

DIGENETIC TREMATODES OF MARINE FISHES FROM THE
FLORIDIAN NORTHERN GULF OF MEXICO

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ABSTRACT

Seventy-three fishes representing 50 species from the Northern Gulf of Mexico in Florida were examined for digenetic trematodes. Thirty-two species harbored 27 Digenea. Two new species are described: the hemiurid *Ectenurus yamagutii* from *Caranx crysos*, *C. hippos*, and *Lagodon rhomboides*, and the lepecreadiid *Lepocreadium sogandaresi* from *Eupomacentrus leucostictus*. *Monascus filiformis* (Rudolphi, 1819) Looss, 1907 (Fellodistomatidae), known previously from the Mediter-

anean and reported for the first time from North American waters, is described and figured.

INTRODUCTION

This is the third paper on the Digenea of marine fishes from the northern end of the Gulf of Mexico. The first two (Nahhas and Short, 1965; Nahhas and Powell, 1965), included a description or report of a total of 53 species from Apalachee Bay. The present

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material was collected by the junior author during 1967 and 1968. All fishes examined were captured in Pensacola Bay and neighboring waters with the exception of four specimens of *Eupomacentrus leucostictus* from Panama City, Florida. Seventy-three fishes representing 50 species were examined. Digenea were washed in saline, fixed in alcohol-formalin-acetic acid (A.F.A.) under slight coverslip pressure, stained with acetocarmine, dehydrated in a graded series of alcohol, cleared in methyl salicylate, and mounted in Kleermount® (Carolina Bio. Supply Co., Burlington, N. C.). A few immature trematodes or those represented by a single specimen not suitable for study were not included. Figures were drawn with the aid of a microprojector. Measurements are in millimeters except when otherwise stated. Holotypes of new species are deposited in the U. S. National Museum Helminthological Collection. Asterisks preceding host names indicate new host records.

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DESCRIPTION AND DISCUSSION OF SPECIES

FAMILY ACANTHOCOLPIDAE Lühe, 1909

Stephanostomum megacephalum Manter,
1940

Host: Caranx hippos

Site: Intestine

Locality: Santa Rosa Sound

FAMILY BUCEPHALIDAE Poche, 1907 *Bucephalus brevitentaculatus* Corkum, 1967

Host: Trichiurus lepturus

Site: Ceca

Locality: Pensacola Bay

Our nine specimens are in complete agreement with the description by Corkum

(1967). The tentacles are difficult to see, but two knob-like structures interpreted as partly protruded tentacles are present in each of three specimens. No basal papillae are evident.

Bucephalus gorgon (Linton, 1905) Eckmann, 1932

Host: Seriola zonata

Site: Ceca

Locality: Mouth of Pensacola Bay

Our three specimens are referred to this species on the basis of Corkum's (1967) description. At least 19 retracted tentacles can be counted.

Bucephalus varicus Manter, 1940

Host: Caranx hippos

Site: Intestine

Locality: Santa Rosa Island

FAMILY CRYPTOONIMIDAE Ciurea, 1933

Siphodera vinaledwardsii (Linton, 1901)
Linton, 1910

Synonym: Monostomum vinaledwardsii Linton, 1901

*Host: *Bairdiella chrysura*

Site: Ceca

Locality: Pensacola Bay

FAMILY FELLODISTOMATIDAE Nicoll, 1913

Monascus filiformis (Rudolphi, 1819)
Looss, 1907
Figure 1

Synonyms: Distoma filiforme Rudolphi, 1819
Haplocladus filiformis (Rudolphi, 1819) Odhner, 1911

*Host: *Decapterus punctatus*

Site: Intestine

Locality: Santa Rosa Island

Description (based on a single specimen): Body elongate, 3.268 long by 0.408 wide at anterior fourth. Forebody 0.684 long; hindbody 2.414 long. Tegument smooth. Eyespot pigment absent. Oral sucker subterminal, 0.231 long by 0.176 wide. Prepharynx absent. Pharynx cylindrical, 0.132 long by 0.110 wide. Cecum single, extending to near posterior end of body. Acetabulum at ante-

