of four large hooks. Scott did not give any measurements of the parasite beyond mentioning that it was a small species, and easily overlooked. The tentacle sheaths are depicted as convoluted, and the tentacle bulbs appear to occupy over half the scolex length.

Gravid trypanorhynchs from Squatina squatina were described in great detail by Nybelin (1940) as Christianella minuta (van Beneden, 1849). Nybelin compared the specimens with the original specimens of Tetrarhynchus smaridum Pintner, and recognised them as belonging to the same species, but considered T. smaridum to be a synonym of the heteroacanth T. minutus (van Beneden, 1849). Nybelin's description and figures leave no doubt that his specimens were Grillotia smaris-gora. Nybelin based his descriptions on several specimens from Roscoff, France, and the Skagerack, mature specimens being found only at Roscoff.
The worm measured up to 5 mm long, with the scolex measuring 1.0-1.3 mm in length. The tentacle armature is well illustrated, beginning with a metabasal portion consisting chiefly of very large hooks on the internal face and a scattering of small hooks on the external face. These soon form a longitudinal band of hooks running along the external face rapidly decreasing in number with height of tentacle. The metabasal armature thus consists of two rows of four, similarly shaped hooks running diagonally upwards from the external face alternately crossing the bothridial and antibothridial faces. The internal surface is occupied by a sparse scattering of the small 5 µm hooks. Groups of five small hooks are interpolated between the rows of principal hooks. Nybelin notes that towards the tip of the tentacle the hooks become smaller.

The bothridia show a small notch in their posterior part, measuring 0.22-0.27 mm long. The tentacle sheaths are sinuous, and measure from 0.55-0.74 mm depending on the state of contraction. The tentacle bulbs measure 0.41-.054 mm and appear to extend within the zone of proliferation, with the retractor muscle inserted near their base.

Nybelin noted that 5-6 proglottids could be easily distinguished externally, but on staining a further 1-2 segments could be found in the portion nearest to the scolex. The strobila was acraspedote, and the final segment only just beginning to develop signs of the genital organs. Consequently, the strobila was considered as hyperapolytic.
The testes were found both anterior and posterior to the ovary and numbered 69-115. The genital atrium was approximately three quarters down the length of the mature proglottid. The rest of the description of the proglottid anatomy closely agreed with that given by Johnstone (1911) and Dollfus (1942) for *Grillotia erinaceus* (van Beneden, 1858).

Dollfus (1946) described *G. smaris-gora* from *S. squatina* from France, referring to Nybelin for much of the descriptions of anatomy and tentacle armature.

Dollfus noted that in his specimens the fifth of the group of small hooks was often difficult to see, as it merged into the band of longitudinal hooks running along the external surface. His diagrams show only the metabasal armature and the first four rows of principal hooks, while his specimens from the Muséum National d'Histoire Naturelle, Paris, do not show fully extended tentacles.

A new species of trypanorhynch, *G. angeli*, was later described from *S. squatina* by Dollfus (1969) from three greatly flattened and distorted immature specimens from Sète. Dollfus gave the length of the least deformed specimens as 1.6 mm, but the other two measured far less, 1.1-1.25 mm. The tentacle armature consisted of half turns of four principal hooks, which varied greatly in size with the height of the tentacle. The longitudinal band of spines occupying the middle of the external face also varied in number according to the level examined, but the distinguishing feature of this species was the reduction to one or two small hooks of the group of small hooks.
interpolated between two rows of principal hooks. However, on examining Dollfus' original specimens it became apparent that this group of small hooks varied greatly in number along the length of the tentacles, with 3-5 small hooks being clearly visible in portions lower than those depicted by Dollfus (Plate 7: Figs. 1A-3).

The bothridia were described as "Deux bothridies orbiculaires, à bord posterior non échancré", but the bothridia can vary so greatly in appearance, and the specimens were distorted, that this cannot be held as critical to the distinction of a species. The tentacle sheaths were sinuous, together with the bothridia they measured 0.5-1 mm, with the bulbs measuring about 0.63 mm.

The only other record of G. angeli was made by MacKenzie (1980) from the pyloric caeca and intestine of mackerel Scomber scombrus from Mevagissey Bay, Cornwall, U.K. The cyst measured 1.2-2.5 mm long by 0.8-1.2 mm wide, with the enclosed blastocyst 1.0-1.6 mm long by 0.7-1.0 mm wide. The scolex, 1.1-1.5 mm long possessed two plain, unnotched bothridia, and the tentacle armature consisted of a repeating pattern of two similar transverse half turns of four hooks each with one or two small hooks lying between consecutive rows of large hooks.

A close examination of these plerocerci again revealed variation in the number of small hooks from one to five depending on the level examined. A close comparison of plerocerci of G. smaris-gora (from Trachurus trachurus caught north of Scotland) with these specimens revealed no significant differences.
Plate 7  

Tentacle armature of *Grillotia angeli* Dollfus, 1969 from *Squatina squatina* Type specimen

Fig. 1A  Metabasal armature, internal face
Fig. 1B  Metabasal armature, external face
Fig. 2A  Basal armature, bothridial face
Fig. 2B  Basal armature, antibothridial face
Fig. 3  Tip of tentacle
I, therefore, tentatively conclude that the parasites I have examined from *S. squatina*, mackerel, horse mackerel and red sea bream all belong to the species *Grillotia amari-s-gora* of which *G. angeli* Dollfus, 1969 is a junior synonym.

**The Status of Christianella spp.**

Many of the remaining records of trypanorhynchs recorded from *Squatina* can be assigned to a different genus, *Christianella*, belonging to the family Eutetrarhynchidae.

1. *Christianella minuta* (van Beneden, 1849) Guiart, 1831

**Table 5: Records of Christianella minuta**

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<th>Specimen</th>
<th>Host and Locality</th>
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<td>van Beneden (adult)</td>
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<td>Rhynchobothrium minutum</td>
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<td><em>Merlangus merlangus</em> (L.)</td>
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<td></td>
<td><em>Cantharus cantharus</em> (L.)</td>
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<td></td>
<td><em>Trachurus trachurus</em> (L.)</td>
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<tr>
<td><em>Armandia minuta</em></td>
<td><em>Squatina angelus</em></td>
<td>Guiart (1927)</td>
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<td>(van Beneden, 1849)</td>
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<td><em>Armandia minuta</em></td>
<td><em>Squatina angelus</em></td>
<td>Dollfus (1929)</td>
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<td>(van Beneden, adult)</td>
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<tr>
<td><em>Armandia minuta</em></td>
<td><em>Squatina angelus</em></td>
<td>Dollfus (1930)</td>
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<td>(van Beneden, 1849)</td>
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<td>Guiart, 1927</td>
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<tr>
<td><em>Christianella minuta</em></td>
<td><em>Squatina angelus</em></td>
<td>Guiart (1931)</td>
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<tr>
<td>(van Beneden, 1849)</td>
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<td>Guiart, 1931</td>
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<tr>
<td><em>Christianella minuta</em></td>
<td><em>Squatina angelus</em></td>
<td>Joyeux and Baer</td>
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<td>(van Beneden, 1849)</td>
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<td>(1936)</td>
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<tr>
<td>(adult)</td>
<td>Dum.</td>
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<td>(larvae)</td>
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<td><em>Squatina squatina</em> (L.)</td>
<td>Dollfus (1942)</td>
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<tr>
<td>(P.J. van Beneden, 1849)</td>
<td>(= <em>Squatina angelus</em></td>
<td></td>
</tr>
<tr>
<td>(adult)</td>
<td>Valenciennes)</td>
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<td></td>
<td>Coast of Mauritania</td>
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<tr>
<td><em>Christianella minuta</em></td>
<td><em>Squatina sp.</em></td>
<td>Wardle and McLeod</td>
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<td>Belgian waters</td>
<td>(1952)</td>
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<td>Yamaguti (1959)</td>
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<tr>
<td>(Beneden, 1849)</td>
<td>Belgian</td>
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<tr>
<td>(adult)</td>
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Van Beneden (1849) briefly mentioned a new species of trypanorhynch tapeworm *Rhynchobothrius minutus* from *Squatina angelus*, which was distinguished by its tiny size, and the small number of proglottids in the strobila.

Van Beneden (1850) gave a more detailed description of the species as *Tetrarhynchus minutus* Van Bened. Its total length was given as 5-6 mm long, the scolex measured approximately 2.5 mm with two strongly notched bothridia giving the appearance of four distinct fossettes. The tentacles were described as being "couvertes de crochets recourbés" but from his figures it is uncertain whether there are tiny subsidiary hooks between the large, stout, regularly repeated hooks of similar size and shape. The spiral tentacle sheaths occupied 30-50% the scolex length, and the tentacle bulbs about 30% with a large post bulbosa. The number of proglottids never exceeded 6, the 5-6 proglottids being gravid. Van Beneden regarded the length of the proglottids, being several times longer than wide, as being characteristic of this species, but this feature is found throughout the Trypanorhyncha.

Van Beneden (1870) described *T. minutus* from *S. angelus* Cuv. from the Belgium coast, but the scolex differed markedly from his earlier description. The 2 bothridia do not appear to be notched at their posterior edges although the shape and size of bothridia can vary greatly according to their position when fixed. The tentacle armature consisted of rosethorn-shaped hooks of varying sizes, some of which, in relation to the width of the tentacle, are twice as large as the short,
stocky hooks figured in 1850. The hooks also appear to be distributed in distinctly separated diagonal rows rather than regularly spaced over all the tentacle. The thick tentacle sheaths were sinuous rather than spiral, and occupy 75% of the scolex length, the bulbs occupying only 25% with no post-bulbosa. The seven attached proglottids shown are similar to those illustrated by van Beneden in 1850.

Vaullegeard (1899) recorded T. minutus van Beneden from one specimen of S. angelus Risso, caught at Luc-sur-Mer, France, with a total length of 3.1-3.5 mm, the scolex being 2.1-2.5 mm long, and noted that the two bothridia could appear as four fossettes. The tentacle armature was described from the larval forms. The proglottids were recorded as few in number, with the testes arranged in two rows in the first proglottids, and the genital orifice appearing lateral and towards the middle of the last segments.

Vaullegeard was the first author to describe larval trypanorhynch as Tetrarhynchus minutus van Beneden. He recorded specimens encysted in the liver or mesentery of Merlangus vulgaris L., Cantharus griseus Cuv. et Val. and Trachurus trachurus L. From Vaullegeard's drawings it is clear that his specimens belonged to Christianella and not Grillotia, as no subsidiary hooks were indicated. He also regarded several records, including those of Drummond (1838) of Anthocephalus paradoxus from Pleuronectes maximus", Merlangus carbonarius", Trigla pini" and "Trigla gurnadus", Bellingham (1844) of Anthocephalus paradoxus (Drummond) from Pleuronectes maximus and Cobbold (1864) of Tetrarhynchus sp. from the abdomen of a whiting Merlangus vulgaris, as
specimens of *Tetrarhynchus minutus*, although the parasites were described briefly, often without any figures of the tentacle armature.

The cysts were described by Vaullegeard as rounded, ovoid or piriform, measuring from 1.15-0.9 mm for specimens from *M. vulgaris* to 1.4 x 1.1 mm from *C. griseus*, containing a vesicle possessing numerous calcareous corpuscles. The scolex measured 1.5-2.0 mm in length, with two bothridia. The tentacles, just under 1 mm long, and 29 μm (without hooks) or 55 μm (with hooks) in diameter were described as possessing an armature of "crochets disposés avec regularité" and figured a mixture of rosethorn or plain, simple hooks 25-45 μm long. It is difficult to determine their arrangement from one diagram of a portion of one side of a single tentacle, possibly they are arranged in spiral half turns.

In 1927 Guiart created a new genus, *Armandia*, placing it in the heteroacanthous family of the Eutetrarhynchidae with *Armandia minuta* (van Beneden, 1849) as the genotype.

Guiart (1931) later discovered that *Armandia* was pre-occupied by a polychaete described by De Filippi in 1801, and so renamed the genus *Christiana1la*.

Joyeux and Baer (1936) described *Christiana1la minuta* (van Beneden, 1849) as 10 mm long, with a scolex 2.5 mm long, and two strongly notched bothridia. The tentacles were a little under
1 mm long and (p. 20) "elles sont armées de nombreuses rangées de crochets de forme semblable". The illustration showed hooks of similar shape and size, even though the hooks are stated to vary from 25-45 μm. Joyeux and Baer did not state whether the hooks of different sizes occupied distinct regions of the tentacle. The retractor muscles were described as inserted into the base of the tentacle bulbs, but this is not illustrated by the accompanying figures.

Dollfus (1942) critically reviewed the literature on Christianella minuta (van Beneden, 1849) but although he commented on the summary state of knowledge of the parasites external morphology and anatomy he did not redescribe the species, because his own specimens had been destroyed. In Dollfus' definition of the genus Christianella he stated that the hooks were inserted in half-turns, leaving the middle of the internal and crossing over alternate faces of the tentacle and suggested that the hooks were not all of similar size, those of the internal side being smaller. Dollfus agreed with Guiarts' (1931) positioning of this species in the Eutetrarhynchidae which he redescribed. Dollfus' diagnosis of the Eutetrarhynchidae includes the restriction of the testes to the pre-ovarian region of the proglottid, although he did not comment on the distribution of the testes in C. minuta.

Wardle and McLeod (1952) and Yamaguti (1959) gave brief descriptions of C. minuta based on Dollfus (1942). Yamaguti, however, regarded Wageneria porrecta Lühe as a synonym, and included dubious host records based on Southwell (1929). Records of C. minuta which
suggest misidentification are summarised in Table 6.

2. **Trypanorhynchae Incorrectly Recorded as C. minuta or One of its Synonyms**

Scott (1909) figured *Tetrarhynchus minutus* van Beneden from a *Squatina angelus* caught in the Firth of Clyde, but as previously discussed (p. 34) this is a record of a poeciloacanth species, *Grillotia smaris-gora*.

