1990

Binder 005, Acanthostomidae [Trematoda Taxon Notebooks]

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Anisocladiinae ~~n. subfam.~~ YAMAGUTI, 1958

Subfamily diagnosis. — Acanthostomidae: Body long, slender, spinose. Oral sucker small, with circumoral crown of spines. Prepharynx short, pharynx small, ceca of unequal length. Acetabulum small, near anterior extremity. Testes diagonal, in posterior half of body. Seminal vesicle extremely long. Genital sinus tubular, relatively long. Ovary submedian, pretesticular. Vitellaria forming a series of bunches anterior to seminal receptacle. Uterus reaching posterior extremity. Excretory vesicle Y-shaped, with long stem and relatively short arms.

Anisocladium Looss, 1902

Syn. *Anisogaster* Looss, 1901 preoccupied

Generic diagnosis. — Acanthostomidae, Anisocladiinae: Body very much elongated, spinulate; forebody filiform when extended, hindbody always thicker. Oral sucker small, subterminal, with a crown of spines; prepharynx short, pharynx small. One (usually left) intestinal limb much shorter than the other. Acetabulum larger than oral sucker and very near the latter. Testes large; elongate, diagonal, in posterior half of body. Vesicula seminalis very long, extending almost half length of body. No cirrus or cirrus pouch. Genital sinus tubular, relatively long. Genital pore just in front of acetabulum. Ovary submedian, a little in front of anterior testis. Receptaculum seminis large. Vitellaria forming on each side a row of several, indistinctly separated groups of follicles anterior to receptaculum seminis. Uterus descending to near posterior extremity; eggs very small, numerous. Excretory vesicle Y-shaped, stem very long, arms relatively short, reaching to near oral sucker. Parasitic in intestine of marine fishes.

Genotype: *A. fallax* (Rud., 1819) Looss, 1902, syn. ***Anisogaster f.*** (R.) Looss, 1901 (Pl. 17, Fig. 212), in *Uranoscopus scaber;* Naples.

Other species: *A. gracile* (Looss, 1901) in *Uranoscopus scaber;* Triest, Black Sea.

Anisocladium fallax (Rudolphi, 1819) Looss, 1902
syn. Anisogaster fallax (Rudolphi, 1819) Looss, 1901

"ANISOGASTER FALLAX R AFTER LOOSS" FROM PRATT, 1902

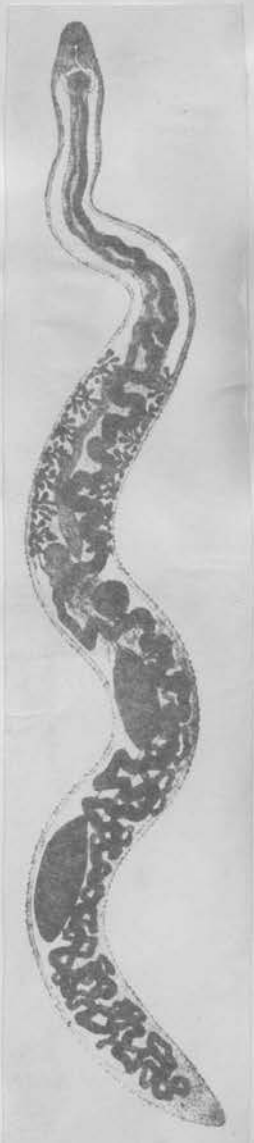

Fig. 13. *Anisogaster fallax* (R.) aus *Urinoscopus scaber*. Vergr. ca. 22.

FROM LOOSS, 1901. SEE REPRINT.

—OVER—

Anisocladium fallax (RUDOLPHI, 1819) LOOSS, 1902, (U.B.Z.M. No. 48231) was collected from the intestine of *Uranoscopus scaber* L. Of this host species 4 out of 13 were found to harbour the parasite. As however, the intestine of these four only were thoroughly searched, single worms present in the remaining nine specimens may have escaped attention. The parasite was further encountered in the intestine of a single specimen of *Mullus barbatus* L.

RUDOLPHI (1819) and LOOSS (1901) respectively gave the stomach and intestine as the location of parasite in the host. As I have also found the parasite in the intestine only, DAWES' (1946) statement about the gall bladder as the habitat appears dubious.

Neither MOLA (1928) nor VÀTOVA (1928) mention this parasite from Italian waters. So far the parasite has been reported from the following localities in the Mediterranean and adjacent waters:

Naples	RUDOLPHI (1819)
Trieste	STOSSICH (1898)
Trieste	LOOSS (1901)
Black Sea (USSR)	OSMANOV (1941), may in reality be *A. gracilis*.
Split (Yougoslavia)	JANISZEWSKA (1953)
Sousse (Tunesia)	NYBELIN (1966, personal communication). He collected the parasite from two of three specimens of *U. scaber* from the fish market at Sousse 23–26 Nov. 1966[1])
Rhodes (Greece)	Present record

An adequate description and illustration was given by LOOSS (1901) and supplementary details has been given by JANISZEWSKA (1953). As the present material agrees with these, a redescription is not called for. It should be mentioned however that the body of the worm often appears somewhat curled up, the convex side always being the dorsal one, and the surface of the parasite appears transversely wrinkled.

FROM BRINCKMANN, 1967

Anisocladium gracile (Looss, 1901)

Host: Uranoscopus scaber
Loc.: Triest, Black Sea

Fig. 14. *Anisogaster gracilis* n. sp. aus *Uranoscopus scaber*. Vergr. ca. 22.

FROM LOOSS, 1901. SEE REPRINT.

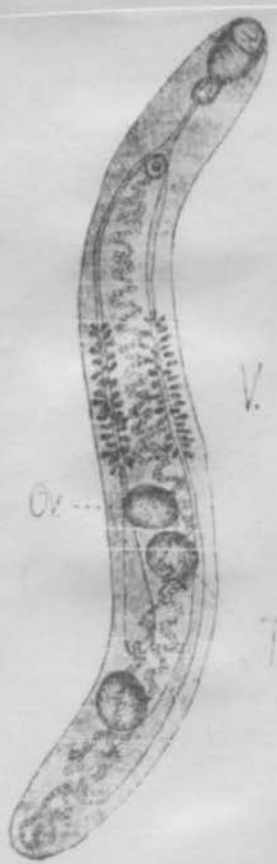

Рис. 19. *Anisocladium gracilie* L. s. s. из кишечника Uranoscopus scaber.

FROM WLASSENKO, 1931

[1] Along with *A. fallax* in the intestine of *U. scaber*, NYBELIN found a closely related species — just as had been previously done by Looss (1901, p. 658) — which appeared to be *Anisocoelium gracilis* (Looss, 1901) Looss, 1902 (Syn. *Anisogaster gracilis* Looss, 1901). My examination of these specimens confirms Nybelin's identification.

This parasite was originally described by Looss (1901) from the same host from Trieste, and was later reported from the Black Sea by WLASSENKO (1931). OSMANOV's (1941) report of *A. fallax* from the Black Sea may from his drawing turn out to be *A. gracilis*. Still later JANISZEWSKA (1953) reported the parasite from Split and she seems to be in no doubt as to its validity. In so far DAWES (1946) and MOROSOV (in SKRJABIN 1955) have regarded *A. gracilis* as a synonym for *A. fallax*, this view can not longer be maintained as *A. gracilis* appears to be a valid species. The main characteristics in which *A. gracilis* differs from *A. fallax* — easily observed — is the complete lack of oral spines, its short and wide seminal vesicle and its ventral sucker being only half the size of the oral one.

FROM BRINKMANN, 1967

Anisocoeliinae Looss, 1901

Subfamily diagnosis. — Body subcylinderical, with maximum width at or near acetabulum, oculate or not. Circumoral crown of spines absent. Prepharynx short, esophagus bifurcating about midway between pharynx and acetabulum. Ceca terminating short of posterior extremity, at different levels or about the same level. Acetabulum small, one fourth to one third of body length from anterior extremity. Testes situated diagonally mediodorsal or dorsolateral to ceca in middle third of body or more posteriorly. Ovary median or submedian, in middle third of body. Vitellaria in preacetabular or postacetabular lateral fields. Descending uterus turning forward anterior or posterior to testes, but not reaching posterior extremity. Excretory vesicle Y-shaped, bifurcating between two testes.

Key to genera of Anisocoeliinae

Vitellaria preacetabular; uterus reaching beyond testes ..... *Anisocoelium*

Vitellaria postacetabular; uterus not reaching beyond testes ..... *Paraisocoelium*

Anisocoelium Lühe, 1900

Generic diagnosis. — Acanthostomidae, Anisocoeliinae: Body broadest in acetabular zone, whence it tapers towards the extremities, truncate in front, but rather pointed behind. Oral sucker larger than acetabulum, followed by prepharynx; pharynx comparatively large; esophagus very short; ceca of unequal length, right one the longer, but not reaching to posterior extremity. Acetabulum about one fourth of body length from anterior extremity. Testes longitudinally elongated, diagonal, dorsomedial to ceca a little behind ovary. No cirrus pouch. Genital pore median, immediately in front of acetabulum. Ovary lobed, ventral, median, postacetabular. Receptaculum seminis present. Vitellaria extending in lateral fields from pharynx to posterior end of acetabulum. Uterine coils mostly ventral, not reaching to posterior extremity; eggs small, numerous. Excretory vesicle Y-shaped, bifurcating between two testes, arms reaching to level of pharynx. Parasitic in intestine of marine fishes.

Genotype: *A. capitellatum* (Rud., 1819) Lühe, 1900 (Pl. 17, Fig. 215), in *Uranoscopus scaber*; Mediterranean, Black Sea. Also in *Trachinus draco*, Batum.

Distomum capitellatum Rud. of Monticelli, 1893, differs from the genotype chiefly in the vitellaria being more extensive and the excretory vesicle bifurcating near its opening.

Other species: *A. hippoglossi* MacCallum, 1921, in *Hippoglossus hippoglossus*; Mass., U.S.A.

Acanthostomidae

Anisocoelium capitellatum (Rud.)

Anisocoelium capitellatum (Rud.)

(Fig. 10).

Famille des *Acanthostomidae*.

Le corps fusiforme, très allongé, s'effile particulièrement du côté postérieur et présente des extrémités arrondies. La taille des individus récoltés varie de 3 à 5 mm. de long. La largeur maxima, au niveau de la ventouse ventrale, est de 0,93 à 1,3 mm. Le corps est recouvert d'épines aplaties en écailles dans la région antérieure tandis que dans la postérieure elles restent de véritables épines. La ventouse orale, située à l'extrémité antérieure a la forme d'une coupe qui porte sur son bord une couronne de 24 forts aiguillons. Elle mesure de 0,40 à 0,50 mm. de long sur 0,44 à 0,58 mm. de large. La ventouse ventrale, qui se trouve à la limite du premier et du deuxième tiers du corps, est beaucoup plus petite que l'orale et a de 0,29 à 0,33 mm. de diamètre. La distance entre le bord postérieur de la ventouse orale et le bord avant de la ventouse ventrale est de 0,8 à 1,55 mm.

Le tube digestif débute par un court prépharynx qui fait suite à la ventouse orale. Le pharynx très développé a de 0,25 à 0,29 mm. de long sur 0,29 à 0,32 mm. de large. Tout autour de lui rayonnent, dans le parenchyme, des muscles ramifiés très apparents. L'œsophage, plus court que le pharynx, a une longueur qui oscille entre 0,14 et 0,29 mm. Il se bifurque en donnant 2 branches très grêles, plus ou moins dirigées obliquement, qui se dilatent rapidement pour former les deux cæcums intestinaux d'inégale longueur, le droit étant un peu plus long que le gauche. La différence de longueur des deux cæcums varie de 0,45 à 1,08 mm. Le plus grand des cæcums n'atteint pas l'extrémité postérieure du corps, la distance entre celle-ci et la pointe extrême du cæcum est de 0,8 à 1,7 mm.

Dans la région arrière du corps, il n'y a pas d'autre organe que la vésicule excrétrice qui constitue un étroit canal situé sur la ligne médiane.

Elle s'étend du pore excréteur, placé à l'extrémité postérieure du corps, jusqu'au niveau des testicules où elle se bifurque en deux branches qui viennent se terminer un peu au-dessous du pharynx.

Les deux testicules, situés nettement en arrière de la ventouse ventrale, vers la moitié du corps et près de la ligne médiane, sont très allongés et possèdent un contour faiblement ondulé. Le testicule gauche est souvent un peu en avant du droit. Ils ont de 0,31 à 0,63 mm. de long sur 0,09 à 0,11 mm. de large. De leur partie antérieure se détachent les

2 canaux déférents qui se réunissent pour former une vésicule séminale allongée, sinueuse, effilée vers l'avant, de 0,9 mm. de long. Elle se termine au pore génital situé sur la ligne médiane juste en avant de la ventouse ventrale. Il n'y a pas de poche du cirre.

L'ovaire situé à peu près sur la ligne médiane du corps, juste en avant des testicules, est profondément lobé. Il mesure de 0,10 à 0,15 mm. de long sur 0,13 à 0,19 mm. de large. Il donne vers l'arrière un oviducte et près de lui se trouve la glande coquillère.

Les vitellogènes situés latéralement sont formés de follicules très grêles qui leur donnent un aspect ramifié. Ils s'étendent, depuis la région postérieure du pharynx jusqu'un peu au delà du bord postérieur de la ventouse ventrale, sur une distance qui varie de 0,8 à 1,6 mm. de long. Ils donnent naissance à 2 vitelloductes qui viennent se réunir au niveau de l'ovaire.

L'utérus décrit une anse sinueuse dirigée vers l'arrière, de part et d'autre de la ligne médiane. Il dépasse légèrement l'extrémité du cæcum le moins long, mais n'atteint jamais celle du cæcum le plus long, puis l'utérus fait quelques circonvolutions entre l'ovaire et le bord postérieur de la ventouse ventrale et vient se terminer au pore génital. Les œufs très nombreux, de couleur brun jaune foncé, à coque mince, sont de petite taille et mesurent de 0,012 à 0,015 mm. de long sur 0,007 à 0,010 mm. de large.