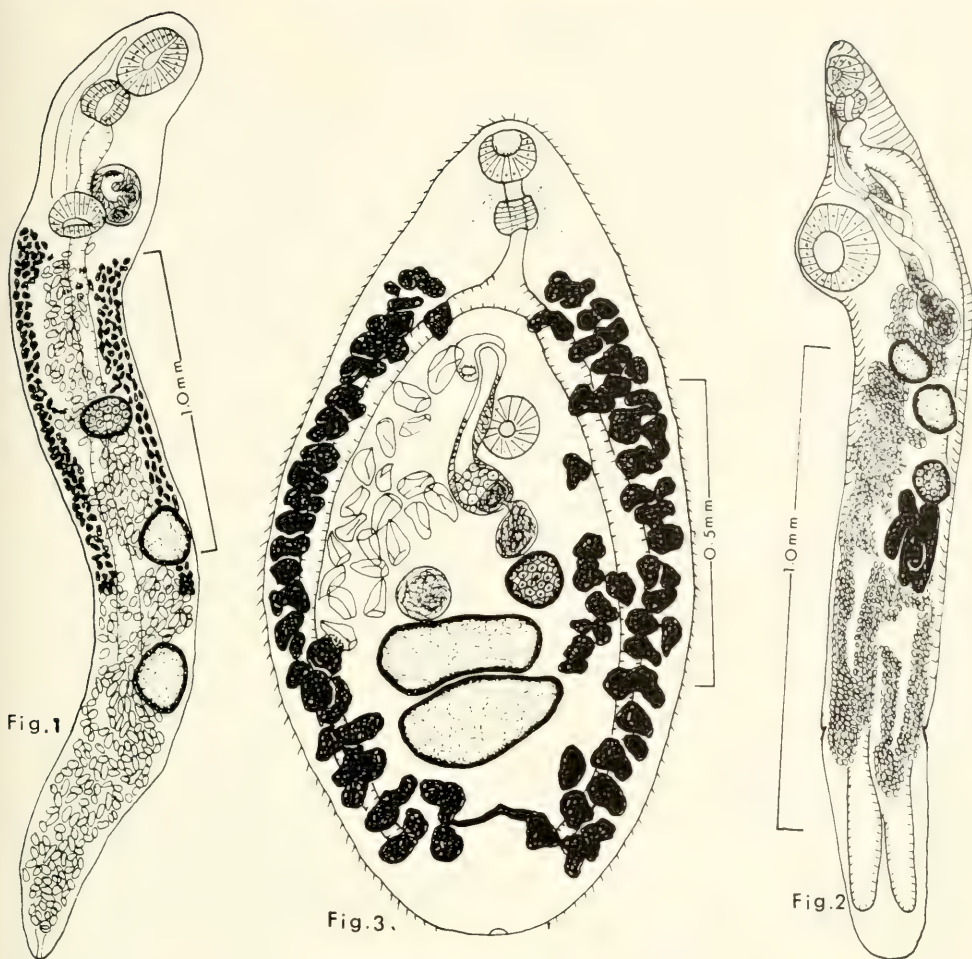


Figure 1. *Monascus filiformis* from *Decapтерus punctatus*; ventral view. Figure 2. *Ectenurus yamagutii*, holotype, from *Caranx hippos*; ventrolateral view. Figure 3. *Lepocreadium sogandaresi*, holotype, from *Eupomacentrus leucostictus*; dorsal view.

rior fourth of body, 0.170 long by 0.190 wide; sucker ratio 1:0.9.

