STUDIES ON HELMINTH PARASITES OF THE COAST OF FLORIDA I. DIGENETIC TREMATODES OF MARINE FISHES FROM TAMPA AND BOCA CIEGA BAYS WITH DESCRIPTIONS OF TWO NEW SPECIES. 1.[1]

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INTRODUCTION

The trematodes reported herein were collected from marine fishes captured by the authors, Dr. V. G. Springer, Messrs. K. Woodburn and D. J. Greeley of the Florida State Board of Conservation Marine Laboratory.

Further studies of the diseases and helminth parasites of marine fishes, birds, and mammals shall be published in connection with research currently being supported by the Florida State Board of Conservation.

Acknowledgments are extended to Dr. V. G. Springer for the identification of some fish hosts; to the U. S. Fish and Wildlife Service, Pass-a-Grille, Florida, through whose courtesy a camera-lucida was made available while this laboratory was obtaining said instrument; and to the Lerner Marine Laboratory of the American Museum of Natural History, Bimini, Bahamas, for support received while one of us (F.S.) collected trematodes which were used to give additional information of some species being compared in this paper.

Unless otherwise cited, all measurements are in millimeters.

SYSTEMATICS

Family BUCEPHALIDAE POCHE, 1907

1. *Bucephalus varicus* Manter, 1940

Host. Caranx hippos (Linn.): Common jack; family Carangidae
Incidence of Infection. In 1 of 1 host
Location. Mainly close to pyloric junction and a few scattered specimens along length of entire intestine
Locality. Bayboro Harbor, Tampa Bay, (new locality record) Florida
Discussion. Manter (1940) pictured variation of tentacles and displa-

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cement of organs in preserved *B. varicus* from the Tropical American Pacific and Tortugas, Florida. We have studied live *B. varicus* under slight coverslip pressure and can confirm the variations observed by Manter (1940).

B. varicus has been reported from no less than eleven different carangid species from Okinawa, the Red Sea, Tortugas, Florida, and the Tropical American Pacific. The only other record of *B. varicus* from *Caranx hippos* is by Bravo and Sogandares (1957) from the Pacific Coast of Mexico. This record is the first from *Caranx hippos* in the Atlantic Ocean and extends the northernmost distribution of *B. varicus* in the Gulf of Mexico.

Family LEPOCREADIIDAE NICOLL, 1935

2. *Lepocreadium floridanus* n. sp.

(Figure 1)

Host. Lagodon rhomboides (Linn.); pinfish; family Sparidae

Incidence of Infection. In 4 of 4 hosts

Location. Pyloric ceca and anterior ¼ intestine

Locality. Bayboro Harbor, Tampa Bay, Florida

Diagnosis. (Based on 21 specimens): Body elongate, notched at posterior end, 0.754 to 1.092 long by 0.364 to 0.520 wide. Cuticle completely spined. Forebody 0.218 to 0.354 long. Posterior body 0.500 to 0.664 long. Oral sucker subterminal, 0.081 to 0.100 long by 0.091 to 0.100 wide. Acetabulum pre-equatorial, 0.091 to 0.100 long by 0.091 to 0.100 wide. Sucker ratio from 1:0.91 to 1.0. Prepharynx appearing to be absent to 1¼ longer than pharynx, depending upon contraction of forebody. Pharynx 0.045 to 0.054 long by 0.054 to 0.064 wide. Esophagus appearing to be absent or equal in length to pharynx, depending upon contraction of forebody. Ceca narrow, extending to near posterior end of body, ending blindly. Genital pore sinistral to midline of body, immediately preacetabular. Testes two, median and intercecal, post-equatorial, lobed, in series, in contact with each other; anterior testis usually about twice wider than long and less lobate than posterior testis, 0.063 to 0.109 long by 0.118 to 0.191 wide; posterior testis longer than wide, usually with a terminal posterior notch, 0.091 to 0.127 long by 0.118 to 0.191 wide. Cirrus sac extending posteriorly from genital pore to midway between acetabulum and ovary to almost in contact with ovary or anterior

