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OBSERVATIONS ON FLATWORMS AND NEMERTEANS
COLLECTED AT BEAUFORT, N. C.

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DURING the summer of 1946, from May 23 to August 27, I studied the consortes of marine animals collected at Beaufort, N. C. This paper discusses the findings for turbellarians, trematodes, and nemerteans. The cestodes and nematodes will be worked up and presented later; those that deal with parasitic crustaceans have already been published (Pearse, 1947).

Three turbellarians, 32 trematodes, and 2 nemerteans that were found on or in marine animals at Beaufort, N. C., are here listed, and eight new species of trematodes and one new genus are described. The species of hosts that were found to be infested with parasites were 1 king crab, 3 decapod crustaceans, 2 clams, 1 turtle, and 28 fishes. Twenty-two species of fishes harbored one species of trematode, five had two, and one had three.

Thanks are due to L. B. Hayes, David Busby, and Glen E. Mathisen, who helped with routine examinations. All animals were dissected and studied under a binocular microscope. Any consortes found were preserved and mounted in dammar. Dr. E. W. Price looked over the manuscript of this paper and made many constructive suggestions in regard to the Monogenea. My hearty thanks are tendered to him.

Phylum PLATYHELMINTHES

Class TURBELLARIA

Order TRICLADIDA

BDELLOURA CANDIDA (Girard)

On June 27 four specimens of *Limulus polyphemus* Linnaeus (2 males and 2 females) were brought into the laboratory; they carried,

respectively, 87, 350, 185, and 65 bdellourans, chiefly about the bases of the legs—an average of 172 per individual. Also approximately the following numbers of egg capsules were found, chiefly on the gill hooks: 800, 500, 400, and 600—an average of about 575 each.

Order POLYCLADIDA

EUSTYLOCHUS ELLIPTICUS (Girard)

On June 24 twenty-five burrows of *Upogobia affinis* (Say) were examined, and three specimens of this worm were found.

STYLOCHUS ZEBRA (Verrill)

On August 5, in a trawl off Fort Macon at a depth of about 40 feet, seven specimens of *Pagurus pollicaris* Say were examined, and a single *Stylochus* was found in the shell of one.

Class TREMATODA

Order MONOGENEA: Suborder MONOPISTHOCOTYLEA

Family DACTYLOGYRIDAE: Subfamily TETRAONCHINAE

ANCYROCEPHALUS CHAETODIPTERI, new species

FIGURE 6, a-c

Body elongate, 0.70 to 0.97 mm. long and 0.10 to 0.18 mm. wide, width about uniform throughout; anterior end truncate, with three pairs of lateral glandular organs, six pairs behind these that are not marginal, and two pairs of eyes. Haptor not sharply separated from body, 0.48 mm. wide, with two pairs of large hooks and six pairs of minute hooklets; two cuticular bars support the large hooks, these lying near the bases of the large hooks (fig. 6, b). The large hooks are nearly equal in size; the dorsal pair is sickle-shaped and constricted in the middle; the ends of the dorsal bar are somewhat bent posteriorly, and there is a median constriction; the ventral bar is spindle-shaped and also has a median constriction. Mouth aperture ventral, just posterior to second row of head glands, 0.05 mm. long by 0.042 mm. wide. Eyes anterior to pharynx. Genital aperture median, about 0.022 mm. from anterior end. Cirrus tubular, curved, about 0.015 mm. long. Testis ellipsoidal, 0.09 mm. long, just posterior to middle of body. Ovary median, ovate, pretesticular, about as long as testis. Vitellaria extend along lateral margins and across body posteriorly from middle of pharynx to within one-eighth of body length from posterior end. Vagina lateral, opening two-fifths of body length from anterior end.

Host.—*Chaetodipterus faber* (Broussonet).

Type.—U. S. N. M. Helm. Coll. No. 36959.

Occurrence.—From five spadefishes; 140 specimens were taken from the gills and esophagus on July 31.

This species differs from others that occur on the coasts of North America (Price, 1937) in the shape of the haptoral hooks and their supporting bars and in the number and arrangement of the cephalic glands.