Genital pore and atrium submedial, about one third distance between acetabulum and pharynx. Testes two, smooth in outline; anterior testis 0.952 from posterior border of acetabulum, 0.176 by 0.154; posterior testis 1.360 from acetabulum, 0.220 by 0.154. Cirrus sac sinistral, extending from midacetabular level to genital atrium, 0.198 long by 0.143 wide, containing a bipartite seminal vesicle, short pars prostatica and globular cirrus. Ovary pretesticular, separated from anterior testis by uterine coils, smooth in outline, 0.132 long by 0.176 wide. Seminal

receptacle not evident. Uterus extending to posterior end of body, coursing anteriorly to insert into genital atrium. Eggs yellowish, 38–43 by 20–26 microns. Vitelline follicles small, numerous, in lateral fields extending from posterior level of acetabulum to nearly midway between testes. Excretory pore terminal; excretory vesicle and its connection with cecum not evident due to overlapping uterus; excretory arms extending laterally, right arm seen reaching level of oral sucker.

This species was previously known from Mediterranean waters only. For this reason, a description and drawing of the present specimen is given.

The status of this genus and its species has been reviewed by a number of investigators including Dollfus (1947), and more recently Fischthal and Kuntz (1963), and Fischthal and Thomas (1968). Most troublesome has been the separation of *Monascus typicus* (Odhner, 1911) Looss, 1912 from the type species *M. filiformis* (Rudolphi, 1819) Looss, 1907. Three features have been used: position of the testes in the hindbody, size of eggs, and their color. According to Dollfus (1947), Odhner distinguished his *Haplocladus filiformis* from *H. typicus* by its more anterior testes (anterior to middle of hindbody) and the somewhat smaller eggs (34–37 microns long) with a reddish brown color. In *H. typicus*, the testes are in, or posterior to, midhindbody and the eggs larger (40 by 24 μ) and yellowish brown in color. On this basis our single specimen should be considered *M. typicus*. It is, however, very similar (except for less elongated pharynx) to Dollfus' specimens of *M. filiformis* from the type host, *Cepola rubescens*. Dollfus (1947) describes in detail the changes that occur in topography of the gonads with maturity of the worms, and indicates the presence of overlapping features between the two species. Fischthal and Kuntz (1963) and Fischthal and Thomas (1968) also note extensive variations in their specimens of *M. typicus*.

If there are any differences between *M. filiformis* and *M. typicus*, they have to be sought in features other than gonad topography and egg size. It is quite possible that *M. typicus* is not a valid species, but the authors hesitate to reduce it to synonymy on the basis of a single specimen.

FAMILY HEMIURIDAE Lühe, 1901

Parabemiurus merus (Linton, 1910)

Woolcock, 1935

Synonyms: Hemiurus merus (Linton, 1910)

Parabemiurus parabemiurus Vaz & Pereira

P. platichthyi Lloyd, 1938

P. atherinae Yamaguti, 1938

P. harengulae Yamaguti, 1938

P. noblei King, 1962

Host: Caranx crysos

Site: Stomach

Locality: Pensacola Bay

Lecithochirium parvum Manter, 1947

Synonyms: Sterrhurus floridanus Manter, 1934, in part

Brachyphallus parvus (Manter, 1934) Skrjabin & Guschanskaja, 1955

Host: Diplectrum formosum

Site: Stomach

Locality: Pensacola Bay

Lecithochirium synodi Manter, 1931

Host: Synodus foetens

Site: Stomach

Locality: Pensacola Bay

Lecithochirium mecosaccum Manter, 1947

Host: Synodus foetens

Site: Stomach

Locality: Pensacola Bay

Lecithochirium microstomum Chandler, 1935

Synonyms: Sterrhurus monticelli (Linton, 1898) of Manter, 1931, in part

Lecithochirium sinaloense Bravo-Hollis, 1956

Host: Trichiurus lepturus

Site: Stomach

Locality: Pensacola Bay

Sterrhurus musculus Looss, 1907

Synonyms: Sterrhurus laeve (Linton, 1898) of Manter, 1931, in part

Sterrhurus floridensis Manter, 1934, in part

Brachyphallus musculus (Looss, 1907) Skrjabin and Guschanskaja, 1955

Hosts: Centropristis melanus, **Lepophidium profundorum*, **Lutjanus blackfordi*, *Ogcocephalus radiatus*, *Opsanus beta* and *Porichthys porosissimus*