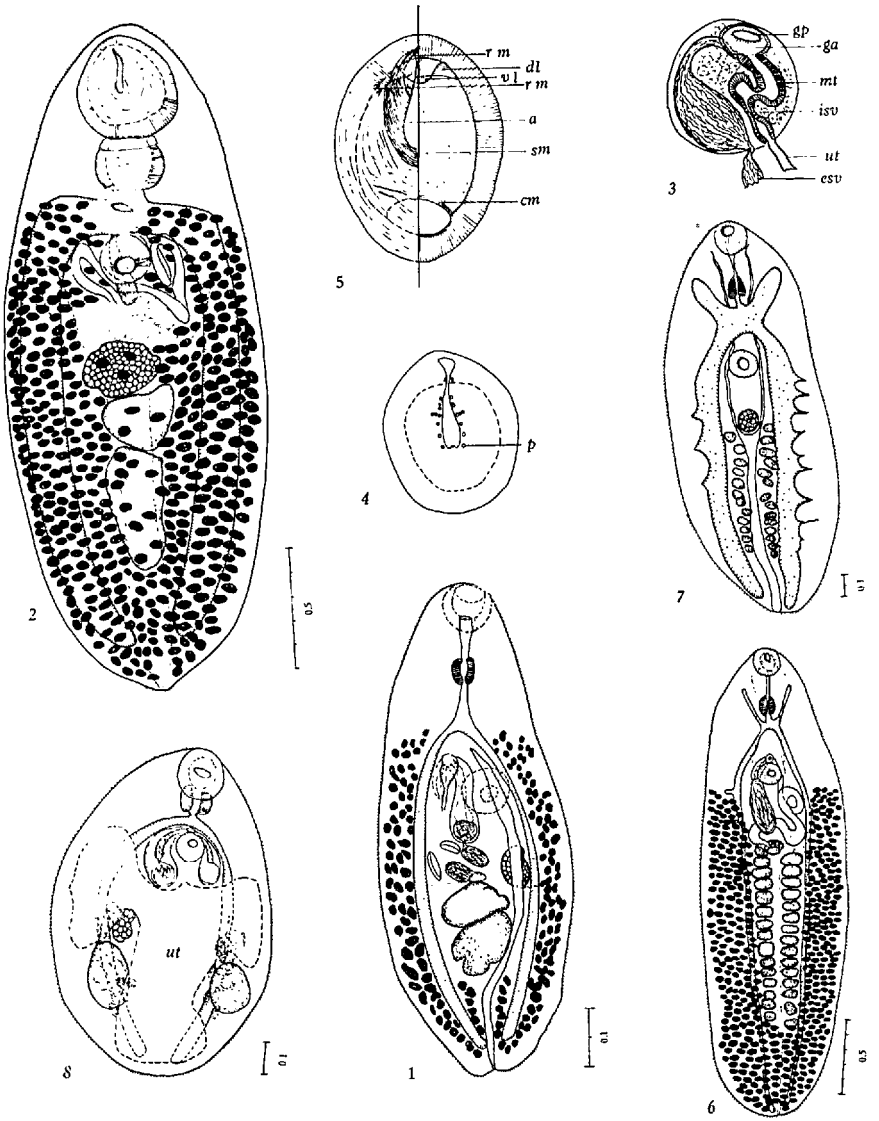

Fig. 1. *Lepocreadium floridanus;* dorsal view. Fig. 2. *Megasolena archosargi,* ventral view. Fig. 3. Same; freehand sketch of hermaphroditic sac; ventral view. Fig. 4. Same; freehand sketch of ventral surface of oral sucker showing arrangement of papillae. Fig. 5. Same; freehand sketch of oral sucker; optical section; left side showing arrangement of muscles on sucker surface and right side showing internal arrangement of lobes. Fig. 6. *Pleorchis americanus;* ventral view of mature specimen. Fig. 7. Same; ventral view of immature specimen. Fig. 8. *Diplomonorchis leiostomi;* ventral view; outline of area covered by uterus in dotted lines.

a, sucker aperture; cm, circular muscle; esv, external seminal vesicle; dl, dorsal lobe; ga, genital atrium; gp, genital pore; isv, internal seminal vesicle; mt, metraterm; p, papilla; rm, retractor muscle; ut, uterus; vl, ventral lobe (camera lucida drawings except where noted; projected scales in millimeters).

testis, depending upon contraction of posterior body; with muscular unspined cirrus in anterior 3/4 sac and internal seminal vesicle in distal ¼ sac. External seminal vesicle present, not surrounded by prostatic cells. Ovary usually with three lobes, sometimes with only one lobe, depending upon angle of observation; always dextral to median line of specimen and in contact with right cecum, anterior to or level with foretestis, 0.063 to 0.091 by 0.063 to 0.072 wide. Seminal receptacle clubshaped, median, immediately pretesticular. Vitellaria extending from level of pharynx or from level of crural junction, depending upon contraction of forebody, to posterior end of body; lateral to ceca, entering intercecal posttesticular space with one row of follicles on each side of excretory vesicle. Vitelline receptacle median, immediately pretesticular. Uterus short, entirely pretesticular, intercecal; entering muscular metraterm which is sinistral to cirrus sac and half as long. Excretory vesicle tubular, from between median posterior notch of body to level of crural junction; between testes and dextral cecum, partially overlapping ovary and acetabulum dorsally on its anterior course.

The name *floridanus* is to indicate the type locality, Florida.