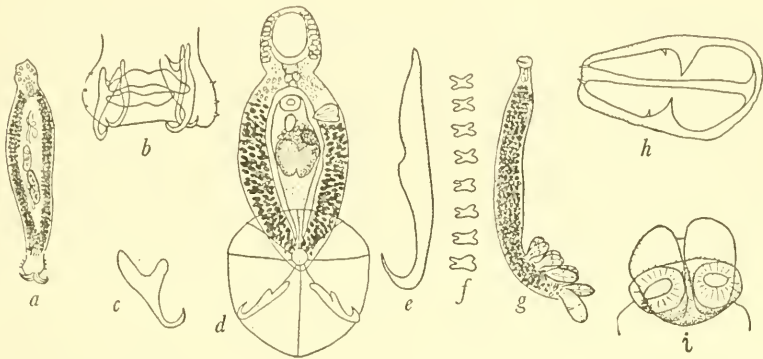


FIGURE 6.—*a-c*, *Ancyrocephalus chaetodipteri*, new species: *a*, Ventral view, $\times 39$; *b*, posterior end; *c*, ventral hook. *d-f*, *Monocotyle pricei*, new species: *d*, Ventral view, $\times 39$; *e*, hook; *f*, tetrapartite bodies from sucker. *g-i*, *Tagia micropogoni*, new species: *g*, Lateral view, $\times 39$; *h*, haptor; *i*, anterior end.

Family MONOCOTYLIDAE: Subfamily MONOCOTYLINAE

MONOCOTYLE PRICEI, new species

FIGURE 6, *d-f*

Body wide, short, and flat, length 1.25 mm., width 0.42 mm.; truncate anteriorly, tapered from the anterior third posteriorly. Posterior haptor nearly circular, 0.51 mm. wide; divided into eight sectors by thickenings marked by rows of tetrapartite chitinous bodies (fig. 6, *f*); a circle of these bodies surrounds the round central area. The hooks are 0.22 mm. in length, with a sharply recurved tip and a tubercle near the middle on the lateral margin. There are two small eyes near the posterior end of the large anterior suckerlike pseudohaptor, which has 10 ovate glandular organs along each lateral margin. Mouth subterminal; pharynx more than twice as long as wide (0.13 by 0.05 mm.); intestinal rami extend back to the central area of the haptor. Ovary on the left side ovate; length 0.1 mm., width 0.04 mm. A single testis lies behind the ovary and is somewhat larger than it. The single egg in the uterus is ovate, with one end rather sharply pointed; length 0.08 mm., width 0.4 mm. The genital opening is just ventral to the pharynx and median. The vaginal aperture occupies

an oval area on the left side. The anterior end is folded over in the only specimen collected but is represented extended in figure 6, *d*.

Host.—*Archosargus probatocephalus* (Walbaum).

Type.—U. S. N. M. Helm. Coll. No. 36960.

Occurrence.—A single specimen was taken from the gill of one of two hosts on July 10. It is named for Dr. E. W. Price.

Remarks.—This species differs from *Monocotyle ijimae* Goto in that it has a shorter body and a relatively larger haptor; the vitellaria extend across the body posteriorly; and the body tapers from near the anterior toward the posterior end; the chief difference is in the large pseudohaptor with its 20 head organs on the present species. It differs from Taschenberg's (1878) *M. mylobatis* in its smaller size, the presence of fewer lateral head organs, the shape of the haptoral hooks, the shape of the chitinous bodies on the haptor, the smaller size of the pharynx, the larger size of the haptor, and in the well-defined central disc of the haptor.

HETEROCOTYLE FLORIDANA (Pratt)

On the gills of a single spotted whip ray, *Aëtobatus narinari* (Euphrasen), 66 of these trematodes were collected in July 18.

Suborder POLYOPISTHOCOTYLEA: Superfamily DICLIDOPHOROROIDEA

Family DISCOCOTYLIDAE

TAGIA MICROPOGONI, new species

FIGURE 6, *g-i*

Body slender; length 1.0 mm., width 0.11 mm. Anterior end slightly bilobate (fig. 6, *i*). The four pairs of haptoral clamps are attached to the posterior three-tenths of the body. They increase slightly in size posteriorly; length of posterior one 0.66 mm., width 0.34 mm. All haptoral clamps are oval in form, truncate at the proximal end; each is supported by a central rod and a thickened margin, which bears a strong spine at about the middle of the median margin and a smaller spine proximal to it (fig. 6, *h*). The posterior tip of the haptoral clamp is in the form of a delicate lobe bearing a pair of minute hooks. The mouth is terminal and behind it a small pharynx is visible, but behind that vitelline glands fill the body and obscure other organs. The 10 spines around the genital aperture are radially arranged.