Fig. 10. *Anisocoelium capitellatum* (Rud.), vue ventrale. Mêmes lettres que fig. 1. Ph, pharynx; Oes, canal excréteur; Va, vésicule excrétrice; M, muscles du pharynx.

Habitat. — Vésicule biliaire d'*Uranoscopus scaber* L.

Les spécimens examinés sont plus petits que ceux étudiés par Loos (1900), mais leur taille se rapproche de celle des individus décrits par Lühe (1900), Stossich (1883, 1886), Monticelli (1893).

Mes observations concernant la taille réduite de l'œsophage concordent avec celles de Lühe et de Monticelli. Chez aucun individu, je n'ai trouvé un œsophage beaucoup plus long que le pharynx comme l'indique Loos.

Conformément aux descriptions de Loos, Monticelli et Lühe et contrairement à celles de Stossich, le cæcum, le plus long, n'atteint pas l'extrémité postérieure du corps. Enfin la forme et la disposition des testicules chez les spécimens que j'ai étudiés correspondent aux indications données par Loos et Lühe. Je n'ai jamais trouvé de testicules ovalo disposés comme les représente Monticelli. Quant aux circonvolutions utérines elles n'atteignent, en aucun cas, vers l'arrière, l'extrémité postérieure du corps comme le dit Lühe.

From Mathias, 1934

Anisocoelium capitellatum (RUDOLPHI, 1819) LÜHE, 1900, (U.B.Z.M. No. 48230) was collected from the gall bladder of *Uranoscopus scaber* L. Of this host species 12 of 13 specimens were found to harbour this parasite which thus appears to be rather common at Rhodes and is here probably the most easily demonstrable marine trematode present. The number of parasites encountered in the single host specimen varied from one to seven. They were found free in the viscous bile as well as sticking to the mucosa of the bladder. The caecal contents of the parasite exhibited smaller and larger gas bubbles, the content proper appeared a brownish-green in colour.

In their faunistic reviews MOLA (1928) oddly enough do not mention any trematodes from *Uranoscopus* in Italian waters, but VÀTOVA (1928) does. The parasite has so far been reported from the following localities in the Mediterranean and adjacent waters:

Arimini/Naples	RUDOLPHI (1819)
Trieste	STOSSICH (1885)
Naples	MONTICELLI (1893)
Trieste/Rimini	STOSSICH (1898)
Rovigno	LÜHE (1900) and PARONA (1912) according to VÀTOVA (1928)
Trieste	LOOSS (1901)
Banyuls (France)	MATHIAS (1931)
Black Sea (USSR)	WLASSENKO (1931)
Marseilles (France)	TIMON-DAVID (1937)
Split (Yugoslavia)	JANISZEWSKA (1953)
Genoa and Taranto	NYBELIN (1966, personal communication). He encountered the parasite in old museum spirit specimens of *U. scaber* belonging to the Gothenburg Museum of Natural History and of Italian origin.
Sousse (Tunesia)	NYBELIN (1966, personal communication). He collected the parasite from three of three specimens of *U. scaber* from the local fish market at Sousse 23—26 Nov. 1966.
Rhodes (Greece)	Present record.

According to DAWES (1946) and MOROSOV (in SKRJABIN 1955) the species has been recorded also from the gall bladder of *Sparus salpa* (Syn. *Box salpa* CUV. & VALENC., *Boops salpa* (L.)). This information appears rather dubious and probably originates from STOSSICH (1883, p. 2, Pl. II, Fig. 9) who however described the specimen as an intestinal monostome with eggs equipped with a long polar filament. Accordingly this cannot have been *A. capitellatum*, and *U. scaber* so far appears to be the only known host.

Adequate descriptions and illustrations of *A. capitellatum* have previously been given by LÜHE (1900), LOOSS (1901), MATHIAS (1931) and JANISZEWSKA (1953). As I have found the present specimens in accordance with these descriptions, a redescription is not required.

FROM BRINKMANN, 1967

Acanthostomidae

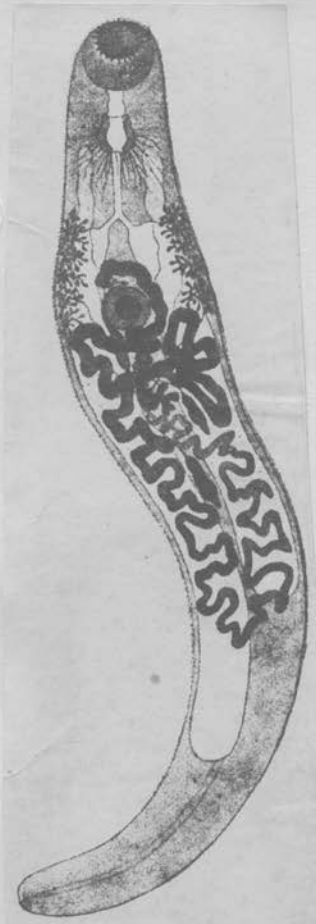

Fig. 12. *Anisocoelium capitellatum* (R.) aus *Uranoscopus scaber*. Vergr. ca. 16.

From Looss, 1901. See reprint.

Famille des ACANTHOSTOMIDAE Poche

Anisocoelium capitellatum (Rudolphi)

Les plus grands individus (auxquels s'appliquent les chiffres qui suivent), atteignent 5,5mm de long et 1,2mm de large ; le corps, progressivément effilé vers son extrémité postérieure, est plus brusquement interrompu en avant. La ventouse orale terminale mesure 500 μ × 400 μ ; elle est munie d'épines ; la ventrale, placée à 1,8mm en arrière, atteint seulement 290 μ.

(717)

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Le tube digestif comprend un prépharynx bien visible (150 μ), un pharynx robuste (300 μ × 290 μ) et deux volumineuses branches intestinales, irrégulièrement dilatées et étranglées, renflées en sacs à leur extrémité ; ces deux cæcums sont de longueur inégale, le droit dépassant le gauche d'environ 950 μ.

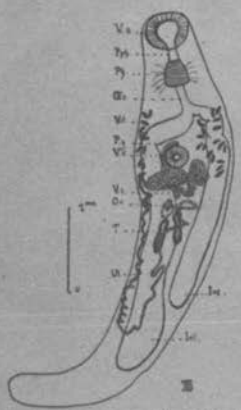


Fig. 5. — *Anisocoelium capitellatum* (Rudolphi). Vésicule biliaire d'*Uranoscopus scaber* L.

Les deux testicules sont beaucoup plus longs que larges, à bord entier (400 μ × 100 μ). La vésicule séminale, longue et étroite, débouche au pore génital, contre le bord antérieur de l'acétabulum.

L'ovaire, de petite taille, (150 μ), à bords profondément lobés, se trouve 400 μ en arrière de l'acétabulum. L'utérus décrit une boucle sinueuse dont le point d'inflexion se trouve entre la terminaison des deux cæcums ; il revient ensuite en avant et se renfle en un métraterme accolé à la ventouse ventrale. Les œufs sont très petits : 18 μ × 8 μ.

Les vitellogènes, peu développés et peu visibles sont formés de petits follicules disséminés de chaque côté, jusqu'à 100 μ en arrière de l'acétabulum.

Habitat. — C'est un parasite classique de la vésicule biliaire d'*Uranoscopus scaber* L. cité par Stossich (1883), Monticelli (1893), Lühe (1900), Looss (1900) ; j'en ai recueilli trois exemplaires chez un de ces poissons provenant du golfe de Marseille ; Mathias l'a récemment (1934) signalé à Banyuls et en a donné une bonne description.

From Wlassenko, 1931

"After Looss" From Pratt, 1902

From Timon-David 1937

Anoiktostomatinae nom. emend. for
Anoiktostominae Nicoll, 1914

Subfamily diagnosis. — Acanthostomidae: Body widened in front of middle, spinose. Oral sucker large, with circumoral crown of spines. Pharynx well developed, esophagus and ceca long. Acetabulum small, pre-equatorial. Testes diagonal, in posterior half of body. Seminal vesicle swollen at base behind acetabulum. Ovary beside acetabulum. Receptaculum seminis large. Uterus extracecal, anterior to testes and intertesticular. Vitellaria extending along anterior part of ceca. Excretory vesicle Y-shaped, with long, very wide arms.

Anoiktostoma Stossich, 1899

Generic diagnosis. — Acanthostomidae, Anoiktostomatinae: Body small, flat, widened in front of middle and rounded off at two extremities, covered with spines. Oral sucker large, with a crown of spines. Pharynx well developed. Esophagus long. Ceca long, terminating near posterior extremity. Acetabulum small, pre-equatorial. Testes large, diagonal, overlapping ceca a little behind acetabulum. Seminal vesicle swollen at base behind acetabulum. Genital pore median, pre-acetabular. Ovary on the right of acetabulum, with seminal receptacle immediately behind. Vitellaria dendritic, extending along ceca from beside posterior end of esophagus to level of anterior testis. Uterus coiled in extracecal fields anterior to testes and between testes; eggs small, numerous. Excretory vesicle Y-shaped, with long spacious arms. Intestinal parasites of marine fishes.

Genotype: *A. coronatum* (Wagener, 1852) Stossich, 1899 (Pl. 103, Fig. 1250), syn. *A. alosiae* (Stoss., 1855) Stiles et Hassall, 1908; *A. corvinae* (Stoss., 1886), in *Corvina nigra*; Nice.

Other species, transferred by Stossich to this genus in 1899, were assigned by Looss to different genera.

Acanthostomatidae

Anoiktostoma coronatum (Wagner, 1852) Stossich, 1899

" AFTER STOSSICH "
FROM PRATT, 1902

Inclusion of *Paracanthostomum* and *Ateuchocephala* in *Atrophecaecum* requires the following emendations to the generic diagnosis presented by Brooks (1980):

Atrophecaecum Bhalerao, 1940

Ateuchocephala Coil and Kuntz, 1960:145–150.
Paracanthstomum Fischthal and Kuntz, 1965:124–136.

Diagnosis.—Acanthostominae. Tegumental spines uniform in size. Oral sucker armed with single uninterrupted row of spines *or lacking spines*. Mouth terminal *or subterminal*. Prepharynx and esophagus variable in length *or one lacking*. Ceca opening separately and laterally; ceca not atrophied, one cecum atrophied or one cecum lacking. Gonotyl lacking. Seminal vesicle coiled. Vitelline follicles terminating preovarially; *secondary cluster of follicles surrounding testes may be present*. Seminal receptacle posterodorsal to ovary. Uterine loops preovarian. Excretory vesicle Y-shaped, with pre- *or post*acetabular bifurcation. Parasites of crocodilians and ophidians. India, Pakistan, Burma, *Malaysia, Australia*. Type-species: *Atrophecaecum burminis* (Bhalerao, 1926), Bhalerao, 1940.

The above additions to the diagnoses of Acanthostominae and of *Atrophecaecum* eliminate the need for separate diagnoses of *Paracanthostomum, Ateuchocephala* and the Ateuchocephalinae. Additionally, the phylogenetic relationships of the taxa involved are represented in the classification and the new classification differs little from the previous classification of the acanthostomes with the exception of the addition of three new species. Thus, the cladistic system is demonstrably more stable and less ambiguous than any other. The above additions do not require any changes in the generic key presented by Brooks (1980) but do require a new key to the species of *Atrophecaecum*, as follows:

1a. Prepharynx less than 3 times longer than pharynx, one cecum partially or completely atrophied, parasites of ophidians 3
1b. Prepharynx at least 3 times longer than pharynx, ceca not atrophied, parasites of crocodilians 2
2a. Oral spines 18–19 in number ..... *slusarskii*
2b. Oral spines 22 in number ..... *indicum*
3a. One cecum lacking 4
3b. Both ceca present 5
4a. Oral spines 20–22 in number, vitellaria confluent preovarially ..... *proctophorum*
4b. Oral spines 24–28 in number, vitellaria not confluent preovarially ..... *asymmetricum*
5a. Oral spines 23 in number, vitelline follicles extending anteriorly to posterior margin of seminal vesicle ..... *pakistanense*
5b. Oral spines 24–29 in number or lacking, vitelline follicles not extending anteriorly to posterior margin of seminal vesicle, eggs reaching more than 30 μm in length 6
6a. Cecal bifurcation more than 10% of total body length preacetabular, uterine loops occupying less than 50% of total body length ..... *simhai*
6b. Cecal bifurcation less than 5% of total body length preacetabular, uterine loops occupying more than 50% of total body length 7
7a. Mouth terminal ..... *burminis*
7b. Mouth subterminal 8
8a. Oral spines present, acetabulum bipartite ..... *lobacetabulare*
8b. Oral spines lacking, acetabulum unipartite 9
9a. Esophagus present, prepharynx lacking, secondary vitelline cluster surrounding testes, seminal vesicle short ..... *marinum*
9b. Esophagus lacking, prepharynx short, secondary vitelline cluster lacking, seminal vesicle elongate ..... *cerberi*

Brooks and Caira, 1982

Atrophecaecum Bhalerao, 1940

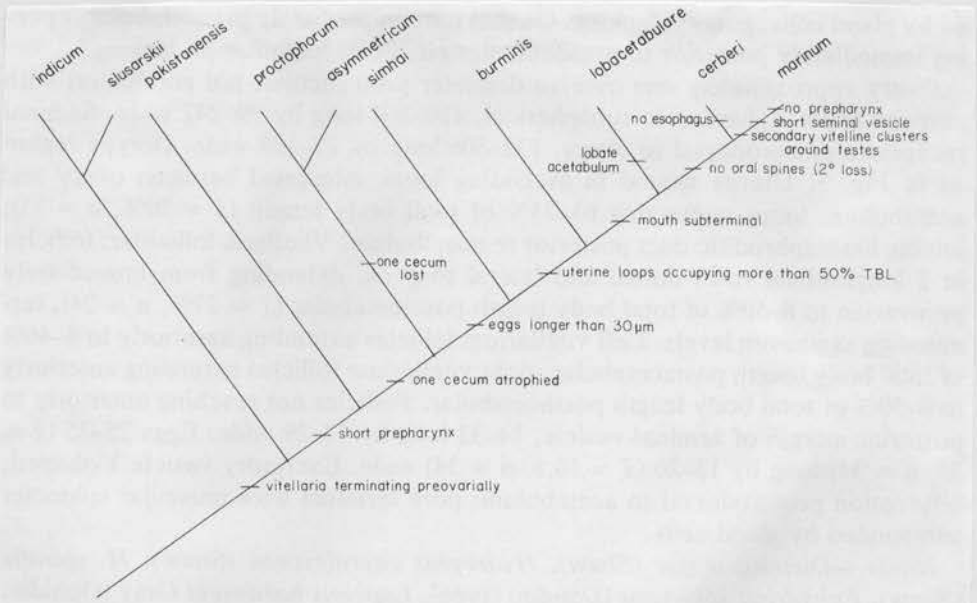


Fig. 5. Cladogram, partly modified from that of Brooks (1980), depicting phylogenetic relationships of *Atrophecaecum* spp. plus *Paracanthostomum cerberi* and *Ateuchocephala marina*. Modifications comprise deletion of some characters from the cladogram for the sake of clarity in viewing, and addition of *A. lobacetabulare* and *P. cerberi* and *A. marina*.