Discussion. There are fifteen species known in the genus *Lepocreadium* Stossich, 1904. These species are as follows: *L. album* (Stossich, 1890) Stossich, 1904; *L. archosargi* Pearse, 1949; *L. bimarinum* Manter, 1940; *L. clavatum* (Ozaki, 1932) Yamaguti, 1938; *L. elongatum* (Nagaty, 1942) Manter, 1945; *L. incisum* Hanson, 1955; *L. micropogoni* Pearse, 1949; *L. ovale* Manter, 1931; *L. pegorchis* (Stossich, 1901) Stossich, 1904; *L. pyriforme* (Linton, 1899) Linton, 1940; *L. retrusum* Linton, 1940; *L. setiferoides* (Miller and Northup, 1926) Martin, 1938; *L.* sp. Szidat, 1950; *L. trulla* (Linton, 1907) Linton, 1910; and *L. trullaforme* Linton, 1940.

The genus *Lepocreadium* Stossich, 1904, is closely related with *Aephidogenes* Nicoll, 1915; *Allolepidapedon* Yamaguti, 1950; *Dermadena* Manter, 1945; *Lepidapedon* Stafford, 1904; *Lepocreadioides* Yamaguti, 1936; *Neolepidapedon* Manter, 1954; *Opechona* Looss, 1907 (Syns.: *Pharyngora* Lebour, 1908; *Prodistomum* Linton, 1910); *Opechonoides* Yamaguti, 1940; and *Pseudocreadium* Layman, 1930 (Syns.: *Hypocreadium* Ozaki, 1936, *Leptocreadium* Ozaki, 1936). In some instances there is a narrow gap separating these genera. These lepocreadiid genera are characterized by possessing a cirrus sac with an external seminal vesicle, suckers without papillae or projections, and unmodified forebodies (viz. *Bianium* Stunkard, 1931). The fol-

lowing key will serve to separate *Lepocreadium* from closely related genera.

KEY TO *LEPOCREADIUM* AND CLOSELY RELATED GENERA

1. External seminal vesicle entirely or partially surrounded by prostate gland cells 2
1¹. External seminal vesicle never surrounded by prostate gland cells 5
2. Metraterm and cirrus sac not opening into common genital atrium, instead opening separately to outside ..... *Aephidogenes*
2¹. Metraterm and cirrus sac opening into common genital atrium 3
3. Uroproct present ..... *Allolepidapedon*
3¹. Uroproct absent, instead ceca ending blindly 4
4. Prostate cells of external seminal vesicle without surrounding membrane ..... *Neolepidapedon*
4¹. Prostate cells of external seminal vesicle with surrounding membrane ..... *Lepidapedon*
5. Epithelial esophagus present, prostate gland cells partially surrounding cirrus sac ..... *Opechona*
5¹. Epithelial esophagus absent, prostate gland cells never surrounding cirrus sac 6
6. Testes side by side 7
6¹. Testes not side by side, either in series or oblique 8
7. Ventral surface of body with glandular projections which are sometimes seen with considerable difficulty in whole mounts ..... *Dermadena*
7¹. Ventral surface of body without glandular projections .... *Pseudocreadium*
8. Ceca ending at testes ..... *Opechonoides*
8¹. Ceca ending at posterior end of body 9
9. Genital pore in vicinity of acetabulum, usually dextral to midline of body and immediately preacetabular ..... *Lepocreadium*
9¹. Genital pore never in vicinity of acetabulum, usually dextral and lateral to oral sucker ..... *Lepocreadioides*

The anterior extent of the excretory vesicle has been described for the following species of *Lepocreadium*: *L. album; L. archosargi; L. bimarinum; L. clavatum; L. micropogoni;* and *L. setiferoides*. Manter (1940) was not sure of the anterior extent of the excretory vesicle of *L. bimarinum* and stated that it appeared to extend to the anterior testis. One of us, (F. S.), has one specimen of *L. bimarinum* collected from *Pimelotopon pulcher* (Ayres), type host, by W. R. Montgomery in La Jolla, California, and the excretory vesicle appears to terminate dorsal to the anterior testis as recorded by Manter (1940). In addition, a study of specimens identified as *L. trulla* from *Ocyurus chrysurus* (Bloch), *Lutjanus analis* (Cuv. & Val.) and *Lutjanus buccanella* (Cuv. & Val.), collected by one of us (F. S.) in Bimini, B.W.I., indicates that the excretory bladder never extends anterior to the posterior border of the ovary, usually only to the anterior testis.

The anterior extent of the excretory vesicle is not known for the

following species: *L. incisum; L. ovale; L.* sp. Szidat, 1950; *L. retrusum;* and *L. trullaforme.*

L. floridanus differs from *L. album; L. archosargi; L. micropogoni, L. ovale, L. trullaforme, L. bimarinum, L. pyriforme* and *L. setiferoides* by possessing a lobed as compared with unlobed ovary. *L. floridanus* further differs from *L. archosargi, L. micropogoni,* and *L. bimarinum* by possessing an excretory vesicle which extends to the crural junction as compared with excretory vesicle never extending anterior to ovary; from *L. ovale* by possessing testes in contact and in series, and vitellaria extending to crural junction in extended specimens as compared with testes oblique and vitellaria extending to midpharynx in an apparently extended specimen; from *L. trullaforme* by possessing testes in series and in contact, and narrower body, as compared with testes oblique, not in contact and a much wider body; from *L. pyriforme,* from *Palinurichthys perciformis,* by lacking a spiny cirrus, and ovary dextral to midline (a constant character in all 21 of our specimens), as compared with cirrus spined and ovary median; from *L. setiferoides* by possessing an excretory vesicle which extends anterior to acetabulum and testes in contact and in series as compared with excretory vesicle which extends to acetabulum and testes oblique and not in contact.