Site: Stomach

Locality: Santa Rosa Island

Lecithocladium excisum (Rudolphi, 1819) Lühe, 1901

Synonyms: Lecithocladium excisiforme Cohn, 1903

L. gulosum (Linton, 1899) Linton, 1940

L. cristatum (Rudolphi, 1819) Looss, 1907

L. crenatum (Molin, 1859) Looss,
1907

*Host: *Poronotus burri*

Site: Stomach

Locality: Pensacola Bay

Our two mature specimens are considered *Lecithocladium excisum* even though the two suckers are almost equal in size. Except for this feature, they are very similar to *L. gulosum* (Linton, 1899) Linton, 1940 from *Poronotus triacanthus* in Woods Hole, Massachusetts, which is reported by Manter (1954) as a synonym of *L. excisum*. In Linton's specimens, the oral sucker is slightly larger with a ratio calculated to be about 1:0.9. Nahhas and Short (1965) also reported this species from *P. triacanthus* and *Peprilus alepidotus* from Apalachee Bay. In these specimens, the oral sucker is also slightly larger than the acetabulum. In all other features, the Pensacola Bay material is almost identical with those of Apalachee Bay and Woods Hole.

Ectenurus virgulus Linton 1910

Host: Caranx crysos

Site: Stomach

Locality: Pensacola Bay

Ectenurus yamagutii new species
Figure 2

Hosts: Caranx crysos, C. hippos, and Lago-
don rhomboides

Site: Stomach

Localities: Pensacola Bay; Santa Rosa Island

Holotype: U.S.N.M. Helm. No. 70734

Description (based on 10 specimens): Body appendiculate; soma 0.770–1.560 long, 0.209–0.286 wide at level of ovary; ecsoma 0.220–0.484 long, 0.204–0.253 wide. Tegumental plications encircle body anteriorly, extending from anterior end of body to posterior end of middle third of soma ventrally and almost to posterior end of soma dorsally. Oral sucker 0.055–0.075 in diameter, surmounted by a preoral lobe. Prepharynx absent. Pharynx 0.038–0.045 long by 0.045–0.050 wide. Esophagus about as long as pharynx. Ceca extending to near posterior end of ecsoma. Acetabulum at anterior third of soma, 0.135–0.187 in diameter; sucker ratio 1:2.45–2.80.

Genital pore ventral, at anterior level of pharynx. Sinus sac long, well-developed, extending down to anterior level of acetabulum; hermaphroditic duct well-developed with muscular wall, free in sinus sac. Testes in middle third of body, diagonal, smooth in outline, 0.088–0.110 in diameter. Seminal vesicle tripartite, posterior to posterodorsal to acetabulum. Prostatic duct with conspicuous prostatic cells around distal third or half, entering posterior end of sinus sac. Ovary, posttesticular, smooth in outline, 0.063–0.100 in diameter. Uterus entering ecsoma or not, joining prostatic duct at base of sinus sac. Eggs 17–20 by 7–10 microns. Vitellaria immediately postovarian, in two groups of four and three digitiform lobes; lobe length 2–4 times width. Excretory arms not uniting anterior to oral sucker.

The single most important characteristic of this species which distinguishes it from others in the genus is the short digitiform vitellaria. In this feature, *Ectenurus yamagutii* differs not only from other ectenurids, but perhaps from all other members of the subfamily Dinurinae. On this basis, a separate genus may be justified, but because of its strong resemblance in other ectenurid features we prefer to retain it in *Ectenurus*.

This species is named in honor of Dr. Satyu Yamaguti in recognition of his contributions to helminthology.