Brooks (1980) alluded to possible taxonomic problems arising from the discovery of *A. lobacetabulare*. The nature of the problem, and of its solution, may be seen best by examining the relative positions of *A. lobacetabulare, P. cerberi,* and *Ateuchocephala marina* in a cladogram depicting the phylogenetic relationships of *Atrophecaecum* spp. (Fig. 5). Synapomorphies (shared special traits) linking the new species and the other two taxa above to *Atrophecaecum* are listed on the cladogram (simplified from that of Brooks 1980).

Figure 5 clearly shows that *A. lobacetabulare, P. cerberi,* and *Ateuchocephala marina* form a monophyletic group most closely related to *Atrophecaecum burminis* and *A. simhai,* hence our choice of comparisons above. This arrangement would require that *Paracanthostomum* and *Ateuchocephala* be considered junior synonyms of *Atrophecaecum* if *A. lobacetabulare* and all other members of the genus are to be retained in a single genus. Despite the perceived morphological distinctness of oral structures possessed by *P. cerberi* and *Ateuchocephala marina,* they represent only secondary loss of traits (oral spines) already reduced in size in their closest relative and a tilting of the mouth orientation. *Paracanthostomum* and *Ateuchocephala* are therefore characterized in part by the absence of traits. Conversely, *Atrophecaecum* would not exist as a natural taxon if *P. cerberi* and *Ateuchocephala marina* are excluded from it.

Three types of objections commonly raised concerning cladistic classification include: (1) they involve loss of information about "gaps" or degrees of difference between taxa (anagenetic information), (2) they produce confusing and unusable diagnoses and keys, and (3) any attempts to preserve cladistic information produce long unwieldy classifications. All of these objections have been treated empirically in papers published by various authors primarily in *Systematic Zoology* during the past ten years. This study provides an opportunity to demonstrate the efficacy of phylogenetic classification using a set of real taxa.

Loss of information.—Consider the three genera *Atrophecaecum, Paracanthostomum,* and *Ateuchocephala* in the classification presented by Yamaguti (1971). *Paracanthostomum* and *Atrophecaecum* (as a subgenus of *Acanthostomum*) belong in the Acanthostominae and *Ateuchocephala* comprises the sole

- over -

member of the Ateuchocephalinae. Such a classification does not represent any information concerning any members of *Atrophecaecum* which exhibit traits intermediate between the other taxa, nor does it recognize any of the similarities between *Ateuchocephala* and *Paracanthostomum*. Yamaguti's classification proposed a set of relationships opposite to the phylogenetic relationships supported by known data; *Ateuchocephala* was considered the sister-lineage of *Paracanthostomum* plus all other acanthostomes, and *Paracanthostomum* was considered the sister-lineage of all armed acanthostomes, including *Atrophecaecum*. Even if *Paracanthostomum* were considered a member of the Ateuchocephalinae, the classification would suggest that *Atrophecaecum* excluding *Paracanthostomum* and *Ateuchocephala* comprises a monophyletic group. Such a notion is not supported by any known data. In such cases, because *Atrophecaecum lobacetabulare* possesses traits intermediate between *Atrophecaecum* and *Paracanthostomum* plus *Ateuchocephala,* the "gap" between the taxa no longer exists, and existed originally only as an artifact of sampling error. Insofar as gaps represent either large numbers of character differences, which may be an artifact of data type or of sampling, or large-scale character differences, which may also be an artifact of data type, information concerning such occurrences should not be a basis for classification. Such occurrences are represented in every cladogram but do not alter the branching pattern or classification produced. A cladistic classification does not indicate directly such gaps, but the diagnoses for which the taxon names stand do.

Confusion in diagnoses and keys.—It has been suggested (Mayr 1969; Sneath and Sokal 1973) that cladistic classifications are not very stable. One aspect of that instability would be wholesale changes in diagnoses and keys every time a new taxon is included in the classification. It is true that the inclusion of the taxa in question within *Atrophecaecum* requires changes in some diagnoses and keys. However, we think the changes are few and minor, especially when compared with the number of unnecessary redundancies in diagnoses required if *Paracanthostomum* and *Ateuchocephalus* were maintained separately from the other acanthostomes.

Brooks and Caira, 1982

Genus: *Atrophecoecum* Bhalerao, 1940

Bhalerao (1926) described the species *Acanthochasmus burminis* Bhalerao, 1926 from the intestine of the river snake *Natrix* (= *Tropidonotus*) *piscator*. This species differs from the other representatives of this genus in termination of intestinal branches which bifurcate in two separate anal openings and, according to Bhalerao (1940), in the atrophy of right intestinal branch. Bhalerao (1940) attaches such taxonomic importance to this character that he transfers *A. burminis* to a new genus, *Atrophecoecum*.

Although the atrophy of the intestinal branch has remained a single finding in this group, two anal openings have already been described in 3 species of trematodes: *Acanthostomum scyphocephalum* (Braun, 1901); *A. caballeroi* Peláez et Cruz, 1956; *A. americanum* Pérez Vigueras, 1956; *A. acuti* Caballero, 1959; *Atrophecoecum diploporum* (Stunkard, 1939) Morozov, 1955; *Atrophecoecum minimum* (Stunkard, 1938) Morozov, 1955. These, as can be said "American" species differ from the Indian species (type-species) in their equally developed intestinal branches and in their terminating in two anal openings situated at the posterior extremity on both sides of excretory pore. In *A. burminis* (Bhalerao, 1940) the atrophy of right intestinal branch is conspicuous and the intestines open higher on both sides of body.

Although Caballero (1956) does not take the presence of anal openings for the character of genus and supposes that their visibility can be influenced by fixation, staining and mode of collecting, the opinion of Caballero (1956) "que es casi constante la presencia de aberturas anales en las especies de *Acanthostomum* Looss, 1899 ..." seems to be valid for both American species. *A. loossi* Pérez Vigueras, 1956 (found also in our collections) with the blind termination of intestinal branches forms an exception to the rule. On the other hand, in all species of the genus *Acanthostomum* of the Old World, with the exception of *Atrophecoecum burminis* Bhalerao, 1940, the blind terminations of intestines are present.

The studies of a greater number of specimens from our collections revealed that the subfamily *Acanthostominae* Nicoll, 1914 can be divided in two morphological groups of species. One of them has constant anal openings, the other one blind termination of intestinal branches. We have further found that our specimens in which the anal openings are present possess an organ very similar to gonotyle, surrounded by glandular cells and situated postacetabularly (Figs 2E, 4C, D). Most probably it is an auxiliary copulatory organ called pseudogonotyl, found also by Cain (1966) in the neotropical genus *Ochoterenatrema* Caballero, 1943 (Lecithodendriidae). This pseudogonotyl was not observed in the specimens with blind termination of intestines. This assertion cannot be generalized, because there were only few species of the genus *Atrophecoecum* in our material. However, if this coherence between both characteristics is confirmed, they would represent suitable and unambiguous characteristics for differentiation between both genera. Collection, fixation and staining of all specimens in our material were performed by the same method.

Conformably to Morozov (1955) we consider the genus *Atrophecoecum* to be a valid taxonomic category and we transfer to this genus the following species: *Atrophecoecum scyphocephalum* (Braun, 1901) comb. n.; *A. caballeroi* (Peláez et Cruz, 1956) comb. n.; *A. americanum* (Pérez Vigueras, 1956) comb. n.; *A. acuti* (Caballero, 1959) comb. n.; *A. nueveleonensis* (Caballero et G. Caballero, 1964) comb. n. The species belonging in the genus *Atrophecoecum* we have found in *C. rhombifer* are described further.

Atrophecaecum Bhalerao, 1940

FAMILY ACANTHOSTOMIDAE POCHE, 1926

Twelve individual trematodes were recovered from three hosts (*Laticauda semifasciata*). All except two of these specimens were in good condition and made excellent whole mounts. It was apparent from a study of these worms that they could not be assigned to any existing genus due to their various peculiarities. Our specimens possess characters which are most similar to those of the genus *Acanthostomum* Looss, 1899.

SYN. *Ateuchocephala*, n. gen. Coil & Kuntz, 1960

DIAGNOSIS: with the characters of the family Acanthostomidae Poche, 1926. Body moderately elongate. Cuticle aspinose. Anterior end lacking crown of spines. Oral sucker terminal. Prepharynx lacking and pharynx adjacent to oral sucker. Esophagus present. Caeca bifurcate between oral sucker and acetabulum and extend to posterior end where they open to exterior through separate, small pores. Acetabulum relatively large, about one-fourth body length from oral sucker. Testes in tandem in posterior quarter of body. Seminal vesicle extremely long, tubular, convoluted. No copulatory organ present. Genital pore adjacent and anterior to acetabuulm. Ductus hermaphroditicus short and thin-walled. Ovary slightly lateral just anterior to testes and ventral to seminal receptacle. Uterus preovarian with numerous eggs, extending into extracecal space. Vitelline follicles in posterior half of body located in field with some follicles in region of gonads. Excretory vesicle Y-shaped with a long stem, bifurcating at level of caecal bifurcation. Rami reach to level of oral sucker. Usually a parasite of marine snake.

Two genera of acanthostomids have been reported from reptiles: *Caimanicola* Freitas and Lent, 1938 and *Acanthostomum* Looss, 1899. It is this latter genus that our worms resemble most; however, there are several differences which make it mandatory to establish a separate category. The most striking of these differences is the absence of a crown of spines around the anterior end. In the event that cephalic or oral spines were present, which seems unlikely since our specimens were in good shape, there are a number of other differences which are sufficient to require the erection of a new genus. These are; 1) an aspinose cuticle, 2) prepharynx lacking, 3) caeca open to exterior some distance from posterior end, 4) uterus extends into extracaecal field, 5) the excretory bladder bifurcates in the region of the bifurcation of the gut.

Type species: A. marinus Coil & Kuntz, 1960

A number of species of *Ateuchocephala* have been described in addition to *A. marina*, but their validity and identities remain in question pending acquisition of material for study. Therefore, we make only the following new combinations:

Ateuchocephala marina Coil and Kuntz, 1960 becomes *Atrophecaecum marinum* (Coil and Kuntz, 1960), n. comb.; Ateuchocephalinae Yamaguti, 1971 becomes a junior subjective synonym of Acanthostominae Poche, 1926.

Brooks and Caira, 1982

Atrophecaecum Bhalerao, 1940

Syn. *Paracanthostomum* ~~n. gen.~~ FISCHTHAL AND KUNTZ, 1965

DIAGNOSIS: Body elongate, narrow; cuticle spined. Circumoral crown of spines lacking. Oral sucker larger than acetabulum, latter in anterior body fourth. Prepharynx very long, longer than pharynx; esophagus shorter than prepharynx or pharynx. Cecal bifurcation preacetabular. Ceca of more or less uniform width, terminating near posterior extremity, opening through anal pores at posterolateral body margins. Excretory bladder Y-shaped, stem passing ventral to gonads, bifurcating near acetabulum, arms extending only to acetabular level, pore terminal. Testes two, tandem, within posterior body fourth. Cirrus sac lacking. Seminal vesicle convoluted, mostly postacetabular. Genital atrium tubular. Genital pore median, just preacetabular. "Genital sac" (invagination of ventral body surface) anterior to genital pore. Ovary pretesticular. Seminal receptacle and Laurer's canal present. Vitelline follicles in lateral fields, postacetabular, pretesticular, mostly extracecal; vitelline reservoir present. Uterus ascending from ovary, mostly intercecal, uniting with duct from seminal vesicle dorsal to acetabulum. Eggs operculate. Parasitic in small intestine of snake.

TYPE SPECIES: *P. cerberi* n. sp.

Synonymy by Brooks and Caira, 1982

Key to the species of the genus *Atrophecaecum* Bhalerao, 1940.

Receptaculum seminis smaller than ovary	*A. burminis* (Bhalerao, 1926)
Receptaculum seminis as large as or larger than ovary ...	*A. hindusthanensis* sp. nov.

Since the genus *Atrophecaecum* has not been properly defined by Bhalerao (1940), it is being done here and an emended diagnosis is given :

Generic diagnosis of *Atrophecaecum* Bhalerao, 1940 : emended.