In connection with species of *Lepocreadium* with unlobed ovaries, *L. archosargi* and *L. micropogoni* are probably synonyms of *L. ovale.* A restudy of the type specimens of all three species would be necessary in order to confirm this point. Linton (1940) apparently has a heterogeneous assemblage of species listed under *Lepocreadium pyriforme.* Linton's (1940; Figure 48) shows prostate cells surrounding the posterior end of the cirrus sac and it may well be that he has confused a species of *Opechona* with *Lepocreadium.* Linton (1940) does not mention the presence of an epithelial esophagus. Here again a study of Linton's material is necessary.

L. floridanus resembles *L. clavatum, L. elongatum, L. incisum* and *L. trulla* by possessing a lobed ovary. *L. floridanus* differs from *L. clavatum* and *L. trulla* by possessing an excretory vesicle which extends anteriorly to the level of the crural junction as compared with excretory vesicle never extending anterior to acetabulum (*L. clavatum*) or to anterior testis or ovary (*L. trulla*); from *L. incisum* by lacking an external seminal vesicle which extends to posterior testis; from *L. elongatum* by possessing testes in series as compared to testes

oblique; from *L. retrusum* by possessing vitellaria which extend anteriorly past acetabulum as compared with vitellaria never extending to acetabulum.

Family ACANTHOCOLPIDAE Lühe, 1909

3. *Pleorchis americanus* Lühe, 1906

Host. Cynoscion nebulosus (Cuv. & Val.); spotted squeteague; family Sciaenidae

Incidence of Infection. In 1 of 1 host

Location. Intestine, close to pyloric cecae

Locality. Bayboro Harbor, Tampa Bay, Florida; new locality record

Discussion. The presence of *P. americanus* in Tampa Bay establishes a new locality record and extends the southern range of the species. Sparks (1958) has reported *P. americanus* from Grand Isle, Louisiana.

P. americanus was formerly known from *Cynoscion* spp. in Woods Hole, Massachusetts, and from Beaufort, North Carolina, under the name of *Distomum polyorchis* and *Pleorchis polyorchis.* Lühe (1906) recognized specific differences between Linton's (1901) misidentified taxon, "*Distomum polyorchis* Stoss." from *Cynoscion regalis* in Woods Hole, Massachusetts, and named *P. americanus* for this species of Linton. Manter (1931) unaware of Lühe's new name for Linton's "*Distomum polyorchis* Stoss.", identified the American Atlantic *Pleorchis* as "*Pleorchis polyorchis* (Stoss.)." Manter (1949) later clarified the nomenclature and status of the taxon misidentified by both Linton (1901) and Manter (1931). In addition, Manter (1949) pointed out that *Pleorchis lintoni* Yamaguti, 1938, a name given to Linton's (1901) "*Distomum polyorchis* Stoss." through unawareness of Lühe (1906), was a synonym of *P. americanus.* Yamaguti (1942) transferred *Pleorchis oligorchis* Johnston, 1913 to the genus *Schistorchis* Lühe, 1906. In connection with the genus *Schistorchis,* we would like to point out that the genus *Megacreadium* Nagaty, 1956 is a synonym of *Schistorchis* Lühe 1906. The species *Megacreadium tetraodontis* Nagaty, 1956 becomes *Schistorchis tetraodontis* (Nagaty, 1956) n. comb. Both *Schistorchis carneus* Lühe, 1906 and *S. tetraodontis* are found in the fish genus *Tetraodon* from the same general area of the world. The presence of eight testes separates *S. tetraodontis* from other species of *Schistorchis.*

Family HAPLOPORIDAE Nicoll, 1914

4. *Megasolena archosargi* n. sp.