Host.—*Micropogon undulatus* (Linnaeus).

Type.—U. S. N. M. Helm. Coll. No. 36961.

Occurrence.—Three specimens were taken from the gills of two of three hosts on July 10.

Remarks.—This species differs from *Tagia ecuadori* (Meserve) (syn., *Heterobothrium ecuadori* Meserve) in the character and larger

size of the haptoral clamps, the notched upper lip and bilobed anterior end, and in the more slender body.

Family MICROCOTYLIDAE

MICROCOTYLE OTRYNTERI, new species

FIGURE 7, a-c

Body slender; length 2.0 mm., width 0.25; length of haptor-bearing portion 0.94 mm. At the anterior end there is a small papilla dorsal to the mouth; the anterior end is expanded (fig. 7, c); the body is widest in the middle and tapers toward each end. About 40 pairs of haptoral clamps are arranged along the posterior end in two closely set rows. Each of these is small (0.13 by 0.08 mm.) and is supported around the margin of its elliptical disc by a U-shaped thickening; those near the anterior end of the haptor area end in a little papilla. Vitelline glands begin about 0.2 mm. from the anterior end extend on each side through about 0.1 mm. of the body.

Host.—*Otrynter caprinus* (Bean).

Type.—U. S. N. M. Helm. Coll. No. 36962.

Occurrence.—Four individuals were taken from one host on July 29.

Remarks.—This species differs from other microcotyleans mentioned in this paper in the dorsal papilla over the mouth and in the number and character of the haptoral clamps.

MICROCOTYLE PEPRILI, new species

FIGURE 7, d-f

Body elongate; length 2.6 mm., width 0.42 mm.; widest in middle and tapered toward anterior end and haptor-bearing region. Mouth terminal with two lateral muscular suckers anterior to the pharynx. On the ventral surface 0.2 mm. from the anterior end there is a sucker 0.073 mm. in diameter that is lined with rows of radiating spinules (fig. 7, e); this surrounds the genital pore. The uterus opens through this. Haptor-bearing area 0.12 mm. long; on it are four rows of haptoral clamps, about 175 in all. The discs on the haptoral clamps nearest the median line have a median supporting rod and a U-shaped thickened margin, but those along the sides of the body have only U-shaped supports. The vitelline glands extend along both sides from the spinulose sucker back into the beginning of the haptor-bearing portion, and they come together posteriorly.

Host.—*Peprilus alepilotus* (Linnaeus).

Type.—U. S. N. M. Helm. Coll. No. 36963.

Occurrence.—A single specimen was taken from the gill of a single host on August 5.

This species differs from others in the genus *Microcotyle* in the number and character of the haptors and in the spinose genital pore.

MICROCOTYLE POMATOMI Goto

On July 16 three bluefishes, *Pomatomus saltatrix* (Linnaeus), were examined. On their gills were 7, 15, and 0 monocotyleans.

Family GASTROCOTYLIDAE

THORACOCOTYLE PARADOXICA Meserve

FIGURE 7, *g-i*

A specimen without the anterior end was the only one taken. The large haptor-bearing region bears two rows of large haptoral clamps, about 28 in all; length of area 1.07 mm. Each haptoral clamp has a marginal thickening around its base, and a thinner portion which encloses a cavity that is strengthened by six small radiating bars; diameter 0.053 mm. Vitellaria extend throughout the body except into the tapering posterior end, which bears two pairs of bifid hooklets.