Acanthostomatidae : *Acanthostomatinae* : Body long, cylindrical, beset with minute spines. Oral sucker terminal, cup-shaped, much larger than ventral sucker, with a circumoral coronet of large strong spines variable in number. Ventral sucker very small, located far forward towards the anterior end. Prepharynx present. Pharynx well-developed. Oesophagus short. Intestinal bifurcation shortly in front of ventral sucker. Intestinal caecum of one side normal, while that of the other side much atrophied ; both caeca open to the exterior at the sides of posterior region of body by separate ani. Testes entire, tandem, located in the posterior region of body. Cirrus-sac absent. Vesicula seminalis large, extends far behind ventral sucker, lies free in parenchyma, and consists of a coiled anterior part and a large oval posterior part. Ductus ejaculatorius, ductus hermaphroditicus and an unarmed cirrus present. Genital pore in front of ventral sucker close to the intestinal bifurcation. Ovary a short distance in front of the testes. Laurer's canal and receptaculum seminis present. Vitellaria well-developed, lateral, confined to the middle region of body, from the region of the ventral sucker upto the level of ovary. Uterus with ascending transverse tails pre-ovarian, extending anterioly upto the coiled portion of vesicula seminalis wherefrom it is continued as the metraterm. Eggs many. Excretory bladder Y-shaped. Intestinal parasites of ophidia.

Genotype *Atrophecaecum burminis* (Bhalerao, 1926).

From Baugh, 1956

Atrophecaecum cerberi (Fischthal and Kuntz, 1965) Brooks and Caira, 1982

Acanthostomatidae

FISCHTHAL AND KUNTZ, 1965

Syn. *Paracanthostomum cerberi* n. sp. (Fig. 5)

HOST: *Cerberus rhynchops* (Colubridae, syn. Homalopsidae).

HABITAT: Small intestine.

LOCALITY: Ranau, North Borneo.

DATES: 20, 21 October 1960.

TYPES: U.S.N.M. Helm. Coll. No. 60943 (one slide of holotype and four with one paratype each).

DIAGNOSIS (based on 19 specimens; three mature in ventral and three in lateral view measured): Body length 2,880 to 4,885, width 165 to 215, depth 215 to 227, elongate, narrow, nearly uniform in width; cuticle spined to short distance preovarian, spines more numerous and coarser anteriorly. Circumoral crown of spines lacking. Forebody 375 to 615; hind body 2,335 to 4,190; posttesticular space 206 to 365; postcecal space 51 to 102. Pigment granules in parenchyma throughout body length. Oral sucker, length 116 to 157, width (in two) 111 to 116, depth (in four) 109 to 138, subterminal, acetabulum, length 62 to 80, width (in two) 67 to 72, depth (in four) 70 to 77, at level of anterior 11 to 18% of body length; sucker length ratio 1 : 0.51 to 0.56. Prepharynx (extended in four) 110 to 215 long; pharynx, length 91 to 123, width (in two) 80 to 92, depth (in four) 94 to 109, shorter then prepharynx; esophagus 19 to 46 long; cecal bifurcation preacetabular, slightly overlapping anterior part of acetabulum, inflated; ceca relatively narrow, extending to near posterior extremity, each opening laterally at slightly different levels through anal pores. Excretory bladder Y-shaped, stem very long, tubular, extending anteriorly ventral to gonads, uterus and seminal vesicle to near acetabulum where it becomes somewhat inflated; arms short, inflated, only extending to acetabular level; collecting ducts extending anteriorly to short distance behind oral sucker; bladder connected to terminal pore by short, narrow canal.

Testes two, tandem, in contact or up to 29 apart, 15 to 58 postovarian, usually oval, smooth, intercecal or slightly overlapping ceca dorsally, lying within posterior 12 to 18% of body length; anterior testis, length 74 to 143, width 73 to 74, depth 77 to 111, 1,985 to 3,545 postacetabular; posterior testis, length 74 to 170, width 68 to 77, depth 94 to 113, 2,057 to 3,695 postacetabular. Cirrus sac lacking. Seminal vesicle commencing 330 to 695 postacetabular, elongate, much convoluted, mostly intercecal, overlapping ceca dorsally, proximal end may be saccular, remainder tubular. Genital atrium tubular, formed by union of duct from seminal vesicle and uterus dorsal to acetabulum. Genital pore median, just preacetabular. "Genital sac" short distance anterior to genital pore, an invagination of ventral body surface.

Ovary, length 62 to 115, width 55 to 70, depth 75 to 85, oval, smooth, submedian to right or left, intercecal or may slightly overlap cecum dorsally, 1,895 to 3,365 postacetabular. Mehlis' gland well developed, dorsal and anteromedian to ovary. Seminal receptacle, length 66 to 143, width 42 to 67, depth 58 to 66, elongate, saccular, commencing median to ovary, oriented diagonally and lying between ovary and anterior testis, slightly overlapping former dorsally and in contact with latter or nearly so, intercecal or distal end overlapping cecum dorsally. Laurer's canal muscular, convoluted, median to seminal receptacle and opening dorsally at level of latter. Vitelline follicles small, extracecal but may slightly overlap ceca, fields 1,125 to 2,420 long, extending from short distance posterior to seminal vesicle to anterior margin of ovary or preovarian, commencing 550 to 750 postacetabular and terminating 480 to 960 from posterior extremity; vitelline duct descending medianly from each field, uniting dorsal to ovary to form short reservoir. Uterus ascending from ovary in transverse, more or less intercecal coils to level of posterior part of seminal vesicle, then continuing ascent in more or less straight path to union with duct of seminal vesicle dorsal to acetabulum. Eggs numerous, operculate, with opercular collar, 30 measuring 26 to 33 by 16 to 21.

DISCUSSION: Our collection consisted of 19 specimens from four snakes: two with two immature specimens each; one with three mature, one just starting egg production, and three immature specimens; one with eight mature specimens. A "genital sac" similar to that noted in our species has been described and illustrated by Coil and Kuntz (1960) for *Acanthostomum pakistanensis*. Three genera of acanthostomids have been reported from reptiles: *Acanthostomum* Looss, 1899, *Caimanicola* Freitas and Lent, 1938, *Ateuchocephala* Coil and Kuntz, 1960. Khalil (1963) reviewed the genus *Acanthostomum*, recognizing four subgenera: *Acanthostomum*, *Atrophecaecum*, *Haplocaecum*, *Gymnatotrema*; all but the latter have been reported from reptiles. Khalil overlooked the genus *Proctocaecum* erected by Baugh (1957a) for three species of *Acanthostomum* possessing anal pores. However, such pores are present in many, if not all, species of *Acanthostomum*. Therefore, we declare *Proctocaecum* a synonym of the latter. The three species in *Proctocaecum* were listed by Khalil in the subgenus *Acanthostomum*. Our form most closely resembles the genus *Acanthostomum*, but the lack of a circumoral crown of spines and the presence of short excretory arms reaching only to the acetabular level rather than the pharynx make it necessary to erect a new genus for it. A careful study of our specimens, most of which are in excellent condition, failed to reveal any evidence of circumoral spines. Our earlier (1963) study of the two species of *Acanthostomum* noted that when circumoral spines were lost scars were visible where formerly they were imbedded. Four genera of acanthostomids are known in which circumoral spines are lacking (*Anisocoelium* Lühe, 1900, *Paraisocoelium* Ozaki, 1932, *Isocoelium* Ozaki, 1927, *Ateuchocephala*), but our form does not resemble any of them.

(over)

Yamaguti (1971)

further reported a fairly long prepharynx in *Paracanthostomum cerberi*, but we found the prepharynx of the holotype and of specimens reported by Brooks and Palmieri (1981) to be as short as or shorter than the pharynx.

Brooks and Caira, 1982

Atropheecaecum hindusthanensis ~~sp. nov.~~ Baugh, 1956

A large number of specimens of this species were collected from the intestine of an unidentifiable snake, the carcass of which was obtained from a dealer in snake skins at Banaras Cantt. U. P.

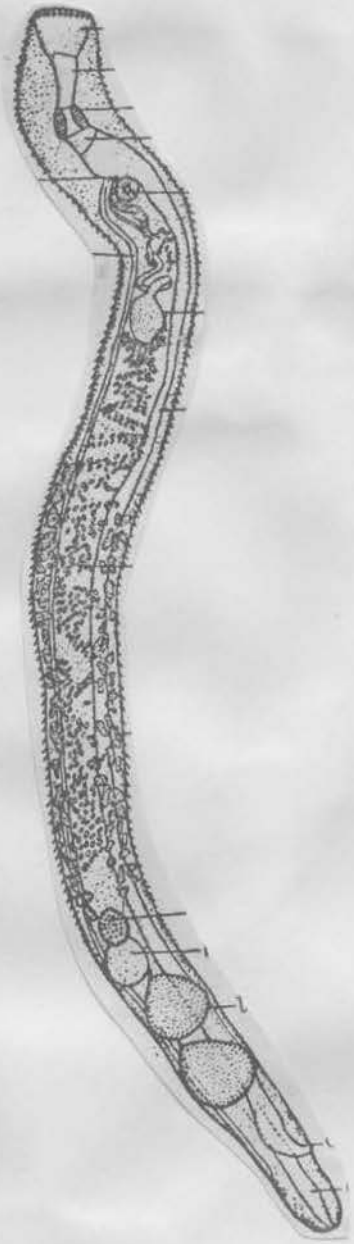
The elongate cylindrical body (Fig. 2a) of the trematode measures 3·25—4·02 mm. in length and 0·28 – 0·33 mm. in maximum width. It is broadest in the region of the ventral sucker or slightly in front of the latter. The oral sucker is terminal, cup-shaped and measures 0·082-0·132 mm. × 0·165-0·181 mm. The ventral sucker is circular, much smaller than the oral sucker, situated at a distance of about one-sixth of the body length from the anterior end and measures 0·074-0·082 mm. in diameter. A coronet of strong spines, usually comprising 26 spines but variable from 25 to 28 in number, is present at the anterior end (Fig. 2b) around the edge of the oral sucker. The spines are mostly 0·018-0·028 mm. in length and 0·0039-0·0052 mm. in width, but some measure about 0·013 mm. × 0·0039 mm. The body is covered with minute spines which are arranged in oblique transverse rows. They are dense in the preacetabular region of the body, but become sparse posteriorly behind the ventral sucker and are altogether absent in the posterior region.

The mouth leads into an elongated prepharynx which measures 0·082-0·181 mm. in length. The pharynx is a well developed structure, usually squarish in shape, measuring 0·082-0·099 mm. × 0·082-0·099 mm. The oesophagus is short, 0·033-0·066 mm. in length and 0·082-0·165 mm. in width. It bifurcates into two intestinal caeca in front of the ventral sucker. The intestinal caeca, which are asymmetrically developed, run backwards along the sides of the body to a short distance in front of the posterior end. Usually the left caecum but in some specimens (about 25%) the right caecum is much slender, being about one-fourth the calibre of the other one which is quite normally developed. The normal caecum is usually much dilated at its posterior end just behind the posterior testis. Both caeca (Fig. 2c) open posteriorly to the exterior by separate ani situated at the sides of the body at a distance of about 0·165-0·297 mm. in front of the posterior end. The normal caecum narrows considerably just before opening to the exterior and its opening lies in some specimens slightly posterior to that of the other one.

The testes are pear-shaped, round, or even oval, closely situated one behind the other in the posterior region of the body and impart in some specimens a sort of a bulge to the body wall in this region. The anterior testis is usually slightly smaller than the posterior one, the former measures 0·181-0·231 mm. × 0·132-0·198 mm., while the latter 0·198-0·247 mm. × 0·165-0·214 mm. The vasa efferentia are long ducts which run forward and meet each other a short distance behind the ventral sucker to form the vas deferens which opens into a large and prominent vesicula seminalis situated about 0·27-0·44 mm. behind the ventral sucker. The vesicula seminalis (Fig. 2d) is full of sperms and lies free in the parenchyma. It consists of two parts : an oval posterior part measuring 0·115-0·198 mm. × 0·066-0·155 mm., and another long, coiled, and gradually tapering anterior part, which passes by a narrow constriction into the ductus ejaculatorius. The ejaculatory duct eventually opens into the ductus hermaphroditicus (Fig. 2d) which leads to the exterior through the genital pore situated in the middle line in front of the ventral sucker close to the intestinal fork or even ventral to the latter. The everted cirrus is a short aspinose structure measuring 0·039-0·057 mm. in length.