In 1929 Southwell recorded *Tentacularia minuta* (van Beneden, 1858) syn. *Tetrarhynchus minutus* van Ben. 1858 from *Carcharias* sp. from Negapatam and Ceylon Pearl Banks, and *Rhina halavi* from Negapatam, and noted that it had previously been recorded from *Squatina angelicus* and *Urolophus testacus* in Europe. Dollfus (1942) commented however, that *Urolophus* (*Trygonoptera*) *testacus* was an Australian dasybatid. Southwell's specimens were about 4 mm long, with a scolex 1.2 mm long, about half the length of other recorded specimens. The tentacle armature is figured as typically heteroacanthous and consists of large hooks gradually decreasing in size, arranged in obliquely ascending half turns of 9-10 hooks and terminating in hooks approximately one third of the length of the largest hooks. Southwell suggested that Scott's (1909) figures appeared different because he had confused the anatomy of the hooks on the dorsal surface with those on the ventral surface, but this does not explain Scott's drawing of a typical poeciloacanth.
Table 6: Incorrect citations of trypanorhynchs as Christianella minuta or one of its synonyms.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Host and Locality</th>
<th>Reference</th>
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<tbody>
<tr>
<td><em>Tetrarhynchus minutus</em> (van Beneden, 1850) (adult)</td>
<td>Squatina angelus Firth of Clyde, Scotland</td>
<td>Scott (1909)</td>
</tr>
<tr>
<td><em>Tentacularia minuta</em> (van Beneden, 1858) (adult)</td>
<td>Carcharias sp. Negapatam, India, and Ceylon Pearl Banks Rhina halavi Negapatam, India</td>
<td>Southwell (1929)</td>
</tr>
<tr>
<td><em>Christianella minuta</em> (van Beneden, 1849)</td>
<td>Rhina squatina (L.) Roscoff, France, Skagerak</td>
<td>Nybelin (1940)</td>
</tr>
<tr>
<td><em>Christianella minuta</em> van Beneden (adult)</td>
<td>Rhinobatus halavi (Forsk.) and Trygon imbricata (Bl. Schn.) Madras Coast</td>
<td>Subhapradha (1955)</td>
</tr>
<tr>
<td><em>Christianella minuta</em> (Beneden, 1849) (adult)</td>
<td>Raja clavata L. Dasyatis pastinaca L. and Squalus acantias Mullus barbatus ponticus Essipov Ophidium rochei Muller, Scorpaena porcus L., Platichthys flesus luscus (Pallas) and Solea lascaris nasuta</td>
<td>Kornyushin and Solonchenko (1978)</td>
</tr>
<tr>
<td><em>Christianella minuta</em> syn. Wageneria porrecta Lühe, 1902</td>
<td>Carcharias sp. and Rhina halavi, India</td>
<td>Yamaguti (1959)</td>
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</table>
Southwell's diagrams show spiral tentacle sheaths leading into tentacle bulbs 0.63 mm long, over half the length of the scolex. The proglottids number three to six, with the testes being restricted to the pre-ovarian field, and the genital pore appearing in the last quarter of the proglottid. Southwell's description of *T. minuta* places his specimens in the Eutetrarhynchidae, but probably in the genus *Parachristianella*.

Nybelin (1940) recorded cestodes from *Squatina* that he considered identical with *Tetrarhynchus minutus* van Beneden. This excellent description clearly refers to a poeciloacanthous species, and was discussed under *Grillotia smaris-gora*.

Subhapradha (1955) recorded *Christianella minuta* van Beneden from *Rhinobatus halari* (Forsk.) and *Trygon imbricata* (Bl. Schn.), and gave a description which closely agreed with that of Southwell. The largest tapeworms measured 3.167 mm long, with a scolex 1.117 mm long. The tentacle armature consisted of spiral half turns of 11 hooks, beginning with the largest on the internal side and decreasing in size to the internal surface where the hooks meet to form inverted Vs. The tentacles were illustrated as sinuous rather than spiral, and the tentacle bulbs, 0.53 mm long, occupied just over half the scolex length. The strobila consisting of three to five segments possessed testes arranged in two lateral rows and restricted to the pre-ovarian field. The genital pore was lateral and appeared in the last quarter of the proglottid. These specimens may also be tentatively regarded as *Parachristianella* specimens rather than *Christianella*. 


Kornyushin and Solonchenko (1978) recorded *Christianella minuta* (Beneden, 1849) as adults from *Raja clavata* L., *Dasyatis pastinaca* L. and *Squalus acanthis*, and as larvae from *Mullus barbatus panticus* Essipar, *Ophidium cochei* Muller, *Scorpaena porcus* L., *Platichthys flesus luscus* (Pallas) and *Solea lascaris nasuta* (Pallas) from the Black Sea, Sea of Azor, Mediterranean and Atlantic Ocean, but only described the adult worm. The total length was up to 6.0 mm, the scolex 0.76-1.1 mm with the tentacle bulbs occupying 0.43-0.65 mm. The tentacle armature consisted of half turns of hooks decreasing in size from the internal face (0.12-0.13 mm high) to a zone of sparsely distributed hooks on the external face 5 μm high. All the hooks gradually decreased in size with increasing height of the tentacle, to 5 μm at the tip of the tentacle. Unfortunately the tentacle armature is neither illustrated or designated as poeciloacanth or heteroacanth type. The testes are restricted to the pre-ovarian field, suggesting that this is again a member of the Eutetrarhynchidae, possibly belonging to the genus *Parachristianella*. Previous records of trypanorhynchus from these elasmobranch hosts include *Parachristianella trygonis-brucconis* Dollfus, 1946.

I, therefore, conclude from the research described above that *Grillotia angeli* is a synonym of *G. smaris-gora*, occurring as an adult in *S. squatina* and *S. californica*, and as a plerocercus in mackerel, horse mackerel and red sea bream. The great variation in tentacle armature, depending upon the point on the tentacle at which it is examined, emphasises the necessity of examining specimens with fully everted tentacles.
It is perhaps surprising that no trypanorhynchs resembling Christianella were obtained from Squatina or teleosts, when this genus has been frequently recorded in the northeast Atlantic (Dollfus, 1942). Prevalences of trypanorhynchs are, however, known to vary greatly (pp. 108-110) (MacKenzie and Mehl, 1984) within this area.
A Comparison of Aporhynchus norvegicum (Olssen, 1866) Nybelin, 1918, a Trypanorhynch Without Tentacles, and Gilquinia squali Fabricius, 1797

Introduction

Aporhynchus norvegicus, recorded solely from the smallest of all known sharks, the green-bellied shark, Etmopterus spinax, is unique amongst almost 200 species of trypanorhynch in that it does not have four armed eversible tentacles. Together with Haplobothrium, a pseudophyllidean which has four hookless tentacles, and is found in the freshwater fish Amia calva, Aporhynchus was referred to as an aberrant genus of trypanorhynch by Hyman (1951). Historically and more recently controversy has surrounded this tapeworm, usually regarded as belonging to the Gilquiiniidae: e.g. Rees (1941b) gave a detailed description of the scolex and observed neither tentacles nor sheaths yet Wardle and McLeod (1952) and Schmidt (1986) refer respectively to "vestigial rhyncheal apparatus" and "tentacle sheaths and bulbs present". My aim, therefore, was to describe and compare this aberrant and little known trypanorhynch with Gilquinia squali, a typical member of the Gilquiiniidae, and to try and establish where Aporhynchus should be placed within a classification of the Trypanorhyncha. The opportunity also arose to observe aspects of the ecology of Aporhynchus, and the results are used to comment on trypanorhynchan ecology generally.

Materials and methods

Two samples of Etmopterus spinax were taken from the Norwegian Sea
northwest of Tromsø, Norway. The first sample of twelve fish was caught in May 1984, and the spiral valves immediately preserved (as described in Materials and Methods pp. 3-15). One spiral valve was completely sectioned. The second sample, consisting of 72 fish, was refrigerated for 24 hours before examination, when some Aporhynchus were found to have migrated out of the spiral valve, both in an anterior direction into the stomach, and in a posterior direction into the cloaca. The records from these fish were not used in investigating the sites occupied by Aporhynchus. Sixty-two Squalus acanthias (Linnaeus, 1758) caught in the North Sea during May and June 1983 were examined. Specimens of A. norvegicus and G. squali were sectioned transversely and longitudinally while others were prepared for scanning electron microscopy. Measurements are given from ten specimens of each species.

Results

In the first sample (eleven dissected specimens of E. spinax) the prevalence of infection was 72.7%, with a mean intensity of infection of 3.8 worms per infected fish, and a range of 1-6 worms per host. A total of 31 worms was found, of which 9.7% were in the first tier, 12.9% in the second, 3.2% in the third, 29.0% in the fourth, 22.5% in the fifth and 22.5% in the sixth, with none in the more posterior tiers. The second sample had a prevalence of 46% with a mean intensity of infection of 2.17 worms per infected fish, and a range of 1-7 worms. In both samples the stomach contents consisted of remains of the shrimp, Pandalus, sp., and all size classes of sharks examined ranging from 11.0 cm to 60 cm in length were infected.
Gilquinia squali were found in 46.7% of the 62 S. acanthias, with a mean intensity of infection of 1.89 worms per infected fish, and a range of 1-4 worms per host. The 55 worms recovered were distributed 23.6% in the first tier, 26.8% in the second, 21.3% in the third and 18.1% in the fourth, with none in the more posterior tiers. Infected S. acanthias spiral valves recovered from the North Sea in 1981 (National Museum of Wales collection) contained up to 11 G. squali. The stomach contents of the sharks consisted mainly of teleost fish, with some crustacean material. All size classes of shark ranging from 60-90 cm in length were infected.

**Taxonomic results**

*Aporhynchus norvegicus* (Olssen, 1866) Nybelin 1918

1. **General Appearance**

   The dorso-ventrally flattened adult worm (Plate 8; Fig. 1) measures 30-40 mm long and consists of a scolex 1.4-1.9 mm long with up to 28 proglottids.

2. **Scolex**

   The scolex (Plate 8; Fig. 2; Plate 9; Fig. 1) has four distinct separated bothridia, two ventral and two dorsal, measuring 0.50-0.61 mm long and 0.34-0.38 mm wide. The ratio pars bothridialis:total scolex length is about 1-1.5:3. The scolex is completely covered with small,
Plate 8: *Aporhynchus norvegicus* (Olssen, 1866) Nybelin 1918 from *Etmopterus spinax*

Fig. 1 Whole adult specimen (scale bar = 1 mm)
Fig. 2 Scolex (Scale bar = 0.25 mm)
Fig. 3 Immature proglottids (scale bar = 0.1 mm)
Fig. 4 Gravid proglottids (scale bar = 1 mm)
Fig. 5A Mature proglottid (scale bar = 0.5 mm)

5B Diagram of female reproductive system

Key to Fig. 5B: o = oviduct; v = vagina; v.d. = vitelline duct

Fig. 6 Egg (scale bar = 50 μm)
Plate 9: The scoleces of *A. norvegicus* and *G. squalli*

Fig. 1  Scolex of *A. norvegicus* l.s.  (scale bar = 0.3 mm)

Fig. 2  Scolex of *G. squalli* l.s.  (scale bar = 0.3 mm)

Fig. 3  SEM of the scolex of *A. norvegicus*

Fig. 3A  Bothridia  (scale bar = 1 µm)

Fig. 3B  Behind bothridia  (scale bar = 2 µm)

Fig. 3C  Base of scolex  (scale bar = 2 µm)

Fig. 4  SEM of the bothridial region of *G. squalli*  (scale bar = 2 µm)
backwardly directed spines which are more closely packed and smaller on the bothridia (Plate 9; Fig. 3a). Towards the base of the scolex the spines become sparser, larger and more pointed (Plate 9; Fig. 3b-3c). Interspersed between the spines are small, rod shaped microtriche-like structures (Plate 9; Fig. 3a) similar to those reported from the scolex of Parachristianella monomegacantha (Whittaker et al, 1985). The internal musculature, nervous and excretory systems have been previously described in detail by Rees (1941b). The musculature consists of circular and longitudinal muscle fibres including four bundles of longitudinal muscle fibres which are comparable to those associated with the tentacle apparatus in other trypanorhynchs. The nervous system is made up of four apical ganglia, two lateral nerve cords and anterior and bothridial nerves leading to the anterior portion of the scolex and to the bothridia. The excretory system corresponds to the usual arrangement in trypanorhynchs of a pair of dorsal and a pair of ventral excretory vessels which continue down the strobila. The anatomy of the scolex corresponds closely to that described for Grillotia erinaceus (Johnstone, 1911) and Hepatoxylon trichiuri (Rees, 1941a) except for a reduced longitudinal musculature and the absence of proboscis nerves. A longitudinal section of the scolex (Plate 9; Fig. 1) shows the presence of numerous gland cells at the level of and extending posterior to the bothridia. Ducts run from the gland cells to the apex of the scolex where they open to the exterior.

3. Strobila

Immediately posterior to the scolex is an unsegmented neck
0.78-0.81 mm long (the "Kopfstiel" of Pintner). Rudiments of the male genital system can be seen in proglottids 13-15 (Plate 8; Fig. 3) while mature proglottids appear from about numbers 19-20 onwards. The last one or two proglottids may be gravid (Plate 8; Fig. 4).

The testes number 200-250 and are round, measuring 0.04-0.07 mm in diameter. They occur in two or three dorso-ventral layers, and occupy most of the proglottid, extending to behind the ovary but not occurring outside the longitudinal excretory canals. The vas efferens unite to form the single, much convoluted vas deferens which runs dorsally and anteriorly to the level of the genital atrium. At this point it constricts to form a small, twisted duct which runs over the dorsal surface of the cirrus sac, and dilates to form an external seminal vesicle. This enters the cirrus sac, which, at this point, is expanded to form a large accessory vesicle, frequently found containing sperm. The cirrus is short. The genital atrium is muscular, lateral and irregularly alternating, with papillae surrounding the genital pore.

The vagina opens into the genital atrium ventral to the cirrus and runs laterally towards the mid-line of the proglottid where it descends posteriorly ventral to the uterus and vas deferens. When it reaches the ovary it expands considerably to form the seminal receptacle which then joins with the oviduct. The ovary consists of two wings up to 0.32 mm long connected in the centre by a broad bridge where the oviduct begins with a well developed ovicapt.