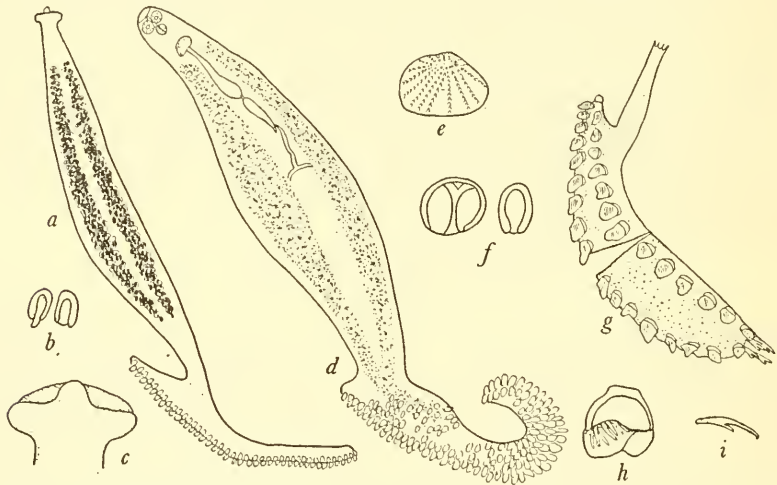


FIGURE 7.—*a-c*, *Microcotyle otrynteri*, new species: *a*, Whole body, $\times 43$; *b*, haptors; *c*, anterior end. *d-f*, *Microcotyle peprili*, new species: *d*, Whole body, $\times 43$; *e*, genital openings; *f*, haptors. *g-i*, *Thoracocotyle paradoxica* Meserve: *g*, Body without anterior end, $\times 43$; *h*, haptor; *i*, posterior hook.

Host.—*Scomberomorus cavalla* (Cuvier and Valenciennes).

Specimen.—U. S. N. M. Helm. Coll. No. 36964.

Occurrence.—A single specimen was taken from the gill of one of five hosts on July 16.

This species appears to differ from *Thoracocotyle paradoxica* Meserve in having two pairs of larger bifid spines at the posterior end of the haptor area and in the character of the haptoral clamps; but, as the only specimen collected lacks the anterior end and may differ in age from that described by Meserve, it is assigned to his species. It occurred in the same host as Meserve's species.

Order DIGENEA

Suborder GASTEROSTOMATA

Family GASTEROSTOMIDAE: Subfamily
GASTEROSTOMINAE

BUCEPHALUS GRACILESCENS Rudolphi

Three encysted gasterostomes were taken from the enterons of two of six silversides, *Menidia menidia* (Linnaeus), examined on July 10.

Suborder PROSTOMATA

Family FELLODISTOMIDAE: Subfamily FELLODISTOMINAE

LINTONIUM VIBEX (Linton)

This trematode infested the inflation sac of the northern swellfish, *Sphoeroides maculatus* (Bloch and Schneider). From one host six were collected on June 26; from two hosts five and three on July 29.

STERINGOTREMA CORPULENTUM (Linton)

Six of these trematodes were taken from *Lagodon rhomboides* (Linnaeus) on June 30, and 50 from one *Orthopristis chrysopterus* (Linnaeus) on July 10. Linton (1905) took them from the same hosts at Beaufort.

Family MONORCHIIDAE

TERGESTIA PECTINATA (Linton)

Twenty of these worms were taken from the intestines of two of three *Cynoscion regalis* (Bloch and Schneider) on June 30.

PARAMONORCHEIDES BIVITTELOSUS Manter

FIGURE 8, a

Four specimens were taken from the intestines of one *Symphurus plagiusa* (Linnaeus) on July 26 and five more from one of two hosts of the same species on July 31.

GENOPLA MINUTA Manter

This trematode was rather common in the intestine of *Fundulus majalis* (Walbaum): 425 from eight males and 0 from seven females on June 18; 158 from ten on June 22; and 58 from two of six females and 2 from four males on July 13.

Family ACANTHOCOLPIDAE

STEPHANOCHASMUS CASUS Linton

In three *Micropogon undulatus* (Linnaeus) two, three, and two trematodes were found in the intestines on July 10. In four *Paralichthys dentatus* (Linnaeus) there was one on July 31.

STEPHANOCHASMUS DENTATUM (Linton)

In a *Paralichthys lethostigmus* Jordan and Gilbert three of these trematodes were found in the intestine on July 24.

Family ALLOCREADIIDAE: Subfamily LEPOCREADIINAE

MULTITESTIS BLENNII Manter

A *Hypsoblennius hentz* (Lesueur) had four of these trematodes in the intestine on June 22.