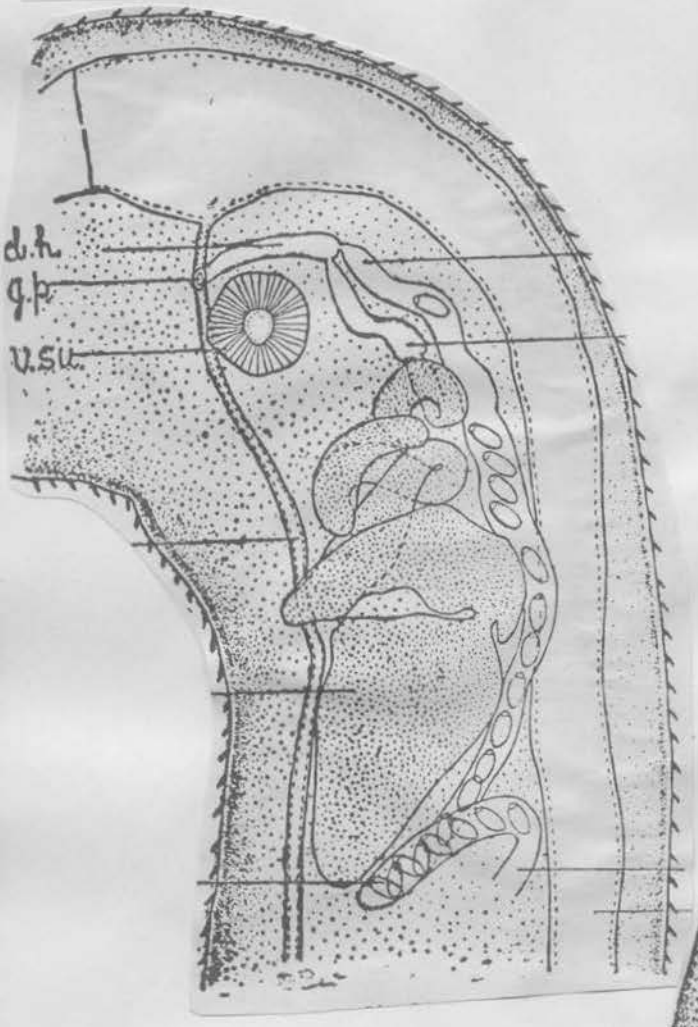
The ovary is ovoid or even round, mesially situated a little in front of the anterior testis and measures 0·115-0·132 mm. × 0·082-0·115 mm. The oviduct is short, about 0·046 mm. in length. Laurer's canal is a long structure measuring about 0·195 mm. in length. The receptaculum seminis which is located in between the anterior testis and the ovary is a strikingly large structure, usually much larger than the ovary, and rarely of the size of ovary. In some specimens it is even as large as the testes. It measures 0·115-0·231 mm. × 0·115-0·148 mm. Its anterior end is slightly narrowed to form a short duct which together with the oviduct, Laurer's canal and median vitelline duct opens into the ootype from which the uterus arises and runs towards the anterior end. The shell gland mass is, however, not distinguishable in any specimen. The vitellaria are well-developed, confined to the middle third of the body, and extend on either side from a distance of 0·132-0·412 mm. behind the vesicula seminalis upto the level of the ovary. The follicles are large, irregular, mostly extracaecal but some overlap the caeca. A vitelline reservoir is distinctly visible in some specimens. The uterus runs forward upto the level of the vesicula seminalis making transverse coils which extend laterally at places across the intestinal caeca. The metraterm runs along with the terminal part of the male genital duct usually by the right side of the ventral sucker in those specimens wherein the left caecum is normal and vice versa. Eventually it opens like the ejaculatory duct (Fig. 2d) into the ductus hermaphroditicus at about the middle level of the ventral sucker. The eggs are elliptical to oval, partly embryonated and operculated. They measure 0·0286-0·0364 mm. × 0·0130-0·0182 mm.

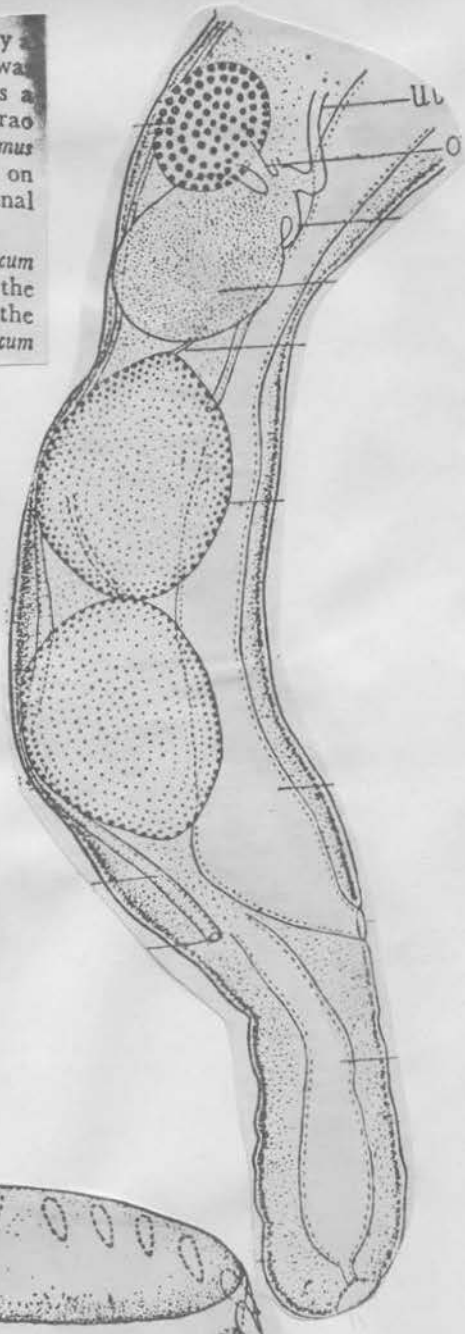
The excretory pore is terminal. It leads through a short canal into a wide and cylindrical excretory vesicle which is traceable upto the level of the posterior testis.



was pointed out that the generic name *Acanthostomum* was not preoccupied by a genus of insect and, therefore, the genus *Acanthostomum* established by looss (1899) was valid, and further that the genus *Acanthochasmus* suggested by looss (1900) as a substitute for *Acanthostomum* fell into synonymy with the latter. In 1940, Bhalerao founded the genus *Atrophecaecum* with *Atrophecaecum burminis* (Syn. *Acanthochasmus burminis* Bhalerao, 1926; *Acanthostomum burminis* Bhalerao, 1936) as the genotype on the basis of the atrophied nature of the right caecum and the direct external anal openings of both the intestinal caeca.

The species described by the writer differs from the genotype, *Atrophecaecum burminis*, chiefly in having its receptaculum seminis as large as or larger than the ovary, larger testes and smaller eggs. The writer, therefore, considers that the form described above is a distinct species which is denominated as *Atrophecaecum hindusthanensis* sp. nov.





D. Acanthostomidae Poche (1926), emend. Nicoll (1935)

1. *Atrophocaecum* Bhalerao (1940)

Bhalerao, 1940, created the genus *Atrophocaecum* for his species *Acanthostomum burminis* (1936) which he had originally described in 1926 under the name *Acanthochasmus burminis* n. sp. This fluke has fairly wide distribution occuring in the water-snake, *Tropidonotus piscator*. It was first described from Burma by Bhalerao, 1926, and then subsequently recorded by Thapar and Ali from Lucknow, India, (1929) and again by Bhalerao from Nagpur in 1940 when he took the opportunity of studying in detail the digestive system of the fluke. He distinguishes the genus *Atrophocaecum* by the peculiar condition of the caeca, the right one being much atrophied and the two caeca opening posteriorly by means of ani.

Atrophocaecum indicum n. sp. This fluke was collected from the water-snake *(Tropidonotus piscator)* caught in the streams in the vicinity of Hyderabad. The parasites were obtained from all the snakes dissected and examined in various seasons of the year. It was, however, noted that infections are light during the months of August and September.

The body of the fluke is elongate and somewhat cylindrical in shape with a truncated anterior and a rounded posterior end. It measures 2.0—2.8 mm. in length and maintains an uniform diameter of 0.186 to 0.207 mm. in the region anterior to the acetabulum, whilst posterior to it the body narrows slightly and then maintains an uniform width for a considerable length. It tapers gradually behind the ovary to terminate in a broadly rounded tail. The cuticle covering the body is thin and armed with minute spines. The oral sucker is terminal, measuring 0.083—0.138 × 0.073 mm. The rim of the sucker carries 24 to 27 spines arranged in a circle round the mouth. The acetabulum which is situated at about 1/5th of the body length from the anterior end, is smaller than the oral sucker, measuring 0.069 mm. in diameter. The mouth opening is terminal and surrounded by the oral sucker,

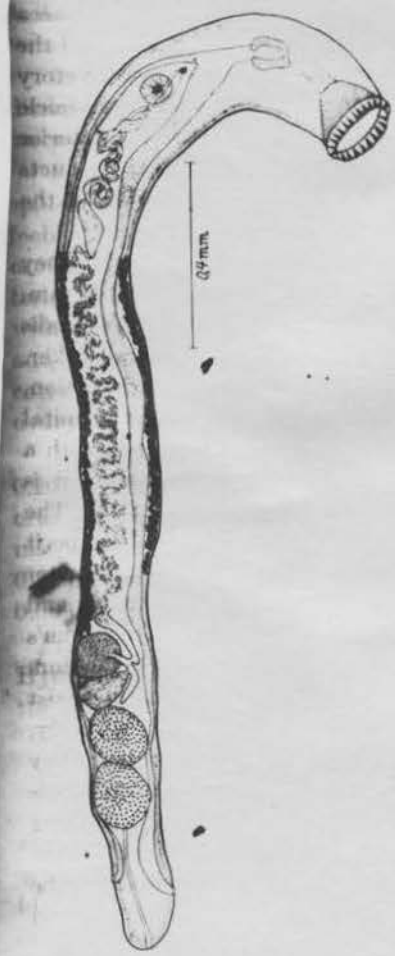


Fig. 13. *Atrophocaecum indicum* n. sp. (Ventral view)

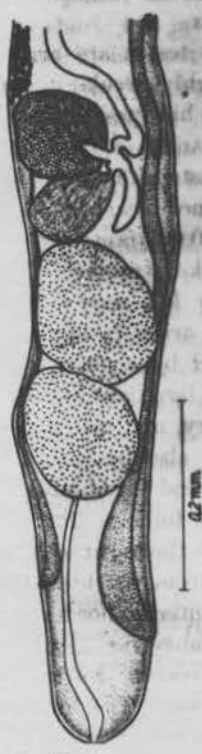


Fig. 14. *Atrophocaecum indicum* n. sp. (Ventral view). Posterior end

↓ ATROPHECAECUM BHALERAO, 1940

Khalil (1963) considers this genus a subgenus of Acanthostomum.

Simha, 1958

posterior to which lies the prepharynx, 0.116—0.117 mm. long. The pharynx is in the form of a sphere with thick muscular walls and measures 0.062 × 0.062 mm. The oesophagus which follows is roughly of the same diameter as the prepharynx; it is about 0.068—0.094 mm. long and divides into 2 fairly thick caeca, a feature which distinguishes the *Atrophocaecum* from the allied genus *Ancanthostomum*. The normally developed left caecum and the much atrophied right caecum proceed down the length of the body to the caudal region where they open to the exterior at the anal apertures situated on the lateral margins, of the body, about 0.012 mm. from the posterior end. The tips of the caeca form funnellike enlargements, the left one measuring 0.022 mm. and the right one 0.01 mm. respectively. The median and terminal excretory pore, situated at the posterior end, communicates with a tubular vesicle which extends along the mid longitudinal axis of the body to the anterior border of the ovary. Here it bifurcates into two lateral excretory ducts which extend forwards along the sides of the body to the level of the pharynx.

The testes are arranged in tandem position to the ovary. They are roughly circular in outline, the front testis measuring 0.092—0.17 mm. and the hind testis 0.094—0.18 mm. in diameter. The vesicula seminalis is large and is situated at a distance of 0.022 mm. from the ventral sucker. It consists of a large, posterior basal sac and a anterior coiled portion, the former measuring 0.124 × 0.055 mm. in length. The common genital pore is 0.003 mm. anterior to the ventral sucker and it is armed with a comb like structure. The ovary is placed in front of the testes; it is more or less ovoid, measuring 0.083—0.104 × 0.069—0.117 mm. The oviduct arises from the mid plane of the ovary and near the ootype it is joined by a short duct from the receptaculum seminis. The latter forms a large sac-like structure wedged in between the front testis and the ovary, and measures 0.069—0.089 × 0.083—0.117 mm. A LAURER's canal is also present which opens into the duct of the receptaculum seminis and terminates blindly at its distal end. The vitellaria consist of small follicles distributed along the lateral margins of the body, those of the right side mostly covering the atrophied caecum. They extend from the level of the hind border of the receptaculum seminis to the anterior border of the ovary. The uterus ascends up describing small transverse loops between the ovary and the basal sac of the seminal vesicle. Further up it runs coiled with the latter to open at the genital pore. The uterus is filled with eggs, which are operculate and yellowish brown in colour, measuring 0.03 to 0.034 × 0.011 to 0.014 mm.

Discussion. The Ancanthostome fluke described above belongs to the genus *Atrophocaecum* which is distinguished by the marked atrophy of the right caecum and by the character of the caeca opening separately by distinct anni. It, however, differs from the only known species of the genus *A. burminis* in the following points:

1. In *A. burminis* the ventral sucker is situated at the level of the intestinal bifurcation partly overlapping the left caecum, whereas it is at some distance behind the bifurcation in *A. indicum*. — 2. The testes occupy almost the entire width of the body in *A. indicum*, whilst they hardly cover half the body width in *A. burminis*. — 3. The genital pore lies over the intestinal fork in *A. burminis*, whereas it is found between the fork and the ventral sucker in the fluke under study. — 4. The body is narrow in *A. indicum* and distinctly broader in *A. burminis*.

As a result of these differences it is concluded that the parasite discribed above constitutes a new species for which the name *Atrophocaecum indicum* n. sp. is porposed.

Principal measurements. Length, 2.0—2.8 mm.; breadt, 0.186 to 0.207 mm. at acetabular level and 0.157—0.176 mm. at middle of body; oral sucker, 0.083—0.138 × 0.078 mm.; acetabulum, 0.069 mm. in diameter; oesophagns, 0.068—0.094 mm. long. Anterior testis, 0.092 to 0.17 mm.; posterior testis, 0.094—0.180 mm.; ovary, 0.083—0.104 × 0.069—0.117 mm.; eggs operculate, 0.03—0.034 × 0.011—0.014 mm.