The vitellaria (Plate 8; Fig 5a) lie outside the testes, and form a hollow tube interrupted only by the genital atrium and dorsally and
ventrally by the ovary. The vitelline ducts leading from the follicles join to form a single duct which then splits into two. One of the paired ducts runs dorsally and one ventrally to the oviduct and vagina after which the two ducts again join to form one, which opens into the distal oviduct. Mehlis' glands are well developed.

The uterus runs anteriorly, lies between the vagina and vas deferens and extends to near the level of the genital atrium, nearly filling the proglottid when gravid.

When gravid proglottids were placed in fresh seawater streams of eggs (Plate 8; Fig. 6) were released. No uterine opening could be seen before placing the proglottids in seawater, but the tear in the uterine wall always seemed to occur at the ventral surface. Nybelin (1918) suggested that this was a pseudouterine type opening according to the classification proposed by Pintner (1913).

4. Eggs

The oval eggs measured about 100 \( \mu \text{m} \) long with a small filament at one end. Dollfus (1942) described the eggs as 150 \( \mu \text{m} \) long with a distinct elongated shape, and containing up to six distinct dividing cells. The specimens available to me appeared to be less well developed, and no further development nor tanning occurred when they were kept in seawater for a month.
Taxonomic Description of *Gilquinia squali* Fabricius, 1794 for comparison with *A. norvegicus*

1. General Appearance

Adult *G. squali* (Plate 10; Fig. 1) measure up to 65 mm in length, consisting of a scolex 2.1-2.25 mm long and 0.75-0.85 mm wide, and a strobila of up to 60 proglottids.

2. Scolex

The scolex (Plate 9; Fig. 2; Plate 10; Fig. 2) consists of a pars bothridialis 0.34-0.40 mm long, pars vaginalis 1.41-1.55 mm long and pars bulbosa 0.41-0.46 mm with a small pars post-bulbosa of 0.05-0.10 mm. The four bothridia are distinct and kidney shaped with the proboscides opening on their anterior margin. The proboscides are up to 1.6 mm long, and their armature is typically heteroacanthous (Plate 1; Figs 1-2) with a repeating pattern of two half-turns of six hooks of varying shapes and sizes. The tentacle sheaths are highly twisted, and the tentacle bulbs small and wide. SEM studies show that the bothridia possess numerous flat, palmate structures (Plate 10; Fig. 4) 2.0-2.5 µm long by 1.5-2.0 µm wide on their adhering surfaces. Similar structures have been reported on the bothridia of *Grillotia dollfusi* (Whittaker, Carvajal and Apkarian, 1982), *Orobothrium kurisi* (Shields, 1985) and *Parachristianella monomegacantha* (Whittaker et al., 1985) usually with smaller, microtrichet-like structures similar to those illustrated for *Aporhynchus norvegicus* (Plate 10; Fig. 3A) obscured beneath the larger, palmate processes. The scolex musculature and nervous and excretory
Plate 10: *Gilquinia squali* Fabricius, 1794 from *Squalus acanthias*.

Fig. 1 Whole adult specimen (scale bar = 2.5 mm)

Fig. 2 Scolex (scale bar = 0.75 mm)

Fig. 3 Immature proglottids (scale bar = 0.75 mm)

Fig. 4 Gravid proglottids (scale bar = 2 mm)

Fig. 5 Mature proglottid (scale bar = 0.2 mm)
systems of *G. squali* were described by MacKenzie (1965) for the plerocercus stage from whiting. The description agreed well with those given by Lönnberg (1889) and Zerny (1912) for adult specimens and is characteristic of trypanorhynchs. The musculature consists of the retractor muscle of the proboscis and the muscle of the bulb wall in addition to the longitudinal and circular muscle fibres described for *A. norvegicus*.

3. **Strobila**

The unsegmented portion of the strobila in *G. squali* measures about 0.7-0.9 mm between the pars post-bulbosa and the beginning of the zone of proliferation. The most anterior proglottids are 5-6 times as wide as long, rapidly increasing in length along the strobila. The male reproductive system begins to appear at proglottids 18-20 (Plate 10; Fig. 3), mature male and female systems are present in proglottids 27-29 onwards (Plate 10; Fig. 5) and the last 1-3 proglottids are gravid and measure up to 2.5 cm long (Plate 10; Fig. 4).

The testes number 295-320 and are ovoid, measuring 0.18-0.21 mm by 0.04-0.06 mm, and are distributed throughout the proglottid, extending beyond the ovary but within the well defined lateral excretory canals. The vas deferens is highly convoluted and runs dorsally up the centre of the anterior half of the proglottid until it reaches the level of the genital atrium. It then becomes constricted to a small duct which dilates forming a small, muscular seminal vesicle which enters the cirrus sac, which possesses a large contractile accessory vesicle (Cirromotionsblase of Zerny) and a short, unarmed cirrus. The genital
atrium is muscular with a series of papillae surrounding the genital pore on its external face, and irregularly alternating. It always occurs in the first quarter of the proglottid.

The vagina opens ventral to the cirrus, and runs posteriorly down the mid-line of the proglottid. Anterior to the ovary it expands, forming a seminal receptacle which crosses the ovarian bridge dorsally and joins the oviduct. The oviduct emerges from the two-winged ovary via an ovicapt. The vitelline follicles are linked by vitelline ducts which join to produce one unpaired vitelline duct which joins the oviduct posterior to the vagina: the vitellaria are distributed as a hollow tube around the proglottid, with gaps appearing around the genital atrium and dorsally and ventrally to the ovary. The Mehlis' gland is well developed. The uterine duct is sinuous and crosses the ovarian bridge and seminal receptacle dorsally, after which it increases in diameter and continues as a thin-walled tube.

The eggs, which measure 67-70 μm by 49-54 μm, were released rapidly when the gravid proglottids were placed in fresh seawater. They tanned in about an hour, but no developmental studies were carried out. No trace of a proformed uterine opening could be found before placing the cestodes in seawater.

Discussion

An examination of the strobila of *A. norvegicus* clearly classifies it as a trypanorhynch, with the characteristic sleeve-like distribution of the vitellaria, the position of the vagina ventral to the uterus and
vas deferens, and the vaginal opening slightly behind the cirrus opening, surrounded by a genital atrium which is strongly muscular. A comparison between *A. norvegicus* and *G. squali* shows a number of further similarities which may be used to distinguish the family Gilquiniidae from other trypanorhynchs: the testes extend beyond the ovary and are distributed in two or three layers; there are both an external seminal vesicle and a well developed accessory vesicle; the ovary is biwinged and the uterus is comparatively short, reaching only to the level of the genital pore. The differences between these two species appear minor with slight differences in the number and size of the testes and proglottids, and the vitelline duct of *A. norvegicus* splitting into two and running either side of the oviduct and vagina. This feature has not been reported for any other species of trypanorhynch. It is in the scoleces of these species that the most important differences are apparent. Both *A. norvegicus* and *G. squali* possess four well developed mobile bothridia, but *Aporhynchus* appears unique in having lost tentacles, sheaths and bulbs, with only weakly developed longitudinal muscle fibres remaining of the rhyncheal apparatus. The well developed gland cells are also atypical.

Nybelin (1918) suggested that the reason for the tentacle reduction in *A. norvegicus* could be linked to the host's diet. *Etmopterus spinax*, the sole recorded host, feeds almost entirely on shrimps. Nybelin considered that this diet would result in far softer spiral valve contents, which would not be able to dislodge the parasites. In contrast the varied diet of other sharks would produce large quantities of hard skeletal material in the spiral valve, so more
Plate 11: The spiral valve of *E. spinax*

Fig. 1 Diagram of spiral valve (scale bar = 15 mm)

Key to Fig. 1. *a* = attached *Aporhynchus;*  
*r.g.* = rectal gland

Fig. 2 Spiral valve t.s. (scale bar = 2.5 mm)
efficient attachment organs would be necessary. When, however, the wide range of elasmobranch hosts is considered, several other species feed almost exclusively on shrimp. *Dasybatis sabina* LeSueur recorded by Aldrich (1964) as the definitive host for *Prochristianella hispida* also feeds on large numbers of shrimp, yet the trypanorhynch has well developed tentacles.

*Gilquinia squa1i* has been recorded from a variety of hosts, including *Squalus ferdinandus*, *S. sucklei*, *Raja binoculata*, *Centroscyllium granulosus* and *Mustelus vulgaris*, but has been most frequently recorded from the cosmopolitan host *Squalus acanthias*. In this host *G. squa1i* occupies only the anterior portion of the spiral valve, as *A. norvegicus* does in *E. spinax* (Plate 11; Fig. 1). When the sites of the two cestodes are compared, however, several striking differences are apparent. In *E. spinax* the outer wall of the spiral valve is thin (Plate 11; Figs. 2-3) and the scolex of *A. norvegicus* fits tightly in between the ridges of the mucosa, up to the posterior border of the bothridia. In contrast the mucosal surface of the spiral valve in *S. acanthias* is comparatively flat and uneven (Williams, 1968) with "threadlike, short and collapsible villi" providing a far less secure surface for bothridial attachment. Williams (1968) suggested that in the Tetraphyllidea the comparatively larger and leaflike bothridia of *Crossobothrium* (? *Phyllobothrium* sp.) found in *S. acanthias* compared to the smaller scolex and bothridia of *Crossobothrium* (? *Phyllobothrium* sp.) found in *E. spinax* could be related to these differences in the surface morphology of the spiral valve.
It is possible that the gland cells which empty their contents out of the apex of the scolex in *A. norvegicus* could have some adhesive function, while the backwardly directed spines on the exterior of the scolex might also increase the strength of attachment of this unusual trypanorhynch.

*Aporhynchus* does not appear to be an aberrant genus to the same extent as *Haplobothrium*, which is the solitary genus in the family Haplobothriidae (Schmidt, 1986). The shared characteristics between *A. norvegicus* and *G. squali* (pp. 52-61) clearly indicate that they belong to the same family. As I have previously stated (Smith, 1985), there is known to be a high degree of specificity among elasmobranch tapeworms, with related species being found in related hosts. If this should be the case for the Trypanorhyncha then studies on the parasite fauna of other squaloid sharks might result in the discovery of other species of *Aporhynchus*. Compagno (1984) listed 17 species of *Etmopterus*, yet trypanorhynchids have been recorded only from *E. spinax*. Investigations into the spiral valve morphology and parasite fauna of the other species could indicate possible reasons why *Aporhynchus* is a trypanorhynch without tentacles.
A Redescription of Parachristianella monomegacantha Kruse, 1959 from a New Host and Locality

Introduction

Spiral valves and stomachs of Raja hollandi Jordan and Richardson were kindly collected for me by Dr. P.G. Oliver of the National Museum of Wales during a visit to the South China Sea. All the specimens were found to contain cestodes which resembled the species Parachristianella monomegacantha, never before reported from this area or host. My aim was to describe these specimens, identify them, and review the known geographic and host distribution of this species.

Materials and Methods (see pp. 3-15)

Seven spiral valves of Raja hollandi were opened and examined for parasites. One spiral valve was sectioned from the first to the third tier.

All eight spiral valves were infected, containing between 21 and 47 adult trypanorhynchs with an average intensity of infection of 23.2 (range and intensity based on the seven dissected spiral valves). No trypanorhynchs were found in the stomachs, which contained remnants of various invertebrates including shrimps.
Previous records

Plerocercus

Kruse (1959) described plerocerci of *P. monomegacantha* from the digestive gland of *Penaeus duorarum* Burkenroad from the northern Gulf Coast of Florida, giving a detailed description of the tentacle armature, and Feigenbaum (1975) reported this species from the hepatopancreas of *Penaeus brasiliensis* Latreille from Sinaloa, Mexico. Feigenbaum and Carnuccio (1976) recorded high prevalences of infection of *P. monomegacantha* in *P. duorarum* (91-96%) and *P. brasiliensis* (100%) from Biscayne Bay, Florida, and identified trypanorhynchs reported as *Prochristianella* sp. from *P. duorarum*, Biscayne Bay by Villella, Iversen and Sindermann (1970) as specimens of *Parachristianella monomegacantha*. *Penaeus azteicus* in the northwestern Gulf coast of Mexico was reported by Corkern (1978) as being parasitized by this trypanorhynch. Owens (1980, 1981) found during field studies in the Norman River, Queensland, Australia that juvenile *Penaeus merguiensis* de Man with a carapace length of under 13 mm were uninfected with trypanorhynchs, but that *P. monomegacantha* infections were observed at 13 mm carapace length, and their prevalence increased with the size of the shrimp. Mudry and Dailey (1971) managed to experimentally infect the splash-pool copepod *Tigriopus californicus* with eggs of *P. monomegacantha*, but this is not regarded as a natural host for this parasite (pp. 75-87 this thesis).
Adult

The first recorded adult specimens of *P. monomacantha* were those recovered by Mudry and Dailey (1971) from the spiral valve of *Rhinobatos productus* (Ayres) caught at Seal Beach, California. No description of the adult worms was given. Heinz and Dailey (1974) also reported adult specimens in the same host species in south California, and again gave no description. Campbell and Carvajal (1975) found adult *P. monomacantha* in the spiral valve of *Dasyatis americana* Hildebrand and Schroeder, Chesapeake Bay, Virginia. The adult tentacle armature was described as being similar to that given by Kruse (1959) for the plerocercus. No information was given about the structure of the proglottids, except that the terminal proglottid of one specimen "measures 0.57-1.49 mm by 130 to 180 m and contains 75 to 80 testes forming two longitudinal rows." Dailey and Carvajal (1976) recorded adult *P. monomacantha* from the spiral valve and stomach of *Rhinobatos planiceps* Garman, 1880 from Antofagaster, Chile, and Carvajal, Campbell and Cornford (1976) found adult specimens in the spiral valve of *Dasyatis lata* (Garman) in Hawaii. Whittaker, Apkarian, Curless and Carvajal (1985) studied the microtopography of *P. monomacantha* scoleces found in *Dasyatis americana* at Palm Beach, Florida. No detailed description of the adult trypanorhynch has yet been published.