MULTITESTIS INCONSTANS (Linton)

One of four *Chaetodipterus faber* (Broussonet) had two of this species in the intestine on July 31.

LEPOCREADIUM ARCHOSARGI, new species

FIGURE 8, b

Body longer than wide (0.8 by 0.44 mm.); notched at the posterior end; flat, the anterior end very slightly tapered. Anterior two-thirds of body covered with minute spines arranged in transverse and oblique rows. The oral sucker is a little larger than the ventral sucker (0.11, 0.08 mm.); the latter is about one-third of body length from the anterior end. A short prepharynx and a small pharynx (diameter, 0.04 mm.) are present. The genital pore is a transverse, median slit just anterior to the ventral sucker. The testes are large, posterior to the middle of the body and one is slightly anteriorad to the other; the cirrus sac is short. The ovary is anterior to the testes on the right side of the body; the uterus contains five to eight eggs of large size (0.14 by 0.06 mm.). The vitellaria extends across the posterior end and along the sides as far forward as the oral sucker. Excretory bladder extends anteriorly from the excretory pore and forks behind the testes.

Host.—*Archosargus probatocephalus* (Walbaum).

Type.—U. S. N. M. Helm. Coll. No. 36965.

Occurrence.—Nine specimens were taken from the intestine of one of two hosts on July 10.

This species differs from Manter's (1931) *L. ovalis* in the smaller number of eggs in the uterus, in having the posterior end notched, in being smaller in size, and in having the anterior part of the body spinulose.

LEPOCREADIUM MICROPOGONI, new species

FIGURE 8, c

Body flat, truncate posteriorly and strongly tapering toward the anterior end; length 0.7 mm., width 0.42 mm.; anterior three-fifths spinulose. Oral sucker larger than ventral sucker (0.1 and 0.08 mm.). Genital pore 0.07 mm. in front of ventral sucker. Testes small (diameter, 0.07 mm.); behind the middle of the body; the left one a little anterior to the right. Ovary in front of the right testis. Only two large eggs (0.13 by 0.06 mm.) in uterus. Cirrus sac shorter than metraterm. Vitelline glands extend from the posterior margin of the pharynx along the lateral margins and across the posterior end. The excretory bladder forks just behind the ovary and eggs.

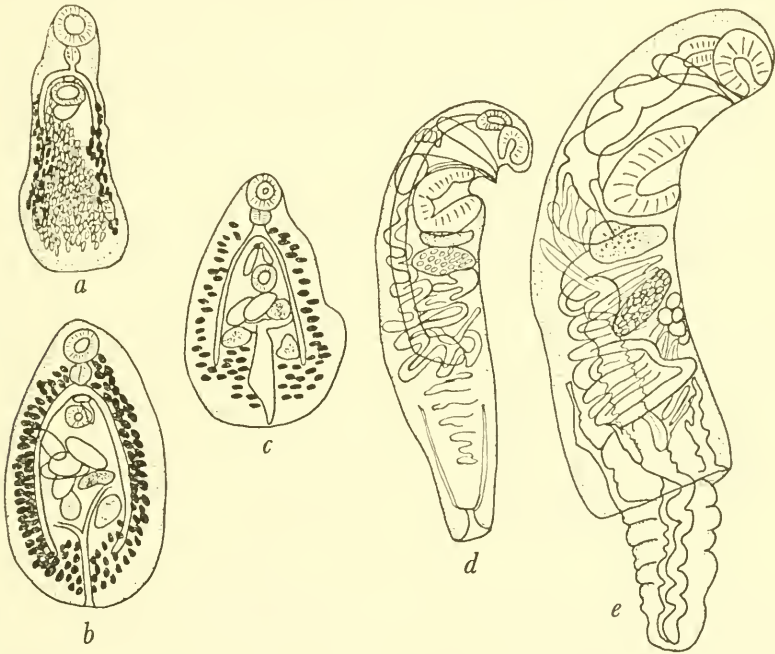


FIGURE 8.—a, *Paramonorchoides bivittellus* Manter; b, *Lepocreadium archosargi*, new species; c, *Lepocreadium micropogoni*, new species; d, *Lecithochirium microstomum* Chandler; e, *Lecithochirium muraenae* Manter. $\times 38$.

Host.—*Micropogon undulatus* (Linnaeus).