(Figures 2 to 5)

Host. Archosargus probatocephalus (Walbaum); sheepshead; family Sparidae

Incidence of Infection. In 3 of 3 hosts

Location. Mid-intestine

Locality. Bayboro Harbor, Tampa Bay, Florida

Diagnosis. (Based on one sectioned specimen and five whole mounts.) Body robust, elongate, flattened, broadest at middle; 2.21 to 2.79 long by 0.99 to 1.14 wide. Forebody from 0.70 to 0.89 long. Posterior body from 1.30 to 1.69 long. Cuticle of anterior 1/3 body heavily spined; spines decreasing in size towards posterior end of body to increase slightly in size close to posterior end of body. Darkly pigmented flakes which may represent "eyespots" lateral to posterior edge of oral sucker and pharynx. Oral sucker subterminal, 0.36 to 0.42 long by 0.33 to 0.46 wide; with one ventral and dorsal median internal lobe at anterior end (Fig. 5); with papillae surrounding sucker aperture (Fig. 4); with sucker aperture controlled by special superficial musculature (Fig. 5). Acetabulum approximately in anterior 1/3 body; 0.17 to 0.21 long by 0.18 to 0.23 wide. Sucker ratio from 1: 0.55 to 0.79. Prepharynx lacking muscular ring, approximately ½ to 7/8 length of pharynx. Pharynx with anterior band of circular muscles, pyriform in shape; 0.18 to 0.23 long by 0.25 to 0.33 wide. Esophagus approximately ½ length of pharynx. Ceca voluminous, extending to near posterior end of body, ending blindly. Genital pore median between pharynx and acetabulum. Testes two, intercecal, postequatorial, in series and in contact with each other; anterior testis 0.21 to 0.34 long by 0.26 to 0.36 wide; posterior testis usually about twice length of anterior testis, 0.39 to 0.51 long by 0.26 to 0.36 wide. Hermaphroditic sac extending dorsally from genital pore, in contact with or slightly overlapping anterior border of acetabulum. Internal seminal vesicle connecting with metraterm proximal to genital atrium (Fig. 3); surrounded by prostate cells. External seminal vesicle extending from posterior tip of hermaphroditic sac dorsal to acetabulum, to between acetabulum and ovary or almost in contact with ovary. Ovary slightly lobed, median and usually in contact with anterior testis, 0.21 to 0.23 long by 0.26 to 0.33 wide. Mehlis' gland large,

occupying most of the intercecal space between half distance from ovary to acetabulum. Laurer's canal not observed. Vitellaria completely surrounding body, laterally, dorsally and ventrally from level of hermaphroditic sac to posterior end of body. Uterus preovarian, intercecal, entering muscular metraterm in hermaphroditic sac on sinistral side. Eggs 73.5 to 88.2 microns long by 42 to 48.3 microns wide. Excretory vesicle Y-shaped, bifurcating at posterior edge of ovary, with branches extending dorsally and laterally to level of mid-acetabulum. Lymphatic vessels present but exact number and arrangement are not clearly visible.

The name *archosargi* is for the host *Archosargus probatocephalus. Discussion. Megasolena archosargi* is closely related to *Megasolena estrix* Linton, 1910 from which it differs by lacking a prepharyngeal muscular ring. The absence of this prepharyngeal muscular ring would perhaps be considered a generic character. One of us (F. S.) has specimens of a new species of *Megasolena* from the Gulf of Panama, which possesses a much reduced muscular collar. The status of the species of *Megasolena* shall be more fully discussed when a manuscript one of us, (F. S.), has prepared on trematodes of marine fishes of the Gulf of Panama and Bimini, B.W.I., is published.

Manter (1957) has presented a strong argument to show that the Haploporidae Nicoll, 1914, Waretrematidae Srivastava, 1939, and Megasolenidae Skrjabin, 1942 are synonyms. All three families possess a hermaphroditic sac and reduced, follicular or more or less tubular vitellaria. There appears to be close intergradation of genera in these families. Until such time as life-cycle studies indicate the opposite, we shall retain Manter's (1957) views regarding the families Waretrematidae and Megasolenidae as synonyms of the Haploporidae.

In connection with Manter's (1957) Table III (p. 191), we would like to point out that the presence or absence of eggs, *en utero,* containing oculate miracidia is dependent upon the maturity of the egg in some species and should be used with caution. Szidat (1954) indicates that only the mature eggs of *Saccocoeloides elongatus* Szidat, 1954 possess miracidia with eyespots. In addition, *Dicrogaster contractus* Looss, 1902, *Haploporus lateralis* Looss, 1902, *Megacoelium plecostomi* Szidat, 1954, and perhaps one other species of haploporid *sensu* Nicoll, 1914 are described as possessing eggs lacking oculate miracidia.

The Haploporidae *sensu* Nicoll, 1914 may have connections with the Monorchiidae. It would not be difficult to visualize that a mem-

brane surrounding an unspined male and female genitalia of a monorchiid would produce a haploporid. In addition, most haploporids *sensu* Nicoll, 1914 and monorchiids share the following characters, one testis, reduced vitellaria, spined cuticle, ceca which frequently terminate in the vicinity of the testis, and uterus extending behind testis. The uterus of the Megasolenidae is usually preovarian.