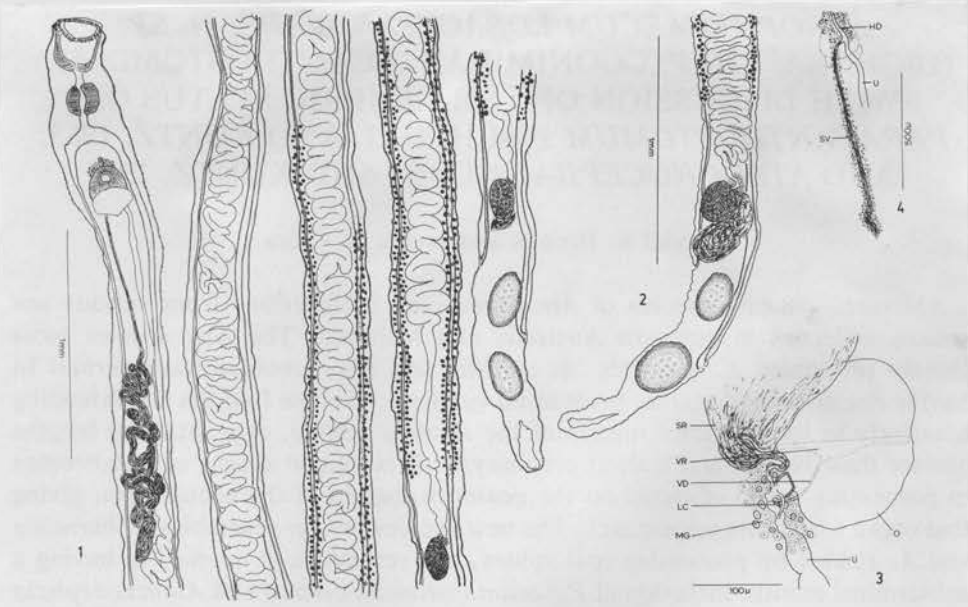
Host: *Tropidonotus piscator*. — Habitat: Intestine. — Locality: Hyderabad, India. — Type specimens are deposited in the museum of the Zoology Department, Osmania University, Hyderabad.

Specific diagnosis. Distomes having elongated body covered with spines; oral sucker terminal, armed with 24—27 spines; acetabulum feebly developed; prepharynx present; oesophagus short; left intestinal caecum normal and right caecum atrophied; intestinal bifurcation anterior to acetabulum. Testes subcaudal in position, occupying the entire width of the body; ovary anterior to testes; receptaculum seminis and LAURER's canal present; genital pore posterior to intestinal bifurcation; vitellaria distributed in the lateral margins of the body between ovary and acetabulum; eggs operculated.

Atrophecaecum lobacetabulare, ~~new species~~ Brooks and Caira, 1982
Figs. 1–4

Description (based on 34 specimens).—Body elongate, 4.32–12.30 mm long (n = 27) by 0.24–0.75 mm wide (n = 27); widest point variable in hindbody; ratio of body width to length 1:9.1–33.8 ($\bar{x}$ = 1:18.1, n = 27). Tegument spinose; extent of spination not determined due to fixation methods. Eyespot pigment lacking. Oral sucker cup-shaped, terminal with subterminal mouth, 154–297 (n = 24) long by 143–231 (n = 24) wide, surrounded by single uninterrupted row of 24–26 spines; spines 22–38 (n = 20) long by 12–29 (n = 20) wide. Acetabulum 105–231 long (n = 23) by 95–209 wide (n = 23), with posterior lobe giving bipartite appearance; lobe not apparent in many specimens. Forebody 6.4–14.1% of total body length. Ratio of oral sucker width to acetabular width 1:0.64–1.07 ($\bar{x}$ = 1:0.84, n = 20). Prepharynx 60–242 long (n = 21), thin-walled. Pharynx barrel-shaped, 108–148 long (n = 22) by 99–214 wide (n = 22). Ratio of oral sucker width to pharyngeal width 1:0.50–0.89 ($\bar{x}$ = 1:0.71, n = 16). Ratio of acetabular width to pharyngeal width 1:0.59–1.15 ($\bar{x}$ = 1:0.87, n = 16). Esophagus usually extremely short, not measured. Cecal bifurcation less than 5% of total body length pre-acetabular; ceca lined with epithelium, opening separately and laterally near posterior end of body; one cecum atrophied.

Testes spherical to subspherical, smooth, tandem, not contiguous; anterior testis 209–345 long by 132–208 wide, posterior testis 220–396 long by 132–352 wide; post-testicular space 3–11% of total body length ($\bar{x}$ = 7%, n = 26). Seminal vesicle consisting of posterior saccate part and anterior sinus part, sinuous, median, intercecal, extending 4.6–11.7 times acetabular length postacetabular ($\bar{x}$ = 9.1, n = 18). Prostatic duct surrounded by few prostatic cells free in parenchyma. Preacetabular pit without spines, with transverse aperture 80–83 wide, surround-



Figs. 1–4. *Atrophecaecum lobacetabulare*: 1, Ventral view of holotype; 2, Close-up of posterior end of paratype, showing position of seminal receptacle, which is not apparent in holotype; 3, Close-up of ootype region; 4, Dorsal view of acetabular region of holotype, showing terminal genitalia. Abbreviations: HD = hermaphroditic duct; LC = Laurer's canal; MG = Mehlis' gland; O = ovary; SR = seminal receptacle; SV = seminal vesicle; U = uterus; VR = vitelline reservoir; VD = vitelline duct.

– over –

ed by gland cells; gonotyl lacking. Genital pore immediately preacetabular, opening immediately posterior to preacetabular pit. Postacetabular pit lacking.

Ovary approximately one ovarian diameter pretesticular, not contiguous with anterior testis, spherical to subspherical, 120–264 long by 99–242 wide. Seminal receptacle posterodorsal to ovary, 132–506 long by 77–198 wide. Ootype region as in Fig. 3. Uterus wound in ascending loops intercecal between ovary and acetabulum; loops occupying 63–75% of total body length ($\bar{x}$ = 70%, n = 23); joining hermaphroditic duct posterior to acetabulum. Vitellaria follicular; follicles in 2 longitudinal rows dorsal and lateral to ceca, extending from immediately preovarian to 8–50% of total body length postacetabular ($\bar{x}$ = 27%, n = 24), terminating at uneven levels. Left vitellarium follicles extending anteriorly to 8–46% of total body length postacetabular, right vitellarium follicles extending anteriorly to 9–50% of total body length postacetabular. Follicles not reaching anteriorly to posterior margin of seminal vesicle, 14–33 long by 12–29 wide. Eggs 25–35 ($\bar{x}$ = 28, n = 34) long by 13–20 ($\bar{x}$ = 16.5, n = 34) wide. Excretory vesicle Y-shaped; bifurcation posterodorsal to acetabulum; pore terminal with muscular sphincter surrounded by gland cells.

Hosts.—Disteira major (Shaw), *Hydrophis caerulescens* (Shaw), *H. spiralis* (Shaw), *Enhydrina schistosa* (Daudin) (type), *Lapemis hardwicki* Gray (Ophidia: Hydrophiidae: Hydrophiinae: Hydrophiini).

Site of infection.—Small intestine.

Localities.—Penang, Malaysia (type) (*E. schistosa, H. spiralis, L. hardwicki*); Western Gulf of Carpenteria, Australia (*D. major, H. caerulescens*).

Holotype.—USNM Helm. Coll. No. 77161. *Paratypes.*—USNM Helm. Coll. No. 77162, 77163, 77164.

Etymology.—The species is named for its lobate acetabulum, a feature unique among acanthostomes.

Specimens upon which the description of the new species is based were collected from sea-snakes quick-frozen shortly after capture and kept frozen until returned to the laboratory, where they were thawed and examined. Most were partially thawed, eviscerated, and the viscera refrozen and shipped to the University of Alberta. Collected helminths were fixed with cold AFA, stained with Harris' hematoxylin and mounted in Permount (Fisher). Measurements are in micra unless otherwise stated, with mean values ($\bar{x}$) and number of observations (n) for some traits; figures were drawn with the aid of a drawing tube.

Atrophecaecum lobacetabulare most closely resembles the species *A. burminis* (Bhalerao, 1926) Khalil, 1963, and *A. simhai* Khalil, 1963, and *Paracanthostomum cerberi* Fischthal and Kuntz, 1965, by having one atrophied cecum, preovarian vitellaria, vitelline follicles not extending anteriorly to the posterior margin of the seminal vesicle, eggs attaining lengths greater than 30 μm, and a very short prepharynx. The new species is unique among known acanthostomes by virtue of its possessing a lobate acetabulum. It resembles *A. burminis* and *A. simhai* by having oral spines, although they are relatively much smaller than those of most other acanthostomes. It resembles *P. cerberi* by possessing a subterminal mouth with terminal oral sucker. Thus, *A. lobacetabulare* occupies a systematic position intermediate between the taxa listed above.

Coil & Kuntz, 1960

Ateuchocephala marinus, n. sp. (Figs. 2 and 4)

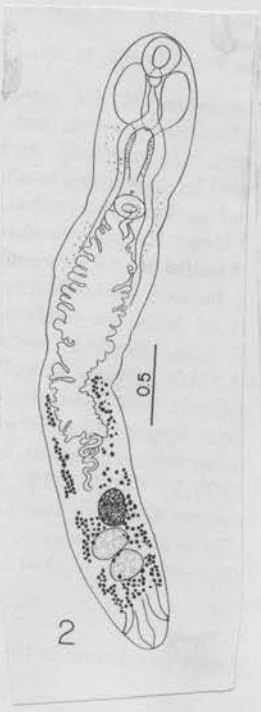
DIAGNOSIS: with the characters of the genus. Distomes of moderate size with an aspinose cuticle. Cuticle somewhat wrinkled or folded. Body up to 4.9 long and up to 0.71 at the widest part. Oral sucker slightly subterminal, 0.22 to 0.31 wide. Prepharynx absent. Pharynx 0.10 to 0.12 wide, located on dorsal, posterior surface of oral sucker. Esophagus 0.20 to 0.32 long. Ceca long, extending near posterior end, 0.17 to 0.25, where they open to the exterior through small ani. Walls of ceca of moderate thickness. Testes frequently of irregular shape, usually touching or very close together, 0.22 to 0.29 long, located in posterior quarter of body. Cirrus sac lacking. Genital pore just anterior to acetabulum. Ductus hermaphroditicus extends from genital pore to a point dorsal to acetabulum where male and female ducts join. Numerous gland cells not apparent in this region. Long, sinuous seminal vesicle extends from region of acetabulum a short distance posteriorly. Ovary 0.17 to 0.24 wide, ventral, and a short distance anterior to testis. Seminal receptacle ellipsoidal, dorsal to ovary. Loops of uterus extend from ovary to region of acetabulum overlapping the ceca and dorsal to them. Uterus joins ductus hermaphroditicus dorsal to acetabulum. Excretory bladder a single stem to level of gut bifurcation where it divides and rami extend to level of pharynx and oral sucker. Numerous pigment granules in dorsal field in region slightly anterior to acetabulum. Vitelline follicles mainly lateral, but extending mediad in region of testes, located in posterior two-fifths of body extending almost to ani. Eggs 0.015 to 0.017 by 0.026 to 0.030.

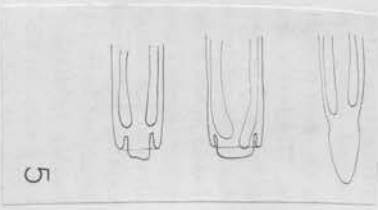
HOST: *Laticauda semifasciata* (sea snake).

HABITAT: Small intestine.

LOCALITY: Hung Tou and Tung Ching (Villages on Lan Yü Island).

TYPE SPECIMENS: In the Helminthological Collection of the U.S.N.M., No. 39414.





Coil and Kuntz (1960) reported lateral ani for *Ateuchocephala marina*, but Yamaguti (1971) reported no ani after examining a paratype. We examined the specimens in question and found lateral ani and slight cecal atrophy.

Brooks and Caira, 1982

Brientrematinae Dollfus, 1950

Subfamily diagnosis. - Acanthostomidae: Body elongate oval, spinose. Circumoral crown of spines present. Prepharynx fairly long, pharynx strongly developed, esophagus extremely short, ceca terminating near posterior extremity. Acetabulum about middle of anterior half of body. Testes directly juxtaposed or diagonal, in posterior half of body. Genital atrium wide, with gonotyl. Ovary submedian, pretesticular. Vitellaria extending along posterior portion of ceca. Uterus in inter- and extracecal fields in acetabulo-ovarian zone. Excretory vesicle Y-shaped, bifurcating in front of ovary; arms wide, reaching to oral sucker or pharynx.

Brientrema Dollfus, 1950

Generic diagnosis. — Acanthostomidae, Brientrematinae: Body longitudinally elongated oval, spinose. Oral sucker globular, terminal, with circumoral crown of spines; prepharynx present; pharynx well developed; esophagus very short or practically absent; ceca simple, terminating near posterior extremity. Acetabulum well developed, at about posterior end of first quarter of body. Testes rounded, unlobed, directly juxtaposed or oblique, intercecal, in posterior half of body. Seminal vesicle tubular, convoluted posterior to acetabulum. Genital atrium median or submedian, surrounded by gland cells, extending over acetabulum dorsally, provided with gonotyl (genital sucker), opening at anterior border of acetabulum at level of posterior end of pharynx or a little behind it. Ovary submedian, postequatorial. Receptaculum seminis and Laurer's canal present. Uterus inter- and extracecal, between acetabulum and ovary; eggs extremely numerous, small. Vitellaria extending along posterior portion of ceca, surpassing a little, if any, the level of anterior end of ovary. Excretory vesicle Y-shaped, with long stem bifurcating in front of ovary; arms wide, reaching to oral sucker or pharynx. Parasitic in intestine of birds(?) and fishes.

Genotype: *B. pelecani* Dollfus, 1950 (Pl. 73, Fig. 895), in *Pelecanus rufescens* [1]); Belgian Congo.

Other species: *B. malapteruri* Dollfus, 1950 (Pl. 37, Fig. 474), in *Malapterurus electricus* and *Distichodus lusosso;* Belgian Congo.