Type.—U. S. N. M. Helm. Coll. No. 36976.

Occurrence.—A single specimen was taken from the gut of one of three hosts on July 10.

This species differs from *L. archosargi*, just described, and from *L. ovalis* Manter (1931) in the shape of the body, the larger eggs, the smaller number of eggs in the uterus, the greater degree of spinosity on the body, and smaller size.

Family HEMIURIDAE: Subfamily HEMIURINAE

STERRHURUS MONTICELLII (Linton)

In four *Trichiurus lepturus* Linnaeus, on July 31, there were the following numbers of this trematode in the intestine: 95, 85, 250, 200—an average of about 158.

LECITHOCHIRIUM MICROSTOMUM Chandler

FIGURE 8, d

A single trematode came from the intestine of one of three *Galeichthys milberti* (Cuvier and Valenciennes) on July 31.

LECITHOCHIRIUM SYNODI Manter

The intestines of three *Synodus foetens* (Linnaeus) yielded 27 specimens on July 10; five of the same hosts on July 26 furnished 32 more.

LECITHOCHIRIUM MURAENAE Manter

FIGURE 8, e

One of three *Felichthys felis* (Linnaeus), on July 31, bore five trematodes in its intestine.

LECITHOCHIRIUM sp.

A young trematode was found in a clam, *Noetia ponderosa* (Say), on July 26. This is perhaps the young of *L. microstomum* Chandler.

HISTEROLECITHA ELONGATA Manter

In 10 *Mugil cephalus* Linnaeus, on July 3, 10 specimens of this trematode were taken from the intestines of four hosts.

LECITHASTER (?) GIBBOSUS (Rudolphi)

Ten trematodes were taken from the enteron of a little agujón, *Strongylura acus* (Lacepède). They apparently belong to this species.

GONOCERCELLA ATLANTICA Manter

FIGURE 9, a

Body elongate, flat, ellipsoidal; length 2.32 mm., width 0.8 mm., skin smooth and thick. Oral sucker terminal and ventral, 0.32 mm. in diameter; acetabulum larger than oral sucker, diameter 0.57 mm., 1.5 mm. posteriad from the anterior end. Pharynx small, diameter 1.13 mm.; rami of gut wide but decreasing in diameter posteriorly where they extend almost to the end of the body. Testes on either side of the body at the posterior margin of the acetabulum; ovary median and posterior to the testes; two vitelline glands posterior to the ovary. Prostatic vesicle large (0.3 by 0.18 mm.), 0.3 mm. posterior to pharynx. Seminal vesicle coiled and posterior to the prostatic vesicle. The uterus could not be observed.

Host.—*Fundulus majalis* (Walbaum).

Occurrence.—A single specimen was taken from the enteron of one of ten hosts on July 10.

The name for this species was given by Manter (1940), who found a specimen at Dry Tortugas in *Monacanthus hispidus* (Linnaeus). Linton (1905) also found a specimen at Beaufort, N. C., in *Trachinotus carolinus* (Linnaeus).