Family MONORCHIIDAE Odhner, 1911

5. *Diplomonorchis leiostomi* Hopkins, 1941

(Figure 8)

Hosts. Bairdiella chrysurus (Lacépède); silver perch; new host record; family Sciaenidae; and *Lagodon rhomboides* (Linn.); pinfish; new host record; family Sparidae

Incidence of Infection. In 1 of 1 *B. chrysurus* and 1 of 4 *L. rhomboides*

Location. Intestine, exact location not noted

Locality. B. chrysurus from Cabbage Key, Boca Ciega Bay, and *L. rhomboides* from Bayboro Harbor, Tampa Bay, Florida; new locality record

Discussion. D. leiostomi has been previously reported from *Leiostomus xanthurus* and sometimes *Orthopristis chrystopterus,* in Beaufort, North Carolina, by Hopkins (1914). This record extends the southern range of *D. leiostomi* and establishes two new host records. Sparks (1958) has reported *D. leiostomi* from Grand Isle, Louisiana.

Family FELLODISTOMATIDAE Nicoll, 1913

6. *Steringotrema corpulentum* (Linton, 1905) Manter, 1931

(Figure 9)

Host. Lagodon rhomboides (Linn.); pinfish; family Sparidae

Incidence of Infection. In 1 of 4 hosts

Location. Intestine proximal to pyloric ceca

Locality. Bayboro Harbor, Tampa Bay, Florida; new locality record

Discussion. Linton (1905) originally described *S. corpulentum* from pinfishes in Beaufort, North Carolina. Manter (1931) listed, added a correction to Linton's description, and pictured, but did not redescribe *S. corpulentum.* To our knowledge, *S. corpulentum* has not been reported from any area other than Beaufort, North Carolina.