Description (Measurements based on ten specimens)

The adult worm (Plate 12; Fig. 1) varies in length from 1.35 mm for specimens with one or two developing proglottids to 4.5 mm for
those with five proglottids and is anapolytic and acraspedote. The scolex is 0.89-1.16 μm long and has two bothridia. The pars bothridialis measures 150-190 μm long and 0.22-0.37 μm wide, the pars vaginalis 280-510 μm depending upon state of contraction, and the pars bulbosa 445-575 μm. There is a small pars post-bulbosa measuring 10-15 μm.

The tentacle sheaths are convoluted. The retractor muscles are attached to the bottom of the tentacle bulbs, where they may be obscured by a mass of red granules.

The metabasal tentacle armature (Plate 13: Figs. 1-4) consists of a repeating pattern of oblique ascending half-turn spiral rows of 11-14 hooks. The rows begin on the internal surface of the tentacle (Plate 13; Fig. 1) with large (19-24.2 μm long, base 13.2-17.1 μm) broad recurved hooks 1 and 1'. The hooks spiralling around the tentacle are long and slender and gradually diminish in size as they cross over to the external side of the tentacle (Plate 13; Fig. 2) where they are spinous and measure about 2.5 μm long. Tentacle rows which have crossed alternately over the bothridial and antibothridial sides (Plate 13; Figs. 3-4) meet on the external face in an inverted V. A similar arrangement of hooks occurs throughout the tentacle length although hooks are less numerous, smaller and closer together at the tip of the tentacle (Plate 14; Fig. 2) and more numerous, larger and further apart towards the tentacle base (Plate 14; Fig. 1).

The proglottids contain up to 82 testes arranged in two
Plate 12: *Parachristianella monomegacantha* Kruse, 1959 from *Raja hollandi* Jordan and Richardson

Fig. 1  Adult specimen of *P. monomegacantha*  
(scale bar = 0.25 mm)

Fig. 2  Mature proglottid  (scale bar = 0.2 mm)

Key to Plate 12: g.p. = genital pore; o = ovary  
r.g. = red granules; t = testis; u = uterus;  
v. = vitellaria
Plate 13: The metabasal tentacle armature of *P. monomegacantha*

Fig. 1 Internal face  
Fig. 2 External face  
Fig. 3 Bothridial face  
Fig. 4 Antibothridial face (scale bar Figs. 1-4 = 10 μm)
Plate 14: The tentacle armature of *P. monomegacantha*, and its attachment within the spiral valve of *R. hollandi*

Fig. 1  *P. monomegacantha* metabasal armature (scale bar = 10 μm)

Fig. 2  *P. monomegacantha* tip of tentacle armature (scale bar = 10 μm)

Fig. 3  Spiral valve of *R. hollandi* t.s. (scale bar = 0.25 mm)

Fig. 4  Enlargement of arrowed region in Fig. 3 (scale bar = 0.2 mm)
longitudinal rows extending from the ovary to the anterior end of the segment. Eight to ten of these testes occur between the genital atrium and the ovary. The genital atrium is not surrounded by a large, muscular area, and is marginal, post-equatorial and irregularly alternating. The ovary is four-winged with a central isthmus, the ovarian lobes surrounding the Mehlis' gland vitelline ducts and oviduct. The uterus extends almost the full length of the segment.

Distribution Within the Spiral Valve of R. hollandi

The spiral valve of R. hollandi consists of seven tiers. The majority of attached trypanorhynchs were found in the first four tiers: 37.7% in tier one; 33.3% in tier two; 17.4% in tier three and 11.6% in tier four. Forty-two per cent of the total number of trypanorhynchs found were unattached. Sections of the spiral valve (Plate 14; Fig. 3) showed densely packed, finger-like villi on the anterior and posterior faces of the tiers, with shallower villi on the outer wall. The trypanorhynchs were found on the anterior and posterior faces and the outer wall of the spiral valve, where they were attached by their extended tentacles (Plate 14, Fig. 4). Gravid proglottids were found towards the anterior end of the spiral valve.

Discussion

The description of the heteroacanthous trypanorhynchs from R. hollandi corresponds well with that given by Kruse (1959) for the plerocercus, and Campbell and Carvajal (1975) for the adults of the
species Parachristianella monomegacantha. This record extends the known distribution of this cestode to the South China Sea, and to a new family, the Rajiidae. Little is known about the ecology, diets, or mucosal topography of the spiral valves of the elasmobranchs Rhinobatos productus, R. planiceps, Dasyatis americana and D. lata, previously reported as definitive hosts for this species, but penaeid shrimp infected with P. monomegacantha plerocerci have been caught within the distribution areas of these hosts. Shrimp remains were found within the stomach contents of Raja hollandi, indicating that they might also be the intermediate host for P. monomegacantha in the South China Sea. The distribution of the parasite may reflect similarities in the diets and ecology of these geographically widely separated elasmobranch species. Close comparisons of the hosts' morphology, with, perhaps, the biochemical examination of parasite specimens from different host species might provide explanations for the unusual geographic distribution of this parasite.
SECTION THREE

LIFE CYCLE STUDIES ON *GRILLOTIA ERINACEUS* (VAN BENEDEN, 1858)
Life Cycle Studies on Grillotia erinaceus (van Beneden), 1858

Introduction

Many descriptions and records exist of almost 200 species of adult trypanorhynchs from elasmobranchs, and of larval stages from teleost fish (Dollfus, 1942; Yamaguti, 1959; Love and Moser, 1983; Bates, in press). Comparatively few records of the early developmental stages from egg to early plerocercoid exist, however, and life cycle studies have been reported from only six species, with no complete life cycle from egg to mature adult having been accomplished in the laboratory. The scarcity of these studies encouraged me to investigate the life cycles of the trypanorhynchs available to me during a five-week visit to the University of New Brunswick in June-July 1984.

Background

Ruszkowski (1932, 1934) carried out the first reported studies on the development of a trypanorhynch, Grillotia erinaceus (van Beneden, 1858). Adult worms obtained from Raia oxyrhynchus Linnaeus, 1758, in Norway released eggs when placed in seawater. Coracidia escaped from the operculate eggs after eight days, and were eaten by four species of copepod, Acartia longiremis, Lilljeborg, Pseudocalanus elongatus Boeck, Paracalanus parvus, Claus and Temora longicornis Müller. He observed development of the procercoid within the copepods over 11 days, but observed that "Le manque de temps et les autres circonstances ne m'ont pas permis d'étudier plus en détail la structure des œufs et des
larves de *G. erinaceus*. The most advanced procercoid described and figured by Ruszkowski had greatly enlarged in size from the oncosphere released from the coracidium, but showed little internal differentiation. Riser (1951, 1956) described the operculate egg, coracidium, oncosphere and procercoid of *Lacistorhynchus tenuis* (van Beneden, 1858) and infection of a splash-pool copepod *Tigriopus fulvus* (Fisher). Riser commented that this species could not be a natural intermediate host because when infected copepods were fed to known second intermediate hosts *Clevelandia ios* (Jordan and Gilbert), no break or tear occurred in the exoskeleton, and the infected copepods were shed, intact, in the faeces. The most advanced procercoid (26 days p.i.) possessed excretory vessels and a zone of invagination had appeared at the anterior end of the worm, corresponding to the invaginated scolex of plerocercoids.

Voge and Edmonds (1969) observed the effects of varying dilutions of seawater on the hatching of *L. tenuis* coracidia in vitro. Hatching appeared to consist of two processes: first the coracidium stopped moving, and the cilia became immobilised; secondly the oncosphere became very active, causing the coracidial membrane to break in the region of the embryonic hooks and the emergence of the oncosphere. Mudry and Dailey (1971) also investigated the development of *L. tenuis*, and described the formation of an apical sucker in *Tigriopus californicus*. Stunkard (1981) successfully infected *Acartia tonsa* Dana, 1849, with this species. Sakanari and Moser (1985a) observed the effects of salinity and temperature on the eggs, coracidia and procercoids of *L. tenuis*, again in *T. californicus*. Eggs were not
viable at low salinities (8.5 and 17.0 parts per thousand salinity), while coracidial and procercoid development and survivorship times were reduced at higher temperatures. In further experiments (Sakanari and Moser 1985b) copepods harbouring procercoids were fed to mosquito fish Gambusia affinis, and plerocercoids with active bothridia and protrusible tentacles were recovered twelve weeks later. Sticklebacks, Gasterosteus aculeatus Linnaeus, 1758 and striped bass, Morone saxatilis (Walbaum, 1792) were also infected. Naive leopard sharks Triakis semifasciata Girard were force-fed experimentally infected mosquito fish and naturally infected white croaker, Genyonemus lineatus Ayres, 1855, and immature adults of L. tenuis were recovered after four months. Young (1954) had previously injected T. semifasciata with infected Cymatogaster aggregata Gibbons and recovered immature adults after four to six weeks.

Coracidia of Callotetrarhynchus nipponica Nakajima and Egusa, 1973, were released from operculate eggs recovered from infected Triakis scyllia (Müller and Henle) in Japan, and described by Nakajima and Egusa (1972d). Surveys of over 10,000 invertebrate specimens failed to identify any naturally infected species (Nakajima and Egusa, 1972e) while attempts to infect ten species of copepod were unsuccessful. Nakajima and Egusa (1969a, 1969b) described what appeared to be early pre-plerocercoids of C. nipponica from anchovy Engraulis japonica Houttuyn which, when force-fed to yellowtail Seriola quinqueradiata Temminck and Schlegel, developed into plerocercoids. Triakis scyllia fed infected yellowtail were found to contain mature adults (Nakajima and Egusa 1972; 1972b) after 15 days, with gravid
proglottids produced after 40 days. Nakajima and Egusa (1972c) observed that immature proglottids became detached from adult worms which had established themselves around the middle portion of the spiral valve. The proglottids then migrated towards the anterior end of the spiral valve where they matured, and then passed towards the posterior end where they were expelled from the anus, ejecting eggs on contact with seawater.

Overstreet (1978) reported that operculate eggs of Poecilancistrium caryophyllum (Diesing, 1850) from adults in carcharhinid sharks produced coracidia which could infect T. californicus, where they developed into procercoids.

Mudry and Dailey (1971) investigated the development of Parachristianella monomegacantha Kruse, 1959 found in Rhinobatos productus (Ayres). No free-swimming coracidial stage was found in this species, instead the egg, containing a well-developed oncosphere was infective to T. californicus. Development within the copepod resulted in a metacestode which contained rudimentary tentacles with spine-like hooks which had not yet formed the characteristic shapes found in plerocercoids and adults of this species.

Overstreet (1978) reported that Prochristianella hispidia (Linton, 1890) Campbell and Carvajal, 1975 from Dasyatis sabina and Dasyatis sayi shed eggs with long filaments which became directly infective to copepods. Procercoids containing the beginnings of tentacles were found in both copepods and penaeid shrimps. The metacestodes were
larger in shrimps and there appeared to be less of a host response against the parasite. It is not known whether the shrimp became infected by eating eggs or infected copepods.

**Materials and Methods**

Ten *Raja ocellata* (Mitchill), 46 *R. erinacea* Mitchell, 1825 and 10 *R. radiata* Donovan, 1806 were trawled in Passamaquoddy Bay, New Brunswick, Canada, and examined for trypanorhynchas. Three *R. ocellata* and six *R. erinacea* were found to be infected with *Grillotia erinaceus* (van Beneden, 1858). Each trypanorhynch was carefully removed from the spiral valve and placed in fresh seawater where eggs were released from gravid proglottids.

The eggs were maintained in seawater at 4°C and between 10-16°C and their development observed. When coracidia were released from the operculate eggs they were presented to a variety of invertebrate fauna from Passamaquoddy Bay including annelids, shrimps and both shallow water and planktonic copepods.

Infected copepods were then exposed to small fish from Passamaquoddy Bay. Drawings were made from photographs.
Results

Eggs

The oval, white eggs were laid while segmenting with eight dividing cells being visible. Tanning of the eggs took about an hour in 100% seawater. *G. erinaceus* eggs from *R. ocellata* (measured from 20 specimens) were 45-52 μm long by 26-38 μm greatest width, while those from *R. erinaceus* were 50-67 μm long by 31-37 μm greatest width. No differences were observed in the appearance and subsequent development of the eggs from the two hosts. No operculum was visible in freshly released eggs, but a short filament 4-10 μm long was found at one end of the egg (Plate 15; Fig. 1). Occasionally eggs would cluster together, adhering to each other by their filaments.

Two days after release of the eggs their internal structure consisted of a mass of dividing cells. No further development was observed until four to five days after release when larval hooks 9-12 μm long were visible. After some four to six days some eggs remained in the dividing cell stage (Plate 15; Fig. 1), but most eggs contained actively moving coracidia occupying approximately two thirds of the egg volume (Plate 15; Fig. 2). Groups of exhausted vitelline cells could be seen outside the coracidium. No operculum was visible.
Plate 15: Development of *Grillotia erinaceus* (van Beneden, 1858) eggs, coracidia and procercoids

Fig. 1  Freshly released eggs (scale bar = 25 µm)
Fig. 2  Egg containing dividing cells (scale bar = 25 µm)
Fig. 3  Ciliated coracidium (scale bar = 20 µm)
Fig. 4  Oncosphere beginning to emerge through the coradicial membrane (scale bar = 20 µm)
Fig. 5  Newly emerged oncosphere in *Tortanus discaudatus* (scale bar = 10 µm)
Fig. 6  Procercoid in *T. discaudatus* 20 days p.i. (scale bar = 50 µm)
Coracidia

After six to eight days at 10-16°C and ten days at 4°C coracidia were released from the operculate egg. At rest the coracidia (Plate 15; Fig. 3) appeared spherical, measuring 38-41 μm in diameter excluding the cilia; when moving they appeared slightly ovoid, and always moved with the larval hooks in the posterior half of the coracidium. The actively beating cilia were shortest (7-9 μm) around the larval hooks and longest opposite this area (9-11 μm). Two membranes surrounding the oncosphere could be seen; between the ciliated outer membrane and the inner membrane various granular bodies could be seen. The coracidia were capable of surviving in filtered seawater for at least two weeks, after which they had all been exposed to and eaten by potential intermediate hosts.