FAMILY LEPOCREADIIDA Nicoll, 1934

Apocreadium balistis Manter, 1947

Host: Balistes capriscus

Site: Intestine

Locality: Santa Rosa Island

Neoapocreadium coili (Sogandares-Bernal, 1959) Siddiqi and Cable, 1960

Synonym: Apocreadium coili Sogandares-Bernal, 1959

Host: Balistes capriscus

Site: Intestine

Locality: Santa Rosa Island

Except for larger size (4.116–4.320 by 0.992–1.120), the three specimens are in agreement with the description by Sogandares-Bernal (1959). This species is now known from Bimini, Puerto Rico, Jamaica, Biscayne Bay, and Pensacola Bay.

Diploproctodaeum plicatum (Linton, 1928)

Sogandares-Bernal & Hutton, 1958

Synonyms: *Distomum* sp. Linton, 1898

Distomum sp. Linton, 1905

Psilostomum plicatum Linton, 1928

Bianium concavum Stunkard, 1930

B. plicatum (Linton, 1898) Stunkard, 1931

B. adplicatum Manter, 1940

Host: *Chilomycterus schoepfi*

Site: Intestine

Localities: Santa Rosa Island; Santa Rosa Sound

Lepocreadium trulla (Linton, 1907)

Linton, 1910

Synonym: *Distomum trulla* Linton 1907

Host: **Lutjanus blackfordi*

Site: Intestine

Localities: Santa Rosa Island; Pensacola Bay

Lepocreadium sogandaresi new species

Figure 3

Host: *Eupomacentrus leucostictus*

Site: Intestine

Locality: Panama City, Florida

Holotype: U.S.N.M. Helm. No. 70735

Description (based on five specimens):

Body, ovoid to pyriform, 0.765–1.360 long, 0.486–0.714 in greatest width at level of ovary. Entire tegument spinose. Eyespot pigment present. Oral sucker 0.055–0.085 long, 0.072–0.100 wide. Prepharynx 0.036–0.045 long. Pharynx 0.036–0.045 long, 0.045–0.063 wide. Esophagus about as long as pharynx. Cecal bifurcation midway between suckers; ceca extending to posterior fifth of body. Acetabulum near anterior and mid-body thirds, 0.070–0.100 in diameter; sucker ratio 1:0.9–1.1.

Genital pore sinistral, midway between acetabulum and cecal bifurcation. Genital atrium large. Testes in posterior half of body, two, tandem, contiguous, 0.090–0.117 long, 0.180–0.279 wide. External seminal vesicle globular to saccular; cirrus sac about $\frac{1}{2}$ body length, dextral to acetabulum in 3 specimens and sinistral in 2, extending posteriorly halfway to ovary and containing seminal vesicle in posterior third of sac, globular

pars prostatica and a long cirrus. Ovary anterodextral to testes, smooth in outline, globular to slightly irregular in shape, 0.063–0.090 in diameter. Seminal receptacle sinistral to, and level with, ovary. Uterus chiefly anterosinistral to testes, short, containing 15–23 eggs 54–60 by 26–36 microns. Vitelline follicles in two lateral rows extending from level of cecal bifurcation to posterior end of ceca. Excretory pore terminal at posterior end of body; vesicle tubular, extending to level of cecal bifurcation.

These specimens agree with the characters of *Lepocreadium bravoae* Lamothe, 1965 in Edwards and Nahhas' (1968) key to the genus. They differ from that species, however, in having a longer esophagus, less extensive vitellaria, especially in the posterior part of the body, somewhat smaller eggs ($54-60 \times 26-36$ compared with $64-72 \times 32-40 \mu$), and more anterior position of the genital pore.

Lepocreadium sogandaresi also bears some resemblance to *L. floridanus* Sogandares-Bernal and Hutton, 1959 and *L. opsanusi* Sogandares-Bernal and Hutton, 1960. It may be distinguished from the former chiefly by having an entire rather than lobed ovary, unlobed testes and the presence of a larger number of eggs in the uterus (15–23 compared with 2–5). *L. opsanusi* was described provisionally by Sogandares-Bernal and Hutton (1960) from *Opsanus beta*. Nahhas and Cable (1964) reported what they considered the same species, but smaller with smaller and fewer eggs, from *Calamus arcifrons* and *C. bajanado* in Jamaica. *L. sogandaresi* differs from *L. opsanusi* in its larger size, less anterior extent of vitellaria, tandem rather than oblique testes, sinistral rather than dextral position of the seminal receptacle, and ovary not contiguous with right cecum.