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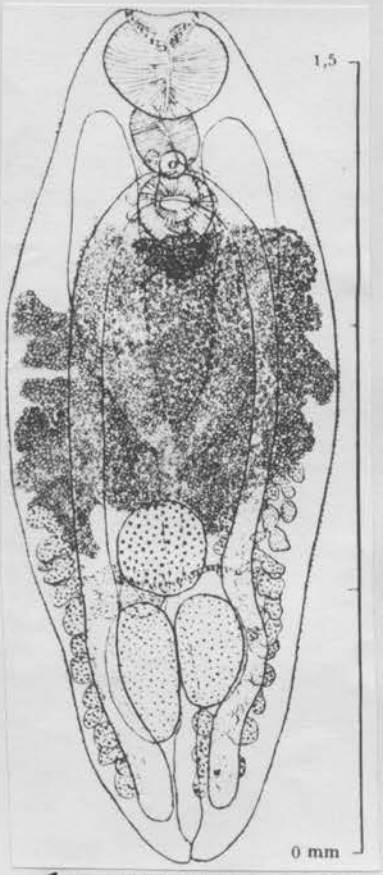
[1]) It seems to me very likely that this species is an accidental parasite, because the other species of the same genus was found in two fish hosts at the same locality.

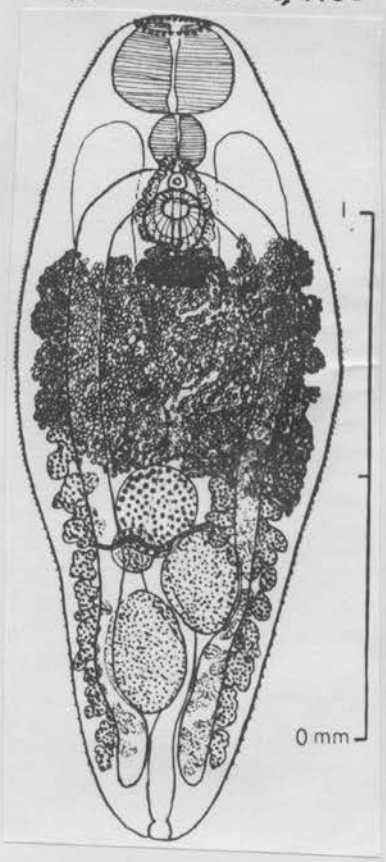
Brientrema pelecani Dollfus, 1950

Host: Pelecanus rufescens Gmelin, 1789

Loc.: Belgian Congo

See publication for description.



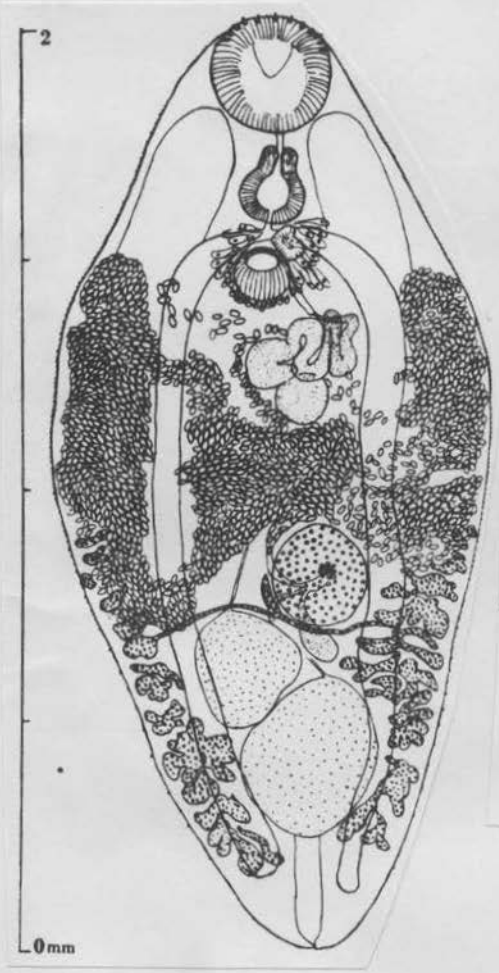


Figs. from Dollfus, 1950

Brientrema malapteruri Dollfus, 1950

Host: Malapterurus electricus (Gmelin, 1789)
Distichodus lusosso Schilthuis, 1891
Loc.: Belgian Congo

See publication for description.



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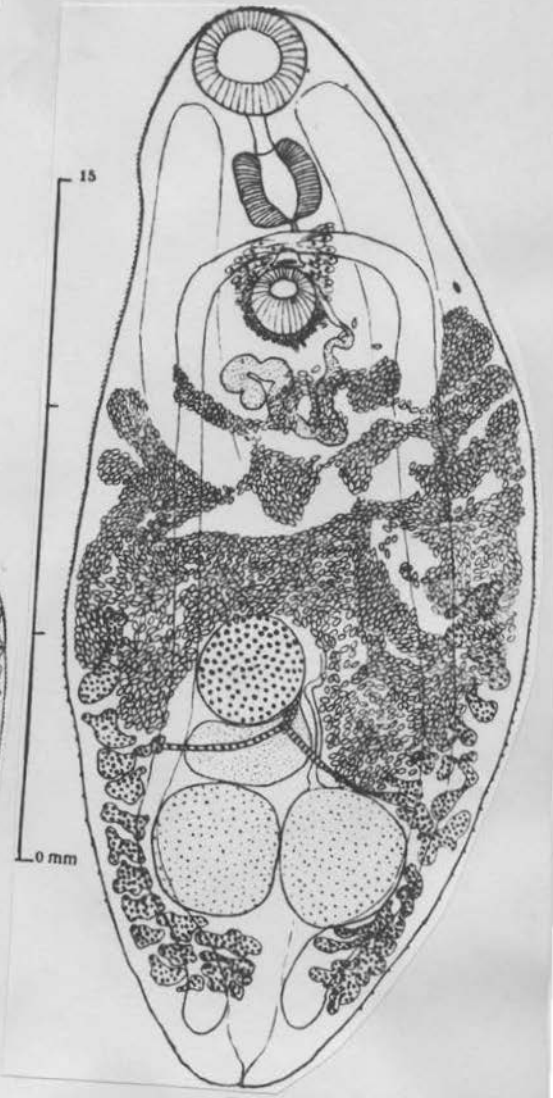


FIGS. FROM DOLLFUS, 1950

Caimanicola Freitas et Lent, 1938

Generic diagnosis. — Acanthostomidae, Acanthostominae: Body lageniform, with a distinct constriction at neck. Acetabulum small, near midbody. Oral sucker very large, with shallow cavity and a crown of spines. Prepharynx long; pharynx longer than broad; esophagus rather short, bifurcating just in front of acetabulum. Ceca terminating at posterior extremity. Testes directly tandem at posterior extremity. "Vesicula seminal não evidenciada". No cirrus pouch. Genital pore median, immediately in front of acetabulum. Ovary submedian, immediately pretesticular. Vitellaria lateral, in acetabulo-ovarian zone. Uterus coiled transversely between ovary and acetabulum, may or may not overreach ceca laterally. Intestinal parasites of reptiles.

Genotype: *C. marajoara* Freitas et Lent, 1938 (Pl. 51, Fig. 627), in *Caiman sclerops*.

This species is transferred by Hughes, Higginbotham and Clary (1942) to *Acanthostomum*, the new combination being *A. marajoarum*.

Caimanicola ~~n. gen.~~ FREITAS AND LENT, 1938

Heterophyidae. Centrocestinae. Ventosa anterior terminal, deprimida, em forma de capsula; abertura oral circundada por espinhos conspicuos; acetabulo mediano, situado approximadamente na zona equatorial do corpo; cuticula com espinhos escamiformes presentes até o terço anterior da zona uterina); pharynge presente; esophago pouco desenvolvido ou não; cecos relativamente longos, extendendo-se até a região posterior do corpo; póro genital logo acima do acetabulo; bolsa do cirro ausente; vesicula seminal não evidenciada; testiculos post-uterinos, post-ovarianos, geralmente intra-cecaes, um adeante do outro, levemente lobados; ovario sub-mediano, pre-testicular, post-uterino, intracecal, lobado ou não; glandula de Mehlis pequena, na zona ovariana; vitellinos de folliculos bem desenvolvidos, extendendo-se da zona post-acetabular á zona ovariana, occupando as areas extra-cecaes e, parcialmente, as cecaes; utero intra-cecal, ás vezes invadindo as areas cecaes, pre-ovariano e post-acetabular, com alças transversaes. Ovos amarellados, operculados.

HABITAT: — Intestino delgado de repteis.

ESPECIE TYPO: — *Caimanicola marajoara* n. sp.

Este novo genero se approxima de *Lacerdaia* Travassos, 1931, do qual se distingue facilmente pela disposição do utero, constituido por alças transversaes intra-cecaes, o que acarreta outra disposição das glandulas genitaes.

Caimanicola marajoara n. sp. FREITAS AND LENT, 1938

Est. 2, figs. 1-3.

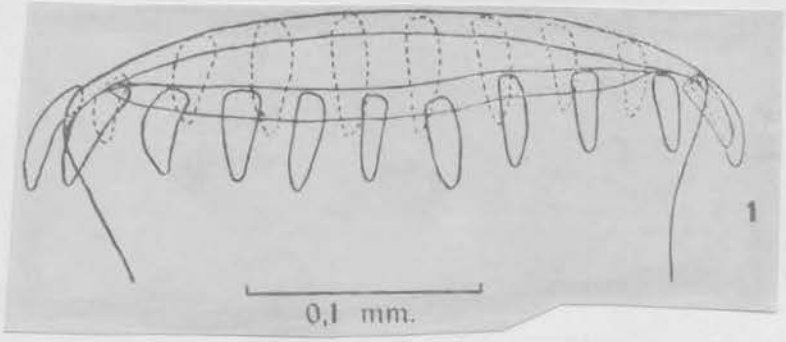
Corpo mais ou menos ovoide, com uma porção cervical um pouco estreitada, tendo a extremidade anterior provida de espinhos circumoraes conspicuos e a extremidade posterior arredondada. Mede 1,18 a 1,21 mm. de comprimento por 0,50 a 0,55 mm. de maior largura. Cuticula provida de pequenos espinhos escamiformes, que se extendem até o terço anterior da zona uterina. Ventosa oral grande, deprimida, terminal, em forma de capsula, que mede cerca de 0,27 a 0,28 mm. de diametro e cujas margens livres são providas de 20 espinhos com 0,051 a 0,054 mm. de comprimento por 0,013 mm. de largura approximadamente. Acetabulo mediano situado approximadamente na zona equatorial do corpo, redondo ou mais largo que longo, com 0,10 a 0,15 mm. de comprimento por 0,15 mm. de largura. Pharynge presente, pouco nitido, com cerca de 0,11 mm. de comprimento por 0,054 mm. de largura. Esophago presente, curto ou não, circumdado por varias cellulas glandulares. Cecos intestinaes relativamente longos attingindo a região posterior do corpo. Póro genital pouco nitido, mediano, situado logo acima da zona acetabular. Bolsa do cirro ausente. Testiculos alongados no sentido transversal, levemente lobados, com campos e zonas coincidindo, parcial ou totalmente aquelles e parcialmente estas, geralmente intra-cecaes, post-uterinos, post-ovarianos, situados na porção posterior do corpo, um atraz do outro. O testiculo anterior mede 0,104 mm. de comprimento por 0,264 a 0,296 mm. de largura; o testiculo posterior tem 0,120 a 0,136 mm. de comprimento por 0,248 a 0,250 mm. de largura. Vesicula seminal não evidenciada. Ovario arredondado ou lobado, sub-mediano, intra-cecal, pre-testicular e post-uterino, com 0,112 a 0,128 mm. de comprimento por 0,120 a 0,136 mm. de largura, approximadamente. Glandula de Mehlis muito pequena, situada na zona ovariana e parcialmente na area deste orgão. Vitellinos de folliculos bem desenvolvidos, extra-cecaes e um pouco cecaes, situados da zona ovariana ao fim da zona uterina, não attingindo a zona acetabular. Campos dos vitellinos com 0,30 a 0,41 mm. de comprimento. Utero desenvolvido, com alças transversaes, situado na area intra-cecal, ás vezes invadindo as areas cecaes, extendendo-se da zona post-acetabular á zona ovariana. Ovos amarellados, operculados, com 0,021 mm. de comprimento por 0,011 mm. de largura.

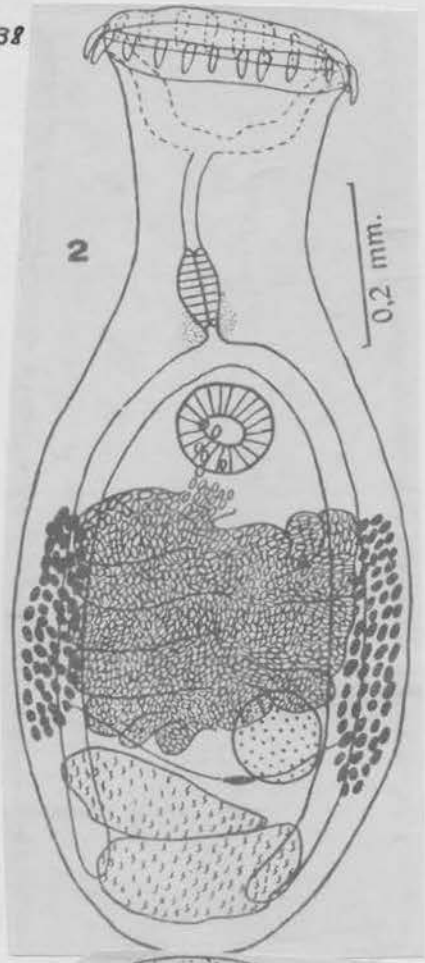
HABITAT. — Intestino delgado de *Caiman sclerops* Gray.