Oncosphere

Coracidia were offered to harpacticoid and calanoid copepods, shrimps and annelids. All invertebrates ingested coracidia, but in shrimps and annelids the coracidia were observed to be gradually digested. In harpacticoid copepods oncospheres failed to emerge and were assumed to have been digested. Hatching of the oncosphere occurred only in two calanoid copepods, *Acartia clausii* Giesbrecht 1889 and *Tortanus discudatus* (Thompson and Scott, 1897).

The hatching of oncospheres began after the coracidia had ceased both forward movement and cilia beating. The oncosphere inside the
coracidium then became very active, and the larval hooks tore the outer ciliated membrane (Plate 15; Fig. 4). Emergence of the oncosphere occurred approximately three to five minutes after the cilia had ceased moving. The larva (Plate 15; Fig. 5) measured 40-55 μm long and 14-17 μm wide and began to move rapidly, with many changes in shape.

Twenty-four hours after introducing the coracidia to the copepods all parasite larvae were found in the copepods' haemocoels, with up to four parasites per host. Seven days after injection the procercoid was oval and measured approximately 110 μm long and 40 μm wide with no observed morphological differentiation.

The rudiments of an excretory system began to appear 15 days after injection. At 20 days p.i. the most advanced procercoid possessed a well developed excretory system (Plate 15; Fig. 6) consisting of two small canals which extended from midway along the procercoid to the region of the larval hooks where they joined to form a bladder and posterior pore. Calcareous corpuscles were distributed around the larva. The procercoid measured about 300 μm long by 90 μm wide. Occasionally a cercomer-like structure would appear posteriorly as the larva moved and a constriction appeared anterior to the larval hooks. This was a transient feature, however, and it appears possible that some trypanorhynch procercoids, at least, do not develop true cercomers. At the anterior end of the procercoid a large apical sucker had formed.

No further development was noted in procercoids which had infected copepods for 35 days.
Infection of teleosts

Twenty *Tortanus discaudatus* and ten *Acartia clausii*, each containing one or more procercoids, were presented to four unidentified small fish netted in Passamaquoddy Bay. The copepods were eaten, but no trypanorhynch were recovered when the fish were sacrificed five to ten days later.

Discussion

The development of *G. erinaceus* from *Raja erinacea* and *R. ocellata* caught in Passamaquoddy Bay is similar to that recorded by Ruzskowski (1934) for this trypanorhynch from *R. oxyrhynchus* caught off Norway, with additional observations on the manner in which the oncosphere emerged, and the development of the excretory system and anterior sucker of the more advanced procercoid. Pintner (1893, 1896) described in detail the excretory bladder and posterior end of plerocercoids in fish and Riser (1956) noted that there was no apparent difference between the bladder regions of *L. tenuis* in copepods and plerocercoids in fish. Similarly the bladder region of *G. erinaceus* advanced procercoids in this study showed close similarities with those described by Pintner (1893) from plerocercoids in fish, strongly suggesting that teleost become infected with *G. erinaceus* by eating infected copepods. *Grilotia erinaceus* is, therefore, an oviparous cestode with a free-swimming coracidial stage which infects copepods, where it develops into a procercoid. This pattern is similar to that reported for certain other poeciloacanth trypanorhynch: *L. tenuis* by Riser (1956) and by Mudry and Dailey (1971); *Poecilocistrium*
caryophyllum by Overstreet (1978) and also for pseudophyllideans by Burt and Jarecka (1982) e.g. Bothriocephalus scorpii (personal observation). In contrast to this group of tapeworms another poeciloacanth, Callotetraphrychus nipponica, described by Nakajima and Egusa (1969a) involves a pre-plerocercus stage in the anchovy, which then develops into a normal plerocercus when another teleost, Seriola quinqueradiata feeds on the anchovy. It, therefore, appears that two life-cycle strategies have been described from the poeciloacanthous trypanorhynchs, involving either a three-host life-cycle (crustacean, teleost and elasmobranch) or a possible four-host life-cycle in the case of C. nipponica (unknown host, teleost, teleost, elasmobranch).

The life-cycle strategies that have been described from the heteroacanths differ from those of the poeciloacanths. The heteroacanths Prochristianella hispida and Parachristianella monomegacantha were reported by Overstreet (1978) and by Mudry and Dailey (1971) to be viviparous cestodes, as the adults produced infective eggs rather than coracidia. Procercoids with distinct cercomers then developed, within the intermediate hosts. Burt and Jarecka (1982) concluded that this resembled the proteocephalan rather than the pseudophyllidean situation. The procercoids possessed rudimentary tentacles and were suggested by Overstreet (1978) to be capable of being directly infective to the definitive host, omitting the need for a teleost intermediate host. All reports of procercoids developing tentacles within an invertebrate host are of heteroacanthous trypanorhynchs e.g. Parachristianella sp. and eutetrarhynchids (Cake 1976, 1977), Renibulbus penaeus in shrimp (Feigenbaum and Carnuccio, 1976), Prochristianella hispida in penaeid shrimp (Overstreet, 1978)
and *Eutetraehynchus* sp. in euphausiids (Shimazu, 1975). It is, therefore, possible that a two-host life-cycle may exist within the heteroacanths. Another intriguing finding is that all records of trypanorhynch larvae developing (rather than references to larvae passing through the gut) in molluscan intermediate hosts are restricted to the heteroacanths e.g. *Parachristianella* sp. and *Eutetraehynchus* sp. (Cake, 1976) and *Tetraehynchobothrium* sp. and *Christianella* sp. (Reimer, 1975). Too few records exist to draw any conclusions from this, but it would be of great interest to investigate the numbers and ranges of intermediate hosts used by the heteroacanthous trypanorhynchs, as it appears that the same genus may develop in both molluscan and crustacean intermediate hosts.

No homeoacanth life-cycle has yet been examined. Frequent records of post-larvae exist e.g. *Hepatoxyton trichiuri* in *Xiphias gladius* by Rasmussen (1973), and *Thunnus albacores* by Bussieras and Baudin-Laurencin (1973), *Nybelinia yamaguti* in *Liosaccus cutaneus* by Dolfus (1960), but nothing is known of their earlier life histories.

The summary of life-cycle studies carried out on trypanorhynchs is based on only six species, yet suggests that several types of life-cycle involving crustaceans, mollusc and/or teleost intermediate hosts may exist within the Trypanorhyncha. Further life-cycle studies of trypanorhynchs are necessary, both to increase our knowledge of this group of cestodes and to understand the manner in which commercially important intermediate hosts become infected.
SECTION FOUR

TRYPANORHYNCHS AS FISH POPULATION INDICATORS
Trypanorhynchs as Fish Population Indicators

Introduction

A pre-requisite for this section of my work was to research all published papers on parasites as biological indicators, with the view of selecting one species of trypanorhynch for original work on its use as an indicator, and so gaining experience in this rapidly expanding area of fisheries biology. Section Four thus consists of two parts, the first a critical analysis of the literature and the second a study of Grillotia smaris-gora as a biological tag for mackerel.

(1) (a) A Review of the Recent Use of Parasites as Fish Population Indicators

The parasite fauna of any animal can provide information about the host because the acquisition of a parasite depends partly upon the host's susceptibility, the degree of which is affected by host age, diet, sex, movement, behaviour and other factors. The study of parasitic organisms can thus give indications about the host's biology including its feeding habits, immune response and, because related parasite genera and species are often restricted to related host genera and species, their phylogenetic relationships.

The susceptibility of hosts varies within the host population, and within a host population the parasite distribution tends to be overdispersed (Crofton, 1971; Evans, Whitfield and Dobson, 1981; Kennedy, 1978; Shotter, 1976), with a large proportion of the total
parasite population occurring in relatively few hosts.

It is sometimes possible to distinguish different host populations by the presence or absence of parasites or because of a significant difference in the parasite distribution, either in their prevalence (percentage of hosts examined that are infected) or intensity of infection (average number of parasites per infected host). The use of terms prevalence and intensity of infection follow the recommendations made by Margolis, Esch, Holmes, Kuris and Schad (1982).

Parasites have been used as natural markers, or biological tags, to separate populations of terrestrial hosts, especially birds, for over a hundred years, but the first efforts to use them as biological tags for marine fish were those of Dogiel and Bykhovsky 1939, who distinguished between two sturgeon stocks in the Caspian Sea using several tags including the capsalid monogenean Nittrichia sturionis (Abildgaard) and the pseudophyllidean cestode, Eubothrium acipenserinum Kholodkovski. Herrington, Bearse and Firth (1939) also used a parasite, the copepod Sphyron lumpy Kröyer to separate stocks of redfish (Sebastes spp.) in the Northwest Atlantic. Since 1939 the use of parasites as biological tags for marine fish has greatly expanded. MacKenzie (1983) recorded well over a hundred species of parasite including fungi, protozoa, helminths and crustaceans, which have been successfully used to provide information about stocks of commercially important fish.

The number of parasites that could potentially be used as biological tags for fish is vast, e.g. Manter (1969) calculated on the basis of eleven large surveys that of an estimated 10,000 species of
marine digeneans only 15% had been described. Most parasites that have been studied are, however, unsuitable for use as biological tags. If a parasite is to be used as a biological tag then it is important to understand as many aspects of its biology and life cycle as is feasible, especially the range of possible intermediate and final hosts, the method by which tagged species become infected, and to be aware of how the parasite affects its host. The more information available on a parasite species the greater the possibility of being able to refine its use and importance. Many parasite life cycles have not yet been elucidated, or are imperfectly known. Sindermann (1961a) was the first to attempt a listing of criteria by which potential tag parasites for marine fish could be selected. These were added to by Kabata (1963) and modified by Konovalov (1975) for use with anadromous fish. Kjøie (1983) concentrated on selection of digeneans as useful biological indicators. Sindermann (1983) reviewed the attributes necessary for successful marine biological tags and MacKenzie (1983, 1986) comprehensively assessed the selection of fish parasites for marine, freshwater and anadromous studies. The following criteria are now regarded as the most helpful in assessing the merits of any parasite as a tag.

1. The parasite species should be distributed at significantly different levels in different parts of the study area. This requirement was given by all the above authors when listing the characteristics of successful biological tags, although MacKenzie (1983) commented that it was not applicable when genetic differences between populations of a parasite species were being studied e.g. Beverley-Burton (1978) used protein polymorphisms of *Anisakis simplex*
larvae to distinguish salmon taken from different areas within Britain and along the Canadian Atlantic coast.

Sindermann (1961a, 1983), Kabata (1963) and Fréchet, Dodson and Powles (1983b) thought that the prevalences of the parasite should remain relatively stable from season to season. MacKenzie (1983), however, pointed out that most fish parasite populations were regarded as unstable and that large fluctuations in parasite prevalences could be expected. This problem can be overcome by ageing the fish examined, and examining and comparing data from separate year classes.

2. The parasite should persist in the host for at least the duration of the study period. Køle (1983) and MacKenzie (1983) both discussed the relatively short life span of adult digeneans which restricted their application to studies of less than one year. The timescale of the study period may be small when investigating seasonal migrations, or extend to cover several years when following recruitment migrations, thus affecting the selection of suitable tags which can range from transitory infections to parasites which remain alive or in a recognisable form throughout the host's life after infection. A disadvantage of any parasite with a brief life span is that the proportion of infected hosts steadily decreases once the population has left the area of infection. This is especially important when selecting suitable parasites for anadromous studies when parasites are frequently lost rapidly as the host migrates through changing salinities.
3. The host's survival should be minimally affected by the parasite. Although any parasite may be recognised as diminishing its host's chances of surviving, parasites which are regarded as highly pathogenic should not be used as biological tags since they cannot be regarded as infecting a reasonably constant proportion of the population. The copepod *Lernaeocera branchialis* (L.), which uses a number of gadoid definitive hosts, has been used in a number of tag studies on various fish including whiting (Shotter, 1973) and cod (Sherman and Wise, 1961). MacKenzie (1983) commented on its high pathogenicity to some of its definitive hosts and on the fact that it has been shown to affect the behaviour of whiting and pollack, *Pollachius pollachius* (L.). Infected individuals tended to remain in inshore waters instead of migrating offshore. The intermediate hosts, principally flatfish, have been found to vary between areas providing another reason why the use of this parasite as a biological tag should only be undertaken with great care.

4. The parasite should be easily detected, preferably with a minimum of dissection, allowing many fish to be examined quickly and so reducing costs. A high degree of site specificity would be advantageous, although the possibility of seasonal variation (MacKenzie and Gibson, 1970) noted an anterior shift in distribution of the nematode *Cucullanus heterochorous* in the alimentary canal in winter should be investigated.

5. MacKenzie (1983) recommended that ectoparasites which were easily detached should not be used, but many ectoparasites leave distinct marks of their past presence. The embedded cephalothorax of *Sphyrio*
lumpi remains in the host long after the parasite dies.

Hare and Burt (1976) noted that although *Discocotyle sagittata* (Leuckhart, 1842) was recorded on 18.5% of a sample of *Salmo salar* taken in 1971, none were recorded in 1970 from the same part of the Miramichi River. It was suggested that this difference might be a result of using electrofishing as a method of capture.

6. The parasite should be easy to identify. Sindermann (1961a, 1961b) used trypanorhynchian larvae as one of the tags for redfish and herring, but merely commented on their resemblance to *Grillotia erinaceus* and *Lacistorhynchus tenuis*. If each plerocercus had been identified then possibly more details of the host migration might have emerged.

Kabata (1963) and Sindermann (1983) suggested that the life cycle of tag parasites should preferably involve only a single host, while Køie (1983) maintained that for the successful use of a digenean biological tag the life cycle and distribution of all infected intermediate hosts must be known. Many parasites have been successfully used, including the cestode *Syndesmobothrium filicolle* in *Hilsa ilisha* by Gopalakrishnan and Pal (1964), whose life cycles are incompletely known.