This species is named in honor of Dr. Franklin Sogandares-Bernal in recognition of his contributions to helminthology.

FAMILY MONORCHIIDAE Odhner, 1911

Lasiotocus lintoni (Manter, 1931)

Thomas, 1959

Synonyms: *Proctotrema lintoni* Manter, 1931

Genolopa lintoni (Manter, 1931)

Hopkins, 1941

Host: Orthopristis chrysopterus

Site: Intestine

Locality: Santa Rosa Island

Diplomonorchis leiostomi Hopkins, 1941

Synonym: Diplomonorchis micropogoni Nahhas and Cable, 1964

*Hosts: *Chasmodes saburrae, *Gobiosoma robustum, Leiostomus xanthurus, Micropogon undulatus and Monacanthus hispidus*

Site: Ceca and Intestine

Localities: Pensacola Bay; Santa Rosa Sound

The differences in size and shell thickness of eggs of worms taken from the various hosts are striking. The eggs are thick-shelled in specimens obtained from *Monacanthus hispidus* and *Chasmodes saburrae* but thin-walled in those from other hosts. Egg measurements are as follows: from *Chasmodes saburrae* (30–33 × 17–27 μ); *Gobiosoma robustum* (28–32 × 18–22 μ); *Leiostomus xanthurus* (20–30 × 14–20 μ); *Micropogon undulatus* (22–25 × 14–16 μ); *Monacanthus hispidus* (28–38 × 17–24 μ). Since these measurements overlap, and in the absence of other differences, it was decided to consider them all *D. leiostomi*.

Nahhas and Cable (1964) described four new species of *Diplomonorchis*, including *D. micropogoni*, from *Micropogon furnieri* and *Archosargus unimaculatus*. This species was distinguished from *D. leiostomi* by shorter ceca and extent of the uterus, features that vary with body contraction and degree of congestion of uterus, as evidenced in the present material. Overstreet (1969) observed similar variations and considered *D. micropogoni* Nahhas and Cable, 1964 a synonym.

Diplomonorchis floridensis Nahhas and Powell, 1965

Host: Symphurus plagiatus

Site: Intestine

Locality: Pensacola Bay

The presence of spines in the anterior portion of the pharynx and ceca distinguishes this species from others in the genus. Two specimens, one mature, the other immature, show these spines.

Chrisomon sp.

Host: Decapterus punctatus

Site: Intestine

Locality: Santa Rosa Island

Two specimens were recovered, but one was lost during processing. The characteristic features of this monorchiid genus include the large single testis that occupies a large portion of the hindbody, the irregularly lobed ovary, long esophagus and extensive vitellaria, characteristics shown in our remaining immature specimen. Two species are known in the genus: *C. tropicus* (Manter, 1940) Manter and Pritchard, 1961, from *Selar crumenophthalmus* in the Panama Pacific and *C. decapteri* Nahhas and Cable, 1964, from *Decapterus macarellus* in Curaçao, West Indies. The morphology and general topography of organs of our single immature specimen, as well as the presence in a related host, suggest that it is *C. decapteri*.