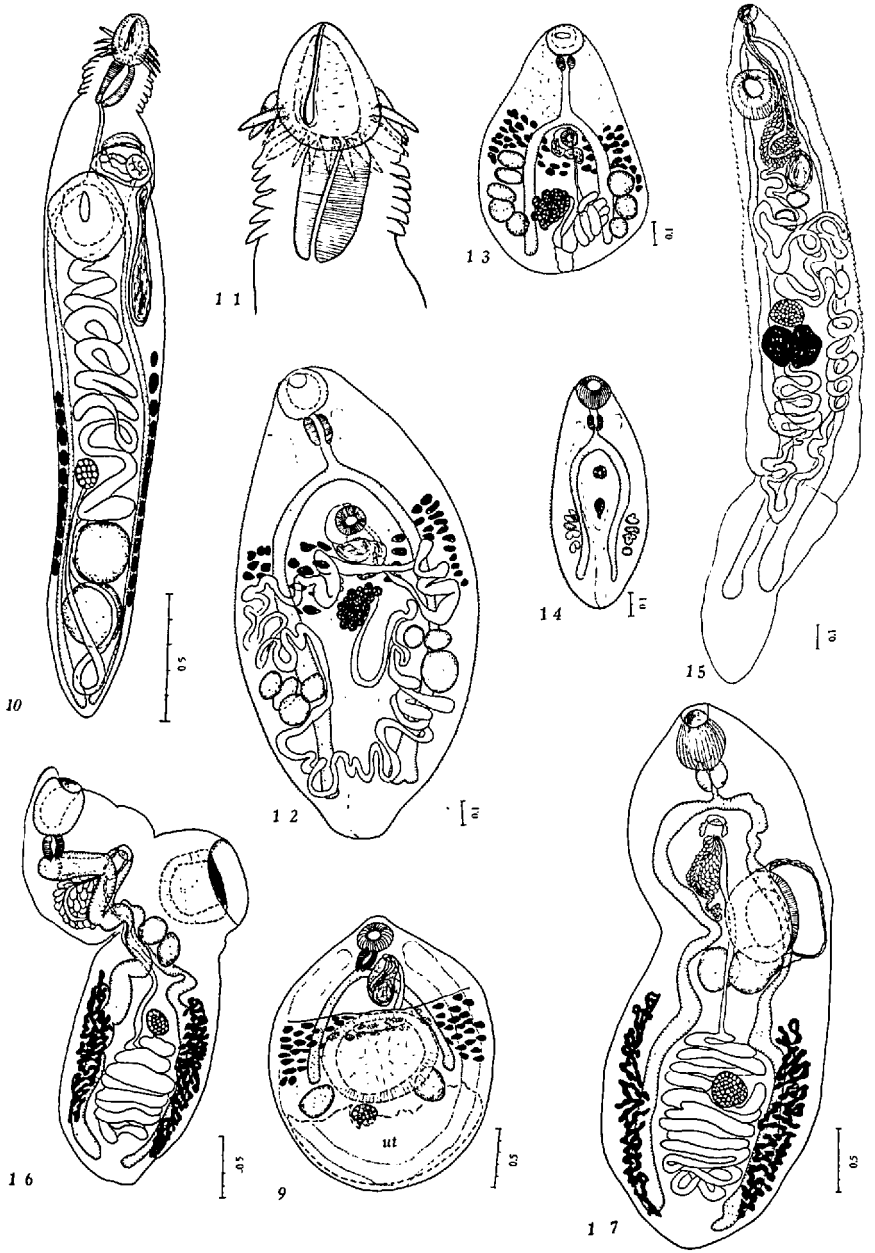

Fig. 9. *Steringotrema corpulentum;* ventral view. Fig. 10. *Tergestia pectinata,* ventral view of entire specimen. Fig. 11. Same; camera lucida drawing of anterior end of body with sucker tentacles sketched in. Fig. 12. *Siphodera vinaledwardsi;* ventral view of mature, normally extended specimen. Fig. 13. Same; showing variation due to contraction; ventral view of mature specimen with extended forebody and contracted hindbody. Fig. 14. Same; ventral view of immature specimen. Fig. 15. *Parahemiurus merus;* ventral view. Fig. 16. *Sclerodistomum sphoeroides;* twisted specimen with forebody in lateral view and posterior body in ventral view. Fig. 17. Same; ventral view.

a, sucker aperture; cm, circular muscle; esv, external seminal vesicle; dl, dorsal lobe; ga, genital atrium; gp, genital pore; isv, internal seminal vesicle; mt, metraterm; p. papilla; rm, retractor muscle; ut, uterus; vl, ventral lobe (camera lucida drawings except where noted; projected scales in millimeters).

The genital pore in well extended specimens of *S. corpulentum* is located at cecal bifurcation as pictured by Manter (1931). When the forebody is much contracted, the genital pore may vary in position, sometimes appearing to be proximal to the posterior border of oral sucker.

7. *Tergestia pectinata* (Linton, 1905) Manter, 1940

(Figures 10 to 11)

Host. Caranx crysos (Mitchell); hard-tailed jack; new host record; family Carangidae

Incidence of Infection. In 1 of 1 host

Location. Intestine, exact location not observed

Locality. Bayboro Harbor, Tampa Bay (new locality record), Florida

Discussion. T. pectinata was distinguished from *T. laticollis* (Rud. 1819) Odhner, 1911 on the basis of sucker ratio 1:2 as compared with 1:1 in *T. laticollis* by Manter (1947). Manter (1947) mentions the sinuosity of the seminal vesicle of *T. pectinata* as an additional distinguishing character. The specimen figured here (Fig. 10) differs by possessing a seminal vesicle which is so swollen with sperm that no convolutions are apparent.

T. pectinata is previously known from Woods Hole, Massachusetts, Beaufort, North Carolina (type locality), and Tortugas, Florida. The occurrence of *T. pectinata* in *Caranx crysos* from Tampa Bay is the northernmost distribution in the Gulf of Mexico and a new host record.

Family CRYPTOGONIMIDAE Ciurea, 1933

8. *Siphodera vinaledwardsi* (Linton, 1901) Linton, 1910

(Figures 12 to 14)

Host. Opsanus beta (Goode and Bean); toadfish; new host record; family Batrachoidiidae

Incidence of Infection. In 6 of 8 hosts

Location. Anterior ¼ intestine

Locality. Mullet Key, Boca Ciega Bay (new locality record), Florida

Discussion. S. vinaledwardsi has been reported from the following localities: Woods Hole, Massachusetts, by Linton (1901), Manter (1926), and Cable and Hunnienen (1942); from Bermuda by Linton (1908) and Hanson (1950); from Beaufort, North Carolina, by Linton (1905) and Manter (1931); from Tortugas, Florida, by Linton

(1910) and Manter (1947). Cable (1956) reported a cercaria from Puerto Rico which "... is so similar to the cercaria of *Siphodera vinaledwardsi* that it seems certain to be the larva of what may be the same trematode found in fishes seined in shallow water." The present record is the northernmost in the Gulf of Mexico.

Figure 12 shows a specimen of *S. vinaledwardsi* in which the forebody is extended and the hindbody somewhat contracted. Variation in the number of testes was also encountered. The normal number of testes is apparently four on each side of the body. Sometimes a specimen may have three testes on one side and from four to five on the other side of the body.

The present indications are that *S. vinaledwardsi* possesses little host specificity, being known from no less than five host species of the families Batrachoidiidae, Lutjanidae, and Pomadasyidae, mainly carnivorous fishes.

Family HEMIURIDAE Lühe, 1901

9. *Parahemiurus merus* (Linton, 1910) Woolcock, 1935

(Figure 15)

Hosts. Harengula pensacolae (Goode and Bean); new host record; family Clupeidae; *Urophycis floridanus* Dean and Dresel; new host record, family Gadidae

Incidence of Infection. In 2 of 2 *H. pensacolae* and in 1 of 2 *U. floridanus.*

Location. Stomach of all hosts

Locality. H. pensacolae from Bayboro Harbor, Tampa Bay (new locality record), and *U. floridanus* from Bird Key, Boca Ciega Bay (new locality record), Florida

Discussion. U. floridanus enters the shallow coastal waters of Western Florida during the winter months, possibly acquiring *P. merus* here. *H. pensacolae* is apparently a year around resident of the coast of Florida.