In fish population studies involving seasonal recruitment or adult age-dependent migrations it is advantageous for a tag to have an indirect life cycle and not to be spread by direct contact with other members of the host population.
Kabata (1963) and Campbell (1983) considered that the entire study area should have environmental conditions within the physiological range of the parasite tag. In anadromous fish studies however, a decrease in prevalence or intensity of infection when freshwater parasites are unable to survive in the sea may be used to distinguish sea-run and non-migrating fish.

MacKenzie (1983, 1986) and Sindermann (1983) divided parasite tag studies into four categories. Sindermann distinguished four types of study of increasing complexity:

1. Studies based on the regional prevalences of a single parasite species.

2. Surveys involving the prevalences of two parasite species.

3. Surveys of parasite prevalences accompanied by a wide range of supplementary work such as artificial tagging, age and growth studies, and biochemical, serological, morphometric and meristic studies.

4. Studies involving two host populations that possess genetically rather than numerically different parasites, detected by biochemical or immunological methods.

These categories of parasite study simply reflect the amount of effort involved. In contrast, MacKenzie (1983) based his tag studies upon the particular type of migration being investigated, resulting in four categories: stock separation, seasonal migration, recruitment migrations and adult age-dependent migrations. After comparing these two sets of guidelines I consider that those suggested by MacKenzie
(1983, 1986) result in a more useful division of parasite tag studies.

Criteria will vary in importance and additional criteria may be involved depending upon which of the five main types of population study is being considered.

1. **Stock Separation**

This is the simplest form of population study directed at defining the geographical boundaries of separate populations or stocks of fish. It is not essential, although recommended, to age the fish so programmes can be carried out comparatively quickly.

Parasites with direct or complicated life cycles can be used in stock separation studies. It is not possible to distinguish two populations of fish simply because the prevalence of a tag is different in two separate areas - enough must be known about the parasite's biology to ensure that the parasite is acting as a tag and not merely sampled at a time when it is spreading through a single population. This means that parasites with direct life cycles are initially easier to incorporate into this type of tag programme, while parasites which utilise intermediate or final hosts in addition to the fish species being studied will require a much larger amount of biological information if they are to be used to their fullest extent.
Table 7: Parasites used for fish stock separation

<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
<th>Area</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atherina boyeri</td>
<td>Glugea atherinae</td>
<td>French Mediterranean</td>
<td>Berrebi and Britton-Davidian (1980)</td>
</tr>
<tr>
<td>Gadus morhua</td>
<td>Trypanosoma murmanensis</td>
<td>Newfoundland</td>
<td>Khan, Murphy and Taylor (1980)</td>
</tr>
<tr>
<td>Clupea harengus pallasi</td>
<td>Thynnascaris adunca</td>
<td>British Columbia</td>
<td>Arthur and Arai (1980a, 1980b)</td>
</tr>
<tr>
<td>Fundulus heteroclitus</td>
<td>Eustrongyloides salmonis</td>
<td>Patuvent River Maryland</td>
<td>Hirschfield et al (1983)</td>
</tr>
<tr>
<td>Osmerus mordax</td>
<td>Echinorhynchus salmonis Diphyllolobothrium sebago Glugea hertwigi</td>
<td>Quebec</td>
<td>Fréchet, Dodson and Powles (1983a) (1983b)</td>
</tr>
<tr>
<td>Podonema longipes</td>
<td>Nybelinia surmenica Diphyllolobothrium sp.</td>
<td>Kurils, Japan</td>
<td>Avdeev (1981)</td>
</tr>
</tbody>
</table>

contd
<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
<th>Area</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melanogrammus aeglefinus</td>
<td>19 species including Lepidapedon rachion Myxidium bergeuse</td>
<td>Scotian Shelf</td>
<td>Scott (1981)</td>
</tr>
<tr>
<td>4 spp. flat fish</td>
<td>13 spp. digeneans</td>
<td>Scotian Shelf</td>
<td>Scott (1982)</td>
</tr>
<tr>
<td>Pollachius virens</td>
<td>Derogenes varicus Hemiurus levinseni Echinorhynchus gadi Anisakis sp.</td>
<td>Scotian Shelf</td>
<td>Scott (1985a)</td>
</tr>
<tr>
<td>Limanda limanda</td>
<td>Digeneans</td>
<td>Danish and adjacent waters</td>
<td>Kjøie (1983)</td>
</tr>
<tr>
<td>Liopsetta putnami</td>
<td>Myxobilatus sp. Cryptocotyle lingua</td>
<td>New Hampshire</td>
<td>Burn (1980)</td>
</tr>
<tr>
<td>Four spp. Channichthyid</td>
<td>Eubrachiella antarctica Contracaecum sp.</td>
<td>Antarctic Shelf</td>
<td>Siegel (1980)</td>
</tr>
</tbody>
</table>

2. Seasonal Migrations

Many fish make seasonal migrations to feeding or spawning grounds or simply follow prey concentrations. To be a successful tag in seasonal migration studies the parasite must infect the fish in one area and be carried to the other migratory area, where the fish cannot pick up any further infections. Seasonal migrations allow the use of transient infections and so can use the greatest variety of potential
Table 8: Parasites used to study seasonal migrations of fish

<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
<th>Area</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vimba vimba</td>
<td>Entire parasite fauna</td>
<td>Baltic</td>
<td>Rautskis (1983)</td>
</tr>
<tr>
<td>Hilsa ilisha</td>
<td>Entire parasite fauna</td>
<td>Hooghly River, India</td>
<td>Pal (1980)</td>
</tr>
<tr>
<td>Salvelinus alpinus</td>
<td>Cystidicola cristivomeri</td>
<td></td>
<td>Eddy and Lankester (1978); Black and Lankester 1981</td>
</tr>
<tr>
<td></td>
<td>Eubothrium salvelini</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proteocephalus longicollis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brachyphallus crenatus</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bothrimonus sturionis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prosorhynchus squamosus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salvelinus alpinus</td>
<td>B. crenatus</td>
<td>Mosie River system</td>
<td>Black (1981); Black, Montgomery and Whoriskey (1983)</td>
</tr>
<tr>
<td></td>
<td>Salmincola edwardsii</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oncorhynchus nerka</td>
<td>E. salvelini</td>
<td></td>
<td>Boyce and Clarke (1983)</td>
</tr>
<tr>
<td>Gadus morhua</td>
<td>Trypanosoma murmanensis</td>
<td>Labrador coastal region</td>
<td>Khan et al (1980)</td>
</tr>
<tr>
<td>Pseudopleuronectes</td>
<td>Digenean spp.</td>
<td>Passamaquoddy Bay, Canada</td>
<td>Scott (1985b)</td>
</tr>
<tr>
<td>americanus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clupea harengus</td>
<td>Eimeria sardiniae</td>
<td>Northwest Atlantic</td>
<td>McGladery and Burt (1985)</td>
</tr>
<tr>
<td></td>
<td>Scolex pleuronicetis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anisakis simplex</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hysterothylacium aduncum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cryptocotyle lingua</td>
<td></td>
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</tr>
</tbody>
</table>
tags, as all other studies require parasites to live for at least a year. MacKenzie (1983) noted that short-lived infections of adult helminths within the alimentary tract of the fish are possibly the most useful tags.

Recent work (Table 8) includes studies on several species of anadromous fish. Marine and freshwater parasites have been successfully used to characterise fish from these ecologically distinct areas. Many ectoparasitic monogeneans and digeneans are, however, unsuitable because they are rapidly lost on leaving their zone of infection.

3. Recruitment Migrations

Recruitment migrations are the journeys made by young fish, often over great distances, from nursery grounds to the adult feeding and spawning grounds. In these studies a successful biological tag that infects fish on only some of the nursery grounds, can provide information about the origin of fish and the connection between different juvenile and adult fish populations (Table 9). This is of great value to fisheries management, but the tag must satisfy two criteria in addition to the ones discussed earlier.

Firstly the fish should be susceptible to infection only on the nursery grounds, and subsequently lose its susceptibility, preferably becoming resistant when it migrates away from these areas. If this is not the case then infections picked up when adult could easily incorrectly identify the fish as coming from a particular nursery ground.
<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
<th>Area</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belone belone</td>
<td>Lacistorhynchus tenuis</td>
<td>Baltic Sea</td>
<td>Grabda (1981)</td>
</tr>
<tr>
<td></td>
<td>Anisakis simplex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmo salar</td>
<td>43 parasite species</td>
<td>Open Atlantic and Greenland coastal waters</td>
<td>Pippy (1980)</td>
</tr>
</tbody>
</table>

Secondly the parasite must remain, either alive or in an identifiable form within the fish for the rest of the host's life—a far longer life span than is necessary in stock separation or seasonal migration studies. These additional requirements severely limit the types and numbers of suitable parasites. Transient adult helminth infections can be excluded, and directly-transmissible infections are often unsuitable, because of the possibility of cross infection on adult feeding and spawning grounds. Usually parasites with indirect life cycles are most promising, with the intermediate infected hosts distributed on some nursery grounds and not others. Fish on nursery
grounds may have diets which include intermediate hosts, and may take different prey items, resulting in an altered susceptibility when they grow and migrate away from the nursery grounds.

4. Adult Age-dependent Migrations

As fish grow older there is a general tendency towards moving to different areas for feeding, overwintering and possibly spawning. This type of study requires the same tag characteristics as the study recruitment migrations, except that infection should take place by the time the fish is a young adult, rather than a juvenile.

Hislop and MacKenzie (1976) used the plerocercus of the trypanorhynch 

Gilquinia squali (Fabricius) as a biological tag to distinguish coastal and offshore stocks of whiting Merlangius merlangus in the North Sea.

Avdeev (1981) reported on the use of Nybelinia sp. and diphyllobothriid larvae as indicators of two separate stocks of Podonema longipes in the northwest Pacific, and also commented on the age-related infection of Nybelinia sp.

5. Changing patterns in stock migration

Although boundaries of stock areas, seasonal, recruitment and adult age-dependent migrations all have the potential of varying markedly from year to year, this final category includes parasites used
to chart distinct changes in migration patterns over long periods of time.

Table 10: **Parasites used to study changing patterns in stock migration**

<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
<th>Area</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Clupea harengus</em></td>
<td><em>Anisakis</em> larvae</td>
<td>North Sea</td>
<td>Van Banning and Becker (1978)</td>
</tr>
<tr>
<td><em>Clupea harengus</em></td>
<td><em>Anisakis</em> larvae</td>
<td>Northwest Atlantic</td>
<td>McGladdery and Burt (1985)</td>
</tr>
<tr>
<td><em>Clupea harengus</em></td>
<td><em>Cercaria</em></td>
<td>North Sea</td>
<td>MacKenzie (1985)</td>
</tr>
<tr>
<td></td>
<td><em>pythionike</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>C. doricha</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Lactiferhynchus</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>sp.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Oncorhynchus nerka</em></td>
<td><em>Myxobius</em> neurobius</td>
<td>North Pacific</td>
<td>Groot, Margolis and Bailey (1984)</td>
</tr>
<tr>
<td></td>
<td><em>Myxidium</em> sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Diphyllobothrium</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>sp.</em> (1984)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Diplostomum</em> sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Tetracotyle</em> sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Philonema</em> sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Salmicolia</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>californiensis</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Long term studies of migration patterns require the greatest amount of effort, but the effort involved in any biological tag programme is considerable, with the collection and examination of many fish from different areas. In an exceptional study, MacKenzie (1985) examined more than 23,000 herring during the course of his
investigations. In contrast to conventional tagging programmes, biological tags do not allow the estimation of natural mortality, population size and growth rates, in addition to the monitoring of fish movements. Biological tags programmes, however, have several intrinsic advantages although whenever possible the use of biological tags will be greatly enhanced by host serological, biochemical, morphometric and meristic studies, and the concurrent use of conventional tags. Biological tags can be used to track a large proportion of a population rather than the individuals in mechanical tagging. The fish need to be caught only once, thus avoiding handling mortalities. Redfish, *Sebastes* spp., were one of the first fish to be examined using biological tags (Herrington et al., 1939). Redfish are usually caught in deepwater by bottom trawling, and the rapid reduction in pressure as they are brought to the surface commonly results in injury or death. Similarly many delicate species of fish that would be damaged by handling are prime candidates for biological tag investigations. Abnormal behaviour of tagged fish may also be avoided, as major trauma associated with the process of catching and tagging is involved. This is dependent on the third criterion used in selecting parasites as tags — that the host's survival is minimally affected by the parasite. Results may be further enhanced by parasite biochemical speciation shown by Beverley-Burton (1978) to enable further discrimination between separate stocks of fish. Finally, because research ships are costly to run, biological tag programmes may eventually prove cheaper than an investigation dependent upon just mechanical tagging.
(i) (b) Trypanorhynchs as Biological Tags

Trypanorhynch larvae have been used in a variety of fish population studies, including: stock separation, e.g. Sindermann (1957, 1961a, 1961b) used unspecified trypanorhynch larvae to distinguish stocks of *Sebastes marinus* in the north-west Atlantic, Lubieniecki (1977) separated stocks of haddock in the North Sea using *Grillotia erinaceus*; seasonal migrations, e.g. Gopalakrishnan and Pal (1964) followed the seasonal migrations of *Hilsa ilisha* in the Hooghly estuary, India, and Rautskis (1983) used *Lacistorhynchus tenuis* to follow *Vimba vimba* in the Baltic; recruitment migrations, e.g. *Grillotia smaris-gora* in studies of *Scomber scombrus* in the northwest Atlantic (present study); and adult age-dependent migrations, e.g. *Gilquinia squali* in *Merlangius merlangus* in the North Sea (Hislop and MacKenzie, 1976).