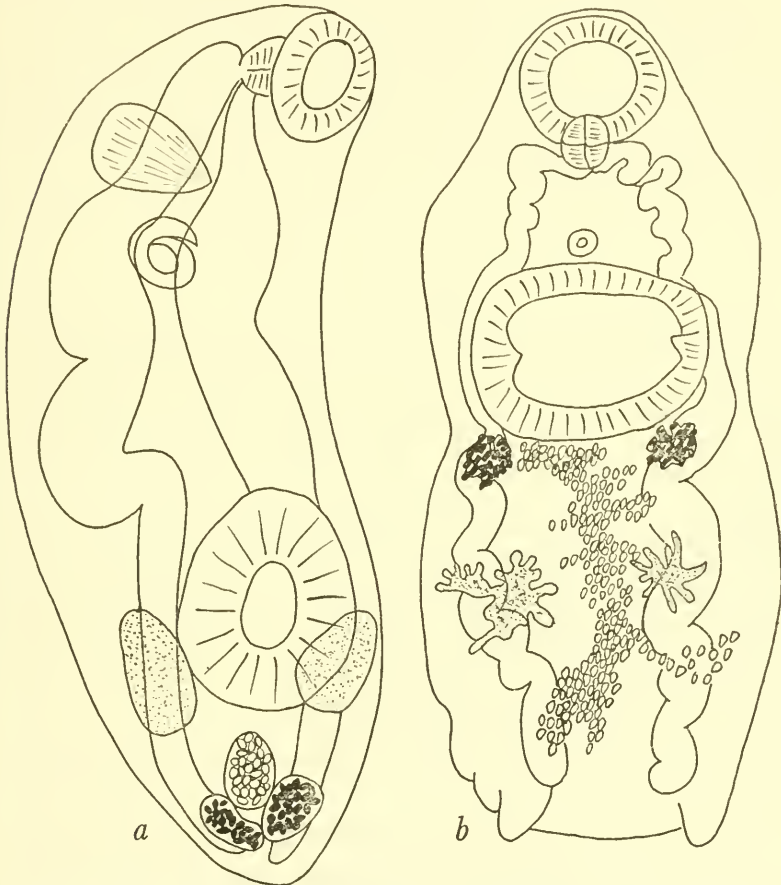


FIGURE 9.—*a*, *Gonocercella atlantica* Manter; *b*, *Bicornuata caretta*, new genus and species. $\times 52$.

Family DIPLOPROCTODAEIDAE

BIANUM PLICITUM (Linton)

A single specimen of this trematode was taken from the intestine of *Sphoeroides maculatus* (Bloch and Schneider) on July 10.

Family GORGODERIDAE: Subfamily ANAPORRHUTINAE

BICORNUATA, new genus

Body stout; posterior end truncate, with two fingerlike lateral papillae; also two blunt lateral papillae on the inside of the acetabulum. Suckers large, the acetabulum more than a third wider than the oral sucker; pharynx less than a third as wide as the oral sucker. Enteric rami extend almost to posterior end; genital pore median and anterior to acetabulum; ovary immediately posterior to acetabulum; vitellaria lateral to it and branched; testes lateral, branched, between vitellaria and posterior end; uterus extends near posterior end. The genus is named for the two papillae at the posterior end and for the two lateral papillae in the acetabulum.

Type.—*Bicornuata caretta*, new species, from *Caretta caretta* (Linnaeus).

BICORNUATA CARETTA, new species

FIGURE 9, b

Body flat and wide, length 1.61 mm., width 0.88 mm., posterior end truncate and bears two lateral papillae 0.12 mm. long and 0.1 mm. wide. The oral sucker is 0.38 mm. wide, acetabulum 0.61 mm., pharynx 0.13 mm. The genital pore is immediately anterior to the acetabulum; the ovary is elongate transversely, somewhat lobate, and lies on the left side of the body; the vitellaria lie on the intestinal rami just posterior to the acetabulum and are lobate; the branched testes are directly posterior to the vitellaria almost halfway between them and the posterior end of the body; the uterus is coiled irregularly posterior to the acetabulum and extends as far back as the enteric rami; the eggs are ellipsoidal and 0.036 mm. long.

Host.—*Caretta caretta* (Linnaeus).

Type.—U. S. N. M. Helm. Coll. No. 36966.

Occurrence.—Three specimens came from the gall bladder of the host.

Family DICROCOELIIDAE: Subfamily BRACHYCOELIINAE

ORCHIDASMA AMPHIORCHIS (Braun)

From the intestine of *Caretta caretta* (Linnaeus) on July 19, about 200 of these trematodes were collected.

Family HETEROPHYIDAE

PARACRYPTOGONIMUS AMERICANUS Manter

From the intestine of *Opsanus tau* (Linnaeus) 12 of these worms were taken on June 28.

Class NEMERTEA

Order HOPLONEMERTEA

CARCINONEMERTES CARCINOPHILA (Kölliker)

Nineteen blue crabs, *Callinectes sapidus* Rathbun, examined on June 24 averaged about 83 nemerteans each. These were mostly among the gills, but some were among the abdominal appendages.

Order BDELLONEMERTEA

MALACOBDELLA GROSSA (Müller)

The clam *Venus mercenaria* Linnaeus was often infested with these parasites. On June 1, eight hosts yielded three; on June 17, nine hosts six (three in one host); and on July 25 five hosts one; an average of 0.45 per host.

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