FAMILY OPECOELIDAE Ozaki, 1925

Opecoeloides fimbriatus (Linton, 1934)

Sogandares-Bernal and Hutton, 1959

Synonym: Cymbephallus fimbriatus Linton, 1934

Host: Menticirrhus americanus

Site: Intestine

Locality: Pensacola Bay

FAMILY PLEORCHIIDAE Poche, 1926

Pleorchis americanus Lühe, 1906

Synonyms: Distomum polyorchis Linton, 1901 nec Stossich, 1888

Distoma molle (Leidy, 1856)

Stiles and Hassal, 1894

Pleorchis mollis (Leidy, 1856)

Stiles, 1896

P. lintoni Yamaguti, 1938

Polyorchis molle (Leidy, 1856)

Monticelli, 1896

Hosts: Cynoscion arenarius and C. nebulosus

Site: Intestine

Locality: Santa Rosa Sound

FAMILY ZOOGONIDAE Odhner, 1911

Diphtherostomum anisotremi Nahhas and Cable, 1964

Host: Lactophrys quadricornis

Site: Intestine

Locality: Santa Rosa Sound

ALPHABETICAL HOST-PARASITE LIST

- Bairdiella chrysura* (Lacépède), silver perch
Siphodera vinaledwardsii
- Balistes capriscus* Gmelin, gray triggerfish
Apocreadium balistis
Neoapocreadium coili
- Caranx crysos* (Mitchill), blue runner
Ectenurus virgulus
Ectenurus yamagutii
Parabemius merus
- Caranx hippos* (Linnaeus), crevalle jack
Bucephalus varicus
Stephanostomum megacephalum
Ectenurus yamagutii
- Centropristis melanus* Ginsburg, southern sea bass
Sterrhurus musculus
- Chasmodes saburrae* Jordan and Gilbert, Florida blenny
Diplomonorchis leiostomi
- Chilomycterus schoepfi* (Walbaum), striped burrfish
Diploproctodaem plicatum
- Cynoscion arenarius* Ginsburg, sand seatrout
Pleorchis americanus
- Cynoscion nebulosus* (Cuvier), spotted seatrout
Pleorchis americanus
- Decapterus punctatus* (Agassiz), round scad
Monascus filiformis
Chrisomon sp.
- Diplectrum formosum* (Linnaeus), sand perch
Lecithochirium parvum
- Eupomacentrus leucostictus* (Müller and Troschel), Beaugregory
Lepocreadium sogandaresi
- Gobiosoma robustum* Ginsburg, code goby
Diplomonorchis leiostomi
- Lactophrys quadricornis* (Linnaeus), cowfish
Diphtherostomum anisotremi
- Lagodon rhomboides* (Linnaeus), pinfish
Ectenurus yamagutii
- Leiostomus xanthurus* Lacépède, spot
Diplomonorchis leiostomi
- Lepophidium profundorum* (Gill), cuskeel
Sterrhurus musculus
- Lutjanus blackfordi* Goode and Bean, red snapper
Lepocreadium trulla
Sterrhurus musculus
- Menticirrhus americanus* (Linnaeus), southern kingfish
Opecoeloides fimbriatus
- Micropogon undulatus* (Linnaeus), Atlantic croaker
Diplomonorchis leiostomi
- Monacanthus hispidus* (Linnaeus), planehead filefish
Diplomonorchis leiostomi
- Mycteroperca microlepis* (Goode and Bean), gag
 immature hemiurids
- Ogcocephalus radiatus* (Mitchill), polka-dot batfish
Sterrhurus musculus
- Opisthognathus fasciatus* Longley, banded jawfish
 trematode lost
- Opsanus beta* (Goode and Bean), Gulf toadfish
Sterrhurus musculus
- Orthopristis chrysopterus* (Linnaeus), pigfish
Lasiotocus lintoni
- Porichthys porosissimus* (Cuvier), Atlantic midshipman
Sterrhurus musculus
- Poronotus burti* (Fowler), Gulf butterfish
Lecithocladium excisum
- Seriola zonata* (Mitchill), banded rudderfish
Bucephalus gorgon
- Symphurus plagiusa* (Linnaeus), blackcheek tonguefish
Diplomonorchis floridanus
- Synodus foetens* (Linnaeus), inshore lizardfish
Lecithochirium synodi
L. mecosaccum
- Trichiurus lepturus* Linnaeus, Atlantic cutlassfish
Bucephalus brevitentaculatus
Lecithochirium microstomum

LIST OF FISHES NEGATIVE FOR DIGenea

The number in parentheses represents number of individuals examined.