The greatest potential for trypanorhynch tags appears to be in the study of recruitment migrations, which have more stringent criteria than other studies. Trypanorhynch larvae are suitable because their fully developed tentacles make identification possible, although great care is needed in making the initial identification, and they appear to live or survive in a recognisable form throughout the life of their host. Within individual hosts they appear to inflict little pathological damage when they encyst on the surface of organs rather than inside them. The occurrence of the early developmental stages in a variety of invertebrates may also mean fish are exposed to infection solely at an early age, after which diet changes greatly reduce the possibility of infection.
The potential of using trypanorhynchs as tags for the definitive, elasmobranch hosts and the invertebrate first intermediate hosts has been largely unexplored, although Owens (1980) used Parachristianella monomegacantha to distinguish stocks of prawns in northern Australia. These remain further areas of research in which trypanorhynchs could play an important role.

(i) Grillotia smaris-gora (Wagener, 1854) Dollfus, 1946 and its Value as a Biological Tag

Introduction

In recent years mackerel fishing in the northeast Atlantic has steadily increased. U.K. catches in 1971-75 averaged 23,055 tonnes per year, while over 220,000 tonnes were landed in 1985 (Anon, 1986). Reasons for this increase include the discovery of large, overwintering shoals close inshore, changes in catching and distribution techniques (Lockwood and Johnson, 1976) and a transfer of fishing effort to mackerel after the decline in herring stocks. Some mackerel stocks, however, are already showing signs of overfishing. North Sea returns for all countries showed catches of 20,000 tons in 1945 rising to 930,000 in 1967, then dropping to 318,000 in 1973 and 49,000 in 1985 (Lockwood and Johnson, 1976; Anon, 1986). The remaining stocks are therefore being closely monitored.

MacKenzie and Mehl (1984) reported on a biological tag programme aimed at tracing movements made by stocks of mackerel, Scomber
scombrus, in the eastern North Atlantic. They recorded the occurrence of a trypanorhynch plerocercus which appeared to infect mackerel up to the age of two years and then to survive throughout the life of the mackerel (MacKenzie, 1983; MacKenzie and Mehl, 1982). The trypanorhynch was identified (MacKenzie, 1980) as Grillotia angeli Dollfus, 1969, but my close examination of the holotype and a range of both adult specimens and plerocerci have shown me that Grillotia angeli is a junior synonym of Grillotia smaris-gora (Section Two, pp. 21-49).

The life cycle of Grillotia smaris-gora is still unknown, but all trypanorhynchs whose life-cycles have been investigated are known to use crustaceans as first intermediate hosts (Ruszkowski, 1932; Riser, 1956; Mudry and Dailey, 1971; Sakanari and Moser 1985a, 1985b).

Adults of G. smaris-gora in the eastern North Atlantic have been recovered solely from the monkfish Squatina squatina L. Monkfish are common in and to the south of I.C.E.S. sub-area VII (i.e. to the south and west of Britain (see Fig. 16), but are regarded as rare to the north of Ireland and throughout the North Sea.

The spawning season for mackerel in the northeastern Atlantic is spring and early summer, sometimes continuing until September (Hamre, 1980). Kennedy (1954) and Wheeler (1969) record that mackerel fry and adult fish prior to spawning feed on plankton, later turning to a mainly piscivorous diet including rockling fry, sand eels, herring, pilchards and young sprats, although a certain amount of crustacean food (including shrimps and mysids) may be taken in summer, while in winter mackerel fast on the bottom in deep water. Kennedy remarked
that in the English Channel shoaling mackerel fed chiefly on zooplankton, including *Calanus finmarchicus*, *Pseudocalanus elongatus* and *Temora longicornis*. Mehl and Westgard (1983) noted that the most important prey items in wet weight were copepods, euphausiids and fish.

As only young mackerel become infected with *G. maris-gora*, presence of the plerocercus indicates that the mackerel fed on infected crustaceans at an early age, and thus originated from I.C.E.S. areas VII and VIII.

The monkfish is usually found at depths of from five to fifty metres, concealed or partially buried in sand or gravel. (Wheeler, 1969). Wheeler lists its food as consisting of mainly benthic organisms, including flatfishes (plaice, dabs and soles) *Raja* sp., other fishes, molluscs, whelks and crustaceans, including the crab *Cancer pagurus*. In northern European waters the young are thought to be born during June and July. Wheeler suggested that, because monkfish become much more common in summer, there might be a summertime northerly migration, supplementing a shoreward movement from deeper waters.

Fitzmaurice (1982) investigated the migration of monkfish using Jumbo and Petersen tags to record their movements. Four hundred and thirty five monkfish were tagged over a period of 13 years on the West coast of Ireland. Thirty fish (6.9%) were recaptured, showing general movements north and south. Few returns were received from any tagging location other than Tralee Bay so no migration pattern could be predicted. It is difficult to imagine how the fast-moving pelagic
mackerel could regularly be taken by the bottom-dwelling monkfish, unless this occurred in winter when the mackerel move to deeper water and settle near the bottom.

MacKenzie and Mehl (1984) examined a total of 9,639 mackerel aged from 0-ring to 18 winter rings. In samples taken from the North Sea and I.C.E.S. areas IIa or IVa, where mixing of stocks is known to occur, the proportion of mackerel originating from the southwest was calculated. The prevalence of the sample was divided by the mean prevalence in area VII, where it was assumed that all the mackerel examined were of southwestern origin. Ninety-five per cent confidence limits were also calculated.

Results showed that the mackerel appeared to fall into two groups. In mackerel of year classes 1977 and earlier the overall mean prevalence was 6.9%, but in year classes 1978-82 the overall mean prevalence dropped to 0.9%. Year classes 1977 and earlier showed the highest prevalences in areas VII and IVc. There was no statistically significant difference between the areas, suggesting that all the mackerel in the southern North Sea might have originated from the southwest. The monkfish is also common in area VIII, but mackerel from the southern part of this area showed a significantly lower prevalence than those from area VII, suggesting that they were of different origin. Similarly, mackerel recovered from area IX probably had a different origin, as none were infected.

Results from Division VIa north of 58°N, IIa and IVa indicated that just over half the mackerel caught off the northwest coast of
Scotland and 30% of those in the Norwegian Sea and northern North Sea originated in nursery grounds in the southwest.

Seasonal variations in Division VIa north of 58°N showed a decrease in the proportion of southwestern mackerel from 50% in September to under 10% in January, increasing again to over 50% in March and April.

Later records from year classes 1978 onwards showed no variations between areas and age groups that were statistically significant. Infected mackerel were spread fairly evenly over all areas. In view of the low overall prevalence of *G. smaris-gora*, MacKenzie and Mehl suggested that younger fish may have been migrating into northern areas at younger ages and in greater numbers than before. If previous patterns of distribution had been maintained infected *S. scombrus* should have been very rare in areas north of VII.

Walsh and Martin (1986) recorded changes in the overwintering areas for adult mackerel, which shifted northwards at about the same time as the drop in the prevalence of *G. smaris-gora*. MacKenzie and Mehl (1984) questioned whether these changes in mackerel distribution could be associated with hydrographic changes recorded in the North Sea. MacKenzie (1987) also noted a sharp decrease in the prevalence of the trypanorhynch *Lacistorhynchus* sp. in herring, *Clupea harengus*, at about the same time as the decrease in prevalence of *G. smaris-gora* in mackerel. MacKenzie suggested that these abrupt changes could have resulted from a number of factors including a change in host diet and herring year class strength.
Studies were made on *Grillotia smaris-gora* in an effort to find out more of its biology, and its potential as a biological tag. Although its value as a tag has decreased somewhat since the drop in prevalence, it could well increase again.

**Materials and Methods**  (See methodology section (pp 2-15) for details)

A variety of elasmobranchs including monkfish, *Squatina squatina*, were trawled in Cardigan Bay, and examined for *Grillotia smaris-gora*. Only *Squatina* was found to be infected by this trypanorhynch, and unfortunately no living gravid specimens were found for life-cycle studies. More adult *G. smaris-gora* were recovered from monkfish that had been caught off southwest Ireland and in Cardigan Bay, and preserved in 4% formalin.

Selected teleosts were examined for plerocerci. Mackerel, *Scomber scombrus* (L.), had been previously recorded (MacKenzie, 1980) as a host for *Grillotia smaris-gora*. Encysted plerocerci from mackerel were dissected out, examined and measured. Further teleosts examined were scad, *Trachurus trachurus* (Linnaeus, 1758), red sea bream, *Pagellus bogaraveo* (Brünnich, 1768), greater weaver, *Trachinus draco* Linnaeus, 1758, common dab, *Limanda limanda* (Linnaeus, 1758) and grey gurnard, *Eutrigla gurnardus* (Linnaeus, 1758).
Plate 16: Map of the British Isles showing I.C.E.S. areas and regions where *S. squatina* were caught.

Key to map $x =$ position of capture of monkfish examined
Results

Twelve Squatina (prevalence 48%) were found to be infected with an intensity of 1-23 trypanorhynchs per infected fish (Table 11). Twelve trypanorhynchs (15.4%) were recovered from the first tier of the spiral valve, 19 (24.4%) from the second tier, and 4 (5.1%) from the third. The rest were recovered from the washings of the spiral valve. The four smallest fish (31-56 cm long) were uninfected with trypanorhynchs.

Examination of the stomach contents showed many food items including whole, small rays (Raja clavata), unidentified remains of teleost fish, and fragments of shells.

Scad, Trachurus trachurus, caught to the southwest of Ireland and aged between 6 and 20 years showed the highest prevalence of infection of G. smaris-gora in any teleosts examined. Prevalence increased with size (and presumably age) from 10% in the smallest scad to 57% in the largest length group at 33-38 cm fork length. The mean intensity varied between 1 and 2.7 parasites per infected fish. Both prevalence and intensity of infection of the plerocerci were higher than values recorded from mackerel (MacKenzie, Smith and Williams, 1984).

A sample of red sea bream, Pagellus bogaraveo, from the Bay of Biscay had a prevalence of 8.1%, with up to 32 plerocerci found in one fish. Unfortunately many of the scad and red sea bream were received frozen so that the tentacles of the dissected plerocercus could not be extended. Sufficient details could be distinguished for identification when compared with excysted trypanorhynchs found in fresh fish.
Table 11: Monkfish, *Squatina squatina*, examined for *Grillotia smaris-gora*

<table>
<thead>
<tr>
<th>Date and area of capture</th>
<th>Length (cm)</th>
<th>Sex</th>
<th>Number of <em>G. smaris-gora</em></th>
</tr>
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<tr>
<td>26.08.1983 Aberystwyth, Cardigan Bay</td>
<td>91</td>
<td>♂</td>
<td>1</td>
</tr>
<tr>
<td>12.09.1983 Cardigan Bay</td>
<td>124</td>
<td>♂</td>
<td>7</td>
</tr>
<tr>
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<td>125</td>
<td>♂</td>
<td>4</td>
</tr>
<tr>
<td>12.09.1983 Cardigan Bay</td>
<td>126</td>
<td>♂</td>
<td>23</td>
</tr>
<tr>
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<td>123</td>
<td>♀</td>
<td>6</td>
</tr>
<tr>
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<td>99</td>
<td>♂</td>
<td>18</td>
</tr>
<tr>
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<td>61</td>
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<tr>
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<td>♀</td>
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<td>♀</td>
<td>0</td>
</tr>
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<td>♂</td>
<td>2</td>
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<tr>
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<td>56</td>
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<td>0</td>
</tr>
<tr>
<td>27.04.1986 Cardigan Bay</td>
<td>36</td>
<td>♂</td>
<td>0</td>
</tr>
<tr>
<td>20.12.1983 Portoyageef, Southwest Ireland</td>
<td>97</td>
<td>♀</td>
<td>0</td>
</tr>
<tr>
<td>04.1984 Brandon Head, Southwest Ireland</td>
<td>31</td>
<td>♂</td>
<td>0</td>
</tr>
<tr>
<td>04.1984 Dingle Bay, Southwest Ireland</td>
<td>121</td>
<td>♂</td>
<td>0</td>
</tr>
<tr>
<td>04.1984 Dingle Bay, Southwest Ireland</td>
<td>125</td>
<td>♂</td>
<td>2</td>
</tr>
</tbody>
</table>
No other teleosts, including a sample of 1-ring mackerel examined in Cornwall (September 1983), were found to be infected.

Discussion

The prevalence of Grillotia smaris-gora in monkfish is high, nearly 50%. This suggests that either the intermediate host, through which the monkfish becomes infected, is a common item in the monkfish's diet, or that any plerocercus ingested by the monkfish has a high probability of survival and development. There is little data on the survival and longevity of trypanorhynchus within their definitive hosts, although the initial establishment of adults from plerocerci appears high (Nakajima and Egusa, 1972a,b; Sakanari and Moser, 1985b). Although small monkfish under 61 cm long were uninfected by G. smaris-gora, insufficient hosts were available to test whether infection levels were significantly lower in smaller, and presumably younger, monkfish, which would have taken smaller prey items.

Previous records of Grillotia smaris-gora from Squatina describe the presence of detached, gravid proglottids in fish caught in the Firth of Clyde in May (Scott, 1909), Norway in August (Nybelin, 1940) and from Arcachon, France in September (Dollfus, 1946). Life cycle studies carried out by Sakanari and Moser (1985a), Nakajima and Egusa (1972e) and by myself (Section Three, this thesis) show periods of up to two weeks for trypanorhynchon eggs to produce coracidia which then develop into infective proceroids within the first intermediate hosts. Infection of teleosts could thus take place in summer and autumn. It
is interesting to note that two of the zooplankton copepod species, Pseudocalanus elongatus and Temora longicornis, recorded by Kennedy (1954) as constituting a major part of the diet of shoaling mackerel in the English Channel, had been successfully infected with plerocerci of Grillotia erinaceus, a species closely related to G. smaris-gora, by Ruszkowski (1932).

Infection of the teleost hosts in the eastern Atlantic appears, at present, to involve two midwater pelagic species, Trachurus trachurus and Scomber scombrus, and one bottom-dwelling species, Pagellus bogaraveo. Other midwater and benthic fishes examined did not appear to maintain this parasite, although only small numbers of fish were examined.

Some species of trypanorhynch have been recorded (Dollfus, 1942) as surviving when taken from one teleost host and presented to another. This has only been recorded, however, in species such as Nybelinia or Tentacularia when a post-larva is involved. No attempted transfer of encysted Grillotia plerocerci from one teleost to another has been successful, so all teleost hosts found to be infected with G. smaris-gora plerocerci are assumed to have fed on infected crustaceans.