P. merus grew to a longer size in *H. pensacolae* than in *U. floridanus* although intermediate conditions occur in our material. The egg sizes of *P. merus* from *H. pensacolae* and *U. floridanus* agree and appear to be constant regardless of the size of the worm specimen.

P. merus is known from at least 6 completely unrelated host families and is perhaps originally a parasite of the Clupeoidei. Collection records by Manter (1940, 1947), by Sparks (1958) and by one of

us (F. S.) in Bimini, B.W.I., indicates *P. merus* only very rarely in fishes other than Clupeoidei from the Pacific and Atlantic Waters of this Continent.

Any record of *P. merus* from *"Harengula macropthalma"* (vide Manter, 1947) should be taken with caution as this fish species has been the subject of an extensive revision by Rivas (1950).

10. *Sclerodistomum sphoeroides* Manter, 1947

(Figures 16 to 17)

Host. *Chilomycterus schoepfi* (Walbaum); spiny boxfish; new host record; family Diodontidae

Incidence of Infection. In 3 of 3 hosts examined

Location. Stomach

Locality. Cabbage Key, and Bird Key, Boca Ciega Bay (new locality record), Florida

Discussion. Manter (1947) named *S. sphoeroides,* a trematode, from the body cavity of a puffer, *Sphoeroides spengleri* (Bloch). We believe that Manter (1947) must have confused the inflated stomach of the puffer with the body cavity. When the stomach of puffers is inflated with air or water, the resultant cavity appears to be the coelom. If the intestine is traced forward, the connection with the, then almost membranous, stomach may be easily observed. In connection with other species of *Sclerodistomum, S. italicum* (Stossich, 1893) is known from the stomach of its host *Lichia amia.* The record of *S. diodontis* from the body cavity of *Diodon holocanthus* in the Mexican Pacific by Bravo (1954) is also probably in error. The location of *Sclerodistomum* spp. in the stomach of their respective hosts adds further evidence of their hemiurid habits.

Summary

1. The following trematodes, all new locality records for the Tampa Bay-Boca Ciega Bay area, are reported herein: *Bucephalus varicus* Manter, 1940 (Family Bucephalidae); *Lepocreadium floridanus* (this paper) (Family Lepocreadiidae); *Pleorchis americanus* Lühe, 1906 (Family Acanthocolpidae); *Megasolena archosargi* (this paper) (Family Haploporidae); *Diplomonorchis leiostomi* Hopkins, 1941 (Family Monorchiidae); *Steringotrema corpulentum* (Linton, 1905) Manter, 1931 and *Tergestia pectinata* (Linton, 1905) Manter, 1940 (Family Fellodistomatidae); *Siphodera vinaledwardsi* (Linton,

1901) Linton, 1910 (Family Cryptogonimidae); *Parahemiurus merus* (Linton, 1910) Woolcock, 1935 and *Sclerodistomum sphoeroides* Manter, 1947 (Family Hemiuridae).

2. New locality records for Florida are as follows: *Pleorchis americanus* Lühe, 1906, previously known from Woods Hole, Massachusetts, to Beaufort, North Carolina, and Grand Isle, Louisiana; *Diplomonorchis leiostomi* Hopkins, 1941, previously known from Beaufort, North Carolina and Grand Isle, Louisiana; and *Steringotrema corpulentum* (Linton, 1905) Manter, 1931, previously known only from Beaufort, North Carolina.

3. New species described are as follows: *Lepocreadium floridanus* and *Megasolena archosargi.*

4. New host records are as follows: *Diplomonorchis leiostomi* Hopkins, 1941 in *Bairdiella chrysurus* (Lacépède) and *Lagodon rhomboides* (Linn.); *Tergestia pectinata* (Linton, 1905) Manter, 1940 in *Caranx crysos* (Mitchill); *Siphodera vinaledwardsi* (Linton, 1901) Linton, 1910 in *Opsanus beta* (Goode and Bean); *Parahemiurus merus* (Linton, 1910) Woolcock, 1935 in *Harengula pensacolae* (Goode and Bean) and *Urophycis floridanus* Bean and Dresel; and *Sclerodistomum sphoeroides* Manter, 1947 in *Chilomycterus schoepfi* (Walbum).

5. The genus *Megacreadium* Nagaty, 1956 is considered a synonym of *Schistorchis* Lühe, 1906 and *Megacreadium tetraodontis* Nagaty, 1956 becomes *Schistorchis tetraodontis* (Nagaty, 1956) n. comb.

6. A key to *Lepocreadium* and related genera is presented.

Additional information concerning the anterior extent of the excretory vesicle of *Lepocreadium bimarinum* Manter, 1947, and *L. trulla* (Linton, 1907) Linton, 1910 is given.

7. Notes on the exact location of the trematodes within the fish digestive tract have been indicated whenever possible.

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