Ancylopussetta quadrocellata Gill (1), ocellated flounder

Antennarius ocellatus (Bloch and Schneider) (1) ocellated frogfish

Astroscoptes y-graecum (Cuvier and Valenciennes) (1), southern stargazer

Elops saurus Linnaeus (1), ladyfish

Equetus acuminatus (Bloch and Schneider) (3), cubbyu

Euthynnus alletteratus (Rafinesque) (1), little tuna

Halichoeres bivittatus (Bloch) (1), slippery dick

Hypsoblennius bentzi (LeSueur) (1), feather blenny

Paralichthys lethostigma Jordan and Gilbert (2), southern flounder

Prionotus tribulus Cuvier (1), bighead sea-robin

Rachycentron canadum (Linnaeus) (1), cobia

Rypticus bistrispinus (Mitchill) (1), soapfish

Scomberomorus maculatus (Mitchill) (1), Spanish mackerel

Serranellus subligarius (Cope) (2), belted sandfish

Strongylura marina (Walbaum) (1), Atlantic needlefish

Syrticus affine (Gunther) (2), pearlfish

Urophycis floridanus (Bean and Dresel) (1), southern hake

Vomer setapinnis (Mitchill) (1), Atlantic moonfish

LITERATURE CITED

- CORKUM, K. 1967. Bucephalidae (Trematoda) in fishes of the northern Gulf of Mexico: *Bucephalus* Baer, 1827. Trans. Amer. Microscop. Soc. 86:44-49.
- DOLLFUS, R. Ph. 1947. Sur *Monascus filiiformis* (Rudolphi, 1819) A. Looss, 1907 trematode de l'intestin de *Cepola rubescens* (L.) en Méditerranée. Ann. Parasitol. 22: 319-323.
- EDWARDS, S. R., and F. M. NAHHAS. 1968. Some endoparasites of fishes from the Sacramento-San Joaquin Delta, California. California Fish and Game 54:247-256.
- FISCHTHAL, J. H., and R. E. KUNTZ. 1963. Trematode parasites of fishes from Egypt. Part IV. A redescription of *Monascus typicus* (Odhner, 1911) (Fellodistomidae). Proc. Helm. Soc. Washington 30:177-182.
- FISCHTHAL, J. H., and J. D. THOMAS. 1968. Digenetic trematodes of some freshwater and marine fishes from Ghana. Proc. Helm. Soc. Washington 35:126-140.
- MANTER, H. W. 1954. Some digenetic trematodes from fishes of New Zealand. Trans. Roy. Soc. New Zealand 82:475-568.
- NAHHAS, F. M., and R. M. CABLE. 1964. Digenetic and aspidogastroid trematodes from marine fishes of Curaçao and Jamaica. Tulane Stud. Zool. 11:169-228.
- NAHHAS, F. M., and E. C. POWELL. 1965. Monorchidiidae (Trematoda) from fishes of Apalachee Bay, Gulf of Mexico. J. Parasitol. 51:16-20.
- NAHHAS, F. M., and R. B. SHORT. 1965. Digenetic trematodes of marine fishes from Apalachee Bay, Gulf of Mexico. Tulane Stud. Zool. 12:39-50.
- OVERSTREET, R. M. 1969. Digenetic trematodes of marine teleost fishes from Biscayne Bay, Florida. Tulane Stud. Zool. and Bot. 15: 119-176.
- SOGANDARES-BERNAL, F. 1959. Digenetic trematodes of marine fishes from the Gulf of Panama and Bimini, British West Indies. Tulane Stud. Zool. 7:69-117.
- SOGANDARES-BERNAL, F., and R. F. HUTTON. 1960. The status of some marine species of *Lepocreadium* Stossich, 1904 (Trematoda: Lepocreadiidae) from the North American Atlantic. Lib. Hom. E. Cabellero y C. (Mexico):275-283.