Pagellus bogaraveo spawns in September to October around the British Isles, young fish feeding close inshore on copepods, amphipods, shrimps and siphonophores, larger bream taking decapod crustaceans and young fish and being found at greater depths of 50 m or more (Wheeler, 1969).
It is possible that mackerel and scad, rather than providing a common route of infection for monkfish, represent a dead-end for the *G. smaris-gora* plerocerci, and that most infection of the final host is via the red sea bream, which is commonly found on sandy bottoms in the same type of area as *Squatina*. As both demersal and pelagic fish are infected with this parasite, it is possible that euphausiids, which undergo regular vertical migrations, could be the first intermediate host (MacKenzie, pers. comm.). Exposure to infection with the cestode eggs could occur on the sea bed, and predation by demersal and pelagic fish during the euphausiid's migrations. Mehl and Westgard (1983) record that euphausiids are an important part of the mackerel's diet.

Heinz and Dailey (1974) recorded *Grillotia smaris-gora* from *Squatina californica* in the eastern Pacific. Larval *G. smaris-gora* were found in the Californian lizard-fish, *Synodus lucioceps*, by Jensen, Moser and Heckmann (1979). *Synodus lucioceps* spends much of its time buried in sand, presumably in the same regions as *S. californica*. This would appear to be very similar to the situation involving *S. squatina* and *P. bogoraveo* in the eastern Atlantic. It would be advisable to investigate the life cycle of *G. smaris-gora* and discover which crustaceans act as intermediate hosts, how the recorded teleost intermediate hosts become infected, and whether any other fish species are involved. Although *G. smaris-gora* has been successfully used as a biological tag for mackerel, and could, potentially, be of use in the future, a better understanding of the parasite's biology, particularly its ecology and life-cycle would enhance its application and possibly that of other trypanorhynchas as population indicators.
SECTION FIVE

GENERAL DISCUSSION AND CONCLUSIONS
General Discussion

The order Trypanorhyncha was, according to Wardle and McLeod (1952), "one of the most chaotic and confused of the tapeworm groups" until Dollfus (1942) conducted a major survey of all the trypanorhynch species known to him at that time, and introduced some order into the group. Dollfus also produced the first comprehensible key, which has remained the basis for all subsequent keys to the Trypanorhyncha, e.g. Wardle and McLeod (1952), Yamaguti (1959) and Schmidt (1970, 1986).

The host-parasite checklist (Bates, in press) compiled after studying over 400 papers, draws together recent publications that include records of the Trypanorhyncha into a manageable form, and emphasizes the continuing neglect of this Order. An example of this neglect is the restriction of the vast majority of trypanorhynch records to within the northern hemisphere, concentrating around the European centres with historical interests in marine parasitology. It is only comparatively recently that a series of studies have been carried out in South America, while very little work has arisen from Australia. Clearly much basic survey work needs to be done since no trypanorhynchs are recorded for the majority of elasmobranch species currently known to exist, presumably because comparatively little effort has been made to examine elasmobranchs in comparison to teleosts commonly used as food fish. When considering the Tetraphyllidea, Schmidt (1986) commented that "only about 17% of the known elasmobranch species have been examined for cestodes". There is clearly a vast amount of work which needs to be carried out in this fundamental area of research. This applies to a greater extent to the Trypanorhyncha than to the Tetraphyllidea.
Another area of neglect which is highlighted by the checklist is the small number of records originating from invertebrates. Species recently described, moreover, do not all fit into existing categories, e.g. the family Rhinoptericolidae, containing the single species *Rhinoptericola megacantha* Carvajal and Campbell, 1975, shows closest similarities to the families Otobothriidae and Mustelicolidae on the basis of the tentacle oncotaxy, but has several unusual internal features, including the presence of an ooreceptacle and an ovary consisting of four lobes but lacking a central isthmus, which differ markedly from the other families in this group. A similar situation exists in the family Mixodigmidae, which also contains one species, *Mixodigma leptaleum* Dailey and Vogelbein, 1982. In this case the arrangement of the hooks on the tentacles and the internal structure of the proglottid appear to contain elements typical of both a poeciloacanthous family, the Dasyrhynchidae, and the heteroacanthous family, the Eutetrarhynchidae. Considering the relatively small number of new species (60-70) described during 1935-1985, based on the checklist, the problems encountered in assigning species positions within the existing taxonomic structure may well become more difficult to solve as new geographic areas are investigated. Many problems still remain, therefore, both in the allocation of species to a systematic position within the Trypanorhyncha, and also in the identification of parasites. Examples of recent confused identifications may be identified from the host-parasite checklist. Sparks and Mackin (1957) identified a larval parasite found within *Penaeus setiferus* as *Eutetrarhynchus* sp., later reidentified as *Prochristianella penaei* Kruse, 1959, by Sparks and Fontaine (1973). Campbell and Carvajal
(1975) recognised this as a synonym of *Prochristianella* (= *Rhynchobothrium*) *hispidum* originally described by Linton in 1890. It became clear during the compilation of the checklist that, except for systematics, hardly any area of the biology of the trypanorhynchs had been the subject of sustained research. This group of tapeworms should, therefore, be a fruitful area of research for many years.

Section Two of this thesis emphasises both the historical and recent existence of numerous synonyms and misidentifications of five species of trypanorhynch. For example, *Grillotia smaris-gora* (Wagener, 1854) Dollfus, 1946, has been recorded as belonging to five separate genera, while *Gilquinia squali* and *Aporhynchus norvegicus* have also been assigned several synonyms, suggesting that the taxonomy of this group is still in a state of turmoil.

In addition to the problems of species identification, Section Two of this work highlights the flimsy evidence on which many species have been erected. For example, the species *Grillotia angeli* Dollfus, 1969, was based on three specimens which Dollfus himself recognised as being distorted. In the same paper Dollfus described another "new" species, *Grillotia microthrix*, from one immature specimen whose tentacles were only partly evaginated. Further difficulties were encountered when attempting to find type specimens. It was found that the majority were unavailable, having been mislaid or destroyed over the years.

Although open to misinterpretation the tentacle oncotaxy remains the most efficient method of identifying species belonging to this
order, assuming that the original description was accurate, and included the arrangement and types of hooks both at varying levels of the tentacle and also on the different faces. Although the hook arrangements and terminology may appear to be initially confusing, a careful study of fully extended tentacles should allow the identification of any species. Campbell and Carvajal (1975) suggested that the ratio of pars bothridialis : pars vaginalis : pars bulbosa could be of greater use in differentiating between closely related species, especially within the Eutetrarhynchidae, but I have found during the examination of specimens, that this method is only applicable when the parasites are in a similar state of tentacle extrusion, and also that adults and plerocerci sometimes show very different ratios. The description of proglottid morphology could also be improved. Too many descriptions neglect any mention of the internal morphology of the proglottids, or they are simply diagnosed as possessing typical trypanorhynchal organisation, when this varies greatly between genera and species.

The taxonomic confusion within the Trypanorhynchia does not facilitate the discussion of the degree of host specificity within groups of this Order. One of these problems is the status of the host, and whether it can be regarded as a natural host: a record of a parasite within an animal does not mean that it will successfully establish in the host. There are several examples of trypanorhynchcs having been recorded in man (see Host-Parasite checklist, Section Two), but no examples of the parasites surviving within man or any other homeothermic animal. In general, hosts can be divided (Holmes, 1973)
into three groups: those in which the parasite can establish and reproduce, those in which it can survive, but not reproduce, and those in which it cannot establish. It is impossible to assign many published trypanorhynchan records to one of these categories without further information, or to assess the value of various hosts in maintaining the population of the parasite. Rohde (1980) has produced indices of host specificity based on the prevalence and intensity of parasitic infections, but again this quantitative approach is not feasible using much of the published data. I, therefore, support Dollfus (1957) in giving tentative suggestions about the apparent host specificity in the Trypanorhyncha.

The homeoacanthous trypanorhynchs include the Hepatoxylidae and Sphyriocephalidae, which are found as post-larvae in a variety of teleosts, but appear to be restricted to the Pleurotremata as adults. The remaining homeoacanthous family, the Tentaculariidae, contains the genus Tentacularia, found as a post-larva in many teleosts, and as an adult in the Pleurotremata, and the genus Nybelinia, found in a wide variety of intermediate hosts, and as adults in both the Hypotremata and the Pleurotremata.

In the poeciloacanthous trypanorhynchs the genus Gymnorhynchus, family Gymnorhynchidae, contains two species that appear to be much more specific in the plerocercus stage. Gymnorhynchus horridus is restricted to the teleost Mola mola, and found as an adult in the Pleurotremata, while G. gigas has been recorded from both Brama raii and Xiphias gladius as a plerocercus. The adult is unknown. In the Lacistorhynchidae the monotypic genus Lacistorhynchus has been recorded
from many teleosts as plerocerci, and from many sharks and rays as adults. In contrast the genus Grillotia, containing over ten species is again found in a wide range of teleost intermediate hosts, but is mainly restricted to the Hypotremata as adults. Exceptions include G. heptanchi from Hexanchus griseus and G. perelica from Carcharinus platydon, which are also cosmopolitan. In the family Callitetrarhynchidae the genus Dasyrbyncus is found in a wide variety of teleost intermediate hosts, and in definitive pleurotrematid hosts. The monotypic genus Floriceps is found in a wider range of definitive hosts, including Prionace glauca and Notorhynchus brevirostris, and in a range of teleost intermediate hosts, especially Mola mola. The genus Callitetrarhynchus has been recorded from many teleost families, while the adults are found in a variety of carcharhinid hosts.

In the heteroacanthous tapeworms the family Gilquiniidae, as already discussed (see Section Two), seems to be generally restricted to squaloid definitive hosts, while the plerocerci of Gilquinia have been recorded from a range of intermediate teleost hosts. The family Otobothriidae includes the genus Poecilancistrium, found as plerocerci and adults in teleosts and the Pleurotremata respectively and Otobothrium, found in a great range of intermediate hosts including teleosts and aquatic reptiles, and in a range of sharks and adults. The family Eutetrarhynchidae is unusual in that many of the records of plerocerci with well-developed tentacles come from decapod crustaceans, in addition to a wide range of teleosts. The adults appear to be restricted to either the Hypotremata or the Pleurotremata, depending on the genus. The species Parachristianella, including the new record (Section Two) of P. monomegacantha, has only been recorded from the
Hypotremata.

The Trypanorhyncha, therefore, appear to show a low degree of host specificity, which may vary between species, genera and families. In contrast the Diphyllidea and the Tetraphyllidea, two other orders of tapeworms which, like the Trypanorhyncha are found as adults in elasmobranch definitive hosts, show a high degree of host specificity, with each tapeworm species usually restricted to one elasmobranch species. The question of whether the Trypanorhyncha may show a higher degree of host specificity than recorded at present cannot be answered until many of the records of infection have been either reassessed or established anew.

The contrast between the biology of the Trypanorhyncha and the Tetraphyllidea is reinforced when life cycle studies are considered. The Tetraphyllidea which have been studied (Burt and Jarecka, 1982) show well developed oncospheres within the delicate, thin-walled eggs in the uterus. In contrast the six species of Trypanorhyncha that have been investigated appear to adopt a variety of strategies, all beginning with a robust egg possessing a hard outer shell which tans rapidly in sea water. The possibility of two types of life cycle suggested by Euzet (1957), one involving a free-living coracidium infecting copepods, which then become infective to teleosts, and the other involving the egg as the infective stage with a larva developing to the plerocercus stage in the crustacean intermediate host, suggests a major division within the Trypanorhyncha. As suggested in Section Three of this thesis, further work on the early developmental stages, especially of those species belonging to the heteroacanthous and homeoacanthous
groups, is needed to clarify the evolutionary significance of the trypanorhynchian life cycle strategies. The lack of any "model" trypanorhynch which is easy to maintain within the laboratory is obvious as no life cycle has been successfully completed within the laboratory.

The biological tag studies reviewed during the course of this research showed a great increase over the last 10-20 years. Ostensibly trypanorhynchs may be considered as possessing great potential as biological tags, but again deficiencies in the knowledge of their basic biology detract from their use. Little is known of their ecology, or pathology, so although they may appear to be site specific in certain economically important fish their current application for commercial studies must be questioned.

The published material on the trypanorhynchs is both confusing and potentially misleading, since much of it is based on questionable identifications. The infrequent investigations into the biology of these cestodes do, however, highlight fundamental differences between the Trypanorhyncha and other orders of cestode. At present the trypanorhynchan development, distribution and life-cycles appear to be unique and suggest that possibly the Trypanorhyncha should be considered phylogenetically as a group apart, like the Caryophyllidea (Mackiewicz, 1982) and the Gyrocotylinea (Williams, Colin and Halvorsen, 1987).
Conclusions

1. A great deal of basic survey work remains to be done, both in different hosts, particularly the elasmobranchs and invertebrates, and also in many neglected geographical areas. This should be extremely productive.

2. The validity of many early taxonomic studies must be questioned. Whenever possible specimens of new or existing species, from new or previously recorded hosts, should be deposited in national collections, to supplement the few existing type specimens.

3. Except for the general fish parasite faunal surveys, and the taxonomic studies of varying value carried out on trypanorhynchas, little effort has been aimed at understanding the biology of these parasites.

4. No trypanorhynch life cycle has yet been completed within the laboratory indicating a fundamental lack of knowledge of these parasites.

5. Increasing pressure to understand the social and economic importance of trypanorhynchas may be expected, in respect of both their pathogenicity and biological tag potential. Neither of these can be comprehensively investigated without other aspects of the parasite's biology being considered.
6. Phylogenetically, the Trypanorhyncha appear to have few affinities with other groups of cestodes. Traditionally, they have been regarded (Dollfus, 1942) as an old group showing little diversification. Until accurate knowledge of these tapeworms is available, it would be advisable to regard them as a group very much apart from other tapeworm orders.
REFERENCES


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