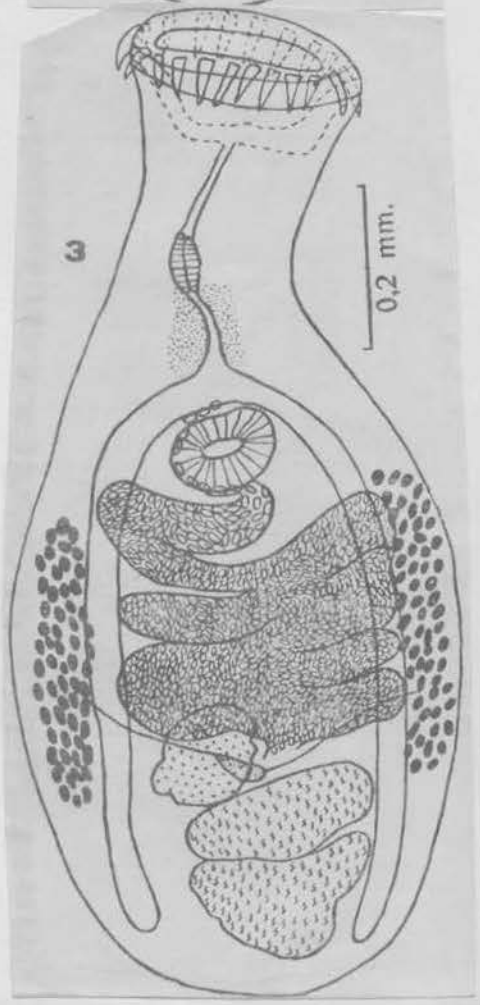
PROVENIENCIA: — Ilha de Marajó, Estado do Pará — Brasil.

TYPOS na collecção helminthologica do Instituto Oswaldo Cruz.

Desta especie só obtivemos 2 exemplares que foram examinados corados.







Cladocystis Poche, 1926

Generic diagnosis. — Opisthorchiidae, Opisthorchiinae: Body flattened elliptical, moderately long. Oral sucker relatively small, prepharynx and esophagus short. Acetabulum small, about one third of body length from anterior extremity. Testes large, longitudinally elongated, symmetrical, at posterior extremity. No cirrus pouch. Genital pore immediately preacetabular. Ovary median, lobate. Receptaculum seminis postovarian. Uterus extending over testes and ceca. Vitellaria in lateral fields of middle portion of hindbody. Excretory arms reaching to oral sucker, with short branches on outer side. In digestive tract of fishes.

Genotype: *C. trifolium* (Braun, 1901). Originally recorded from esophagus of Brazilian *Ardea coicoi* but evidently ingested with a host fish swallowed by the bird — Prudhoe (1951). Fish host: *Salminus maxillosus;* Brazil.

Other species:

C. intestinalis Vaz, 1932, syn *C. trifolium* (Braun, 1901) of Travassos Artigas et Pereira, 1928, (Pl. 103, Fig. 1245) — Vaz (1932), in *Salminus maxillosus;* Brazil.

C. tanganykae Prudhoe, 1951, found amongst the "résidus de fixations des poissons" taken south of Cape Tembwe (Stn. 68).

Opisthorchidae

Note on Cladocystis trifolium (Braun) and CLADOCYSTIS

Vaz (1932) does not agree with Travassos, Artigas & Pereira (1928) that this species inhabits the small intestine of Salminus maxillosus . Vaz names the species C. intestinalis. The host for C.trifolium was Ardea cocoi.

Vaz (1932) does not agree with Poche is assigning Cladocystis to the Heterophyidae. He assigns it to the Opisthorchinae.

Cladocystis Poche, 1926.

Diagnosis. *Opisthorchinae* with elongated body, covered or not with scale-like spines. Acetabulum in the anterior third of the body. Genital pore without sucker, in front of the acetabulum. Pharynx present. Oesophagus and prepharynx short. Excretory vesicle Y-shaped. Testes two, side by side, lobed or smooth, at the posterior extremity of the body. Seminal vesicle long and coiled. Cirrus pouch absent. Ovary on the middle line, lobed or smooth, in front of the seminal receptacle, which is round and in front of the testes. The vitellaria are lateral, cecal and extra-cecal. The uterus is long and coiled, inter and extra cecal. Adults parasitise the intestinal tract of fishes and birds.

Type species: *C. trifolium* (Braun, 1901).

Others: C. intestinalis Vaz, 1931
C. tanganykae Prudhoe, 1951
South & Cape Tembwe -

Cladocystis trifolium (Braun, 1901). Poche, 1926

(Estampa 12, fig. 128)

Estes trematodeos têm a forma de lingua e um comprimento de 0,89 a 0,3 mm. por 0,30 a 1 mm. de largura maxima; a extremidade posterior é mais obtusa e a anterior mais pontuda e arredondada; superficie ventral plana e a dorsal ligeiramente abaúlada; cuticula lisa; ventosa oral sub-terminal, mais ou menos espherica, com um diametro de 0,10 a 0,15 mm.; acetabulo afastado da ventosa oral mais ou menos a terça parte do comprimento do corpo ou 0,30 a 0,77 mm., tem paredes finas e forma circular com um diametro de 0,11 a 0,15 mm.; pré-pharynge presente, curto separa o pharynge da ventosa oral, mede 0,075 a 0,077 mm. de comprimento; o pharynge mede de 0,06 a 0,10 mm. de diametro; o esophago de comprimento muito variavel mede de 0,05 a 0,31 mm. de comprimento; os cecos são difficeis de acompanhar abaixo do equador do corpo e terminam logo abaixo da zona ovariana; póro genital immediatamente adiante da ventosa ventral, na linha mediana, não ha bolsa do cirro mas atraz do acetabulo existe uma longa e sinuosa vesicula seminal; testiculos symetricos, com comprimento de cerca de 0,5 a 0,8 mm. por 0,11 a 0,30 mm. de largura, ficam na extremidade posterior do corpo com zona coincidindo e campos em contacto; ovario trilobado, post-equatorial, pré-testicular, mediano, com um diametro medio no conjunto de 0,22 a 0,36 mm.; para esse orgão se dirigem os vitelloductos; vitellinos muito condensados, situados lateralmente, attingem os testiculos atraz e na frente começam um pouco abaixo do acetabulo, nas areas cecal intra e extra cecal; utero dirige-se a principio para traz e em seguida para frente, passando obliquamente pelo ovario e formando alças dirigidas para traz e attingem até o bordo anterior dos testiculos formando depois alças transversaes; ovos pardo-escuros com (0,023 mm. por 0,014 mm. segundo Braun) 0,029 a 0,035 mm. por 0,018 a 0,021 mm.; o apparelho excretor não poude ser observado.

Habitat: — Esta especie foi descripta por Braun de um exemplar encontrado junto com material de *Clinostomum* proveniente de *Ardea cocoi*. Encontramos nos Dourados (*Salminus maxillosus*) examinados em Emas um trematodeo que corresponde exactamente ao descripto por Braun e do qual nos parece facil explicar a presença em material proveniente de ave ichtyophaga.

A descripção que damos acima é a de Braun accrescida dos dados observados em numerosissimos exemplares por nós examinados; nestes exemplares notava-se uma grande variação de dimensões.

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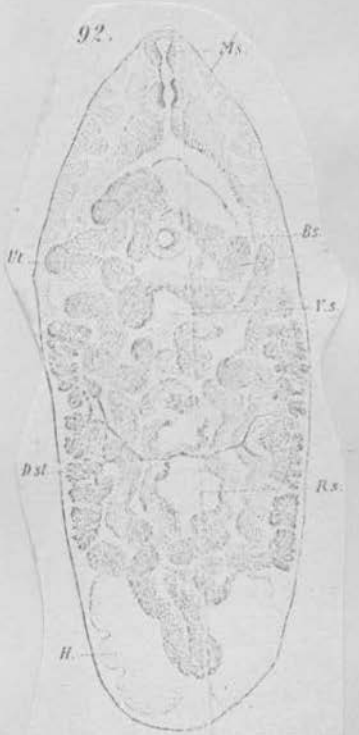

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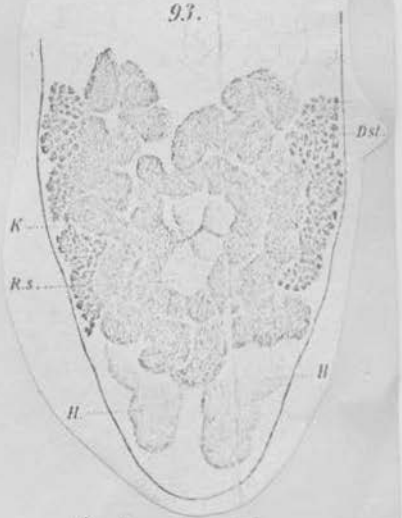


Ex Ardea cocoi
From Braun, 1902

2. *Haplocaecum n. g.* Simha, 1958

Simha, 1958

Khalil (1963) considers this genus a subgenus of Acanthostomum.

***Haplocaecum asymmetricum* n. sp.** In December, 1954, the author collected from the intestine of a green tree-snake, *Dryophis myctirizans*, three specimens of this parasite which could easily be identified as an Acanthostome (Acanthostomidae) due to the presence of the characteristic circlet of spines on the rim of the oral sucker. Detailed examination of live and fixed material, however, revealed the fact that the fluke could not be assigned to any of the known genera of that family. It was therefore concluded that the parasite was new to Science. The following account of the worm is based on a detailed study of the fluke.

The body of the fluke is elongated and has a truncated anterior and broadly rounded tail end. It measures 1.742—1.821 mm. in length and has a maximum width of 0.249—0.257 mm. at the level of the acetabulum. The general body surface is covered with minute spines. The oral sucker is placed at the anterior end and surrounds the mouth which is directed forwards. It measures 0.198—0.217 × 0.091—0.138 mm. and is armed with 24—28 spines arranged in a circlet. The acetabulum is situated to the left of the median line at sbout 1/6th of the body length from the anterior end; it is smaller than the oral sucker, measuring 0.089—0.099 × 0.059 to 0.082 mm.

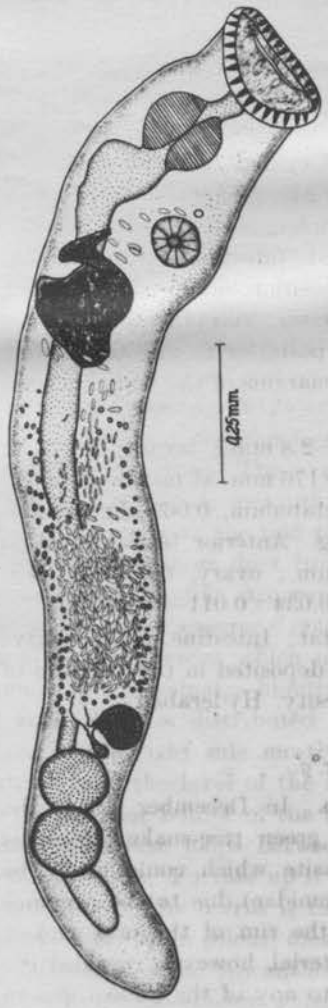


Fig. 15. *Haplocaecum asymmetricum* n. g. et n. sp. (Dorsal view)

The oral sucker communicates with the pharynx by means of a short prepharynx measuring 0.044—0.046 mm. in length. The muscular pharynx, about 0.084—0.085 mm. long, is followed by a very short oesophagus leading into the solitary caecum, which passing along the left hand side of the body extends into the caudal region to terminate in a sac-like dialated end. The right caecum in the fluke has completely disappeared resulting in the unpaired condition of the left caecum. The excretory bladder is tubular and opens at the tail end by means of the terminal excretory pore.

The gonads lie in the posterior portion of the body with ovary placed in front and testes following one behind the other in close proximity. The latter possess rounded entire margins. The anterior testis, is somewhat smaller than the posterior one, they measure 0.118—0.138 and 0.158 to 0.16 mm. respectively. The vesicula seminalis is comprised of a prominent basal-sac and a coiled anterior part situated behind the acetabulum as illustrated in Fig. 15. The common genital pore lies in front of the acetabulum shifted to the left of the median line. The ovary is smooth and rounded, measuring 0.059 to 0.099 mm. in diameter. A small receptaculum seminis and a blind LAURER'S canal are also present. The vitellaria are distributed along the lateral margins of the body; they extend from the level of the hind border of the seminal vesicle to the front border of ovary where the vitellaria of the two sides

onverge in the middle. The uterus emerging from the ootype runs orwards describing small transverse loops between the ovary and the basal-sac" and finally opens in front at the common genital pore. n gravid worms the uterine coils are filled with operculate eggs measuring 0.029—0.034×0.012—0.015 mm.

Systematics. The newly found fluke due to the complete atrophy nd disappearance of one of the two caeca in sharply marked off from he known genera of Acanthostomidae. In having an atrophied caecum he genus *Atrophocaecum* BHALERAO, 1940 occupies an intermediate osition between *Acanthostomum* which has two normally developed aeca and the new fluke which is characterized by the presence of only single caecum. The complete loss of a caecum resulting in the haploid ondition of the intestine is a character of sufficient taxonomic imporance and the writer, therefore, feels justified in creating a new genus or its reception. It is porposed to name it *Haplocaecum* n. g. in view f the structural peculiarity of the gut and to designate the type species s *Haplocaecum asymmetricum* n. sp. for having a displaced acetabulum.

Generic diagnosis of Haplocaecum n. g. — Distomes with flattened nd elongated body covered with small spines; oral sucker armed with 4 to 28 prominent spines; ventral sucker somewhat asymmetrical in osition; oral sucker followed by a small prepharynx leading into a uscular pharynx; a short oesophagus continued into the single left aecum, the right caecum being completely atrophied. Excretory ladder tubular, opening to the exterior at the posterior end. The onads lie in a line closely packed one behind the other; the ovary being tuated immediately in front of anterior testis; cirrus-pouch absent; itellaria, restricted roughly to the middle third of the body, converge nmediately in front of ovary.

Genotype: *Haplocaecum asymmetricum* parasitic in gut of green treeake, *Dryophis myctirizans.*

Specific diagnosis of the type species. With characters as defined ove and with the following body measurements: Length, 1.742 to 821 mm.; breadth, 0.249—0.257 mm.; oral sucker, 0.198—0.217× 099—0.138 mm.; acetabulum, 0.089—0.099×0.059—0.082 mm.; prearynx, 0.044—0.046 mm. long; pharynx, muscular, measuring 0.084 to 0852 mm. Anterior testis, 0.118—0.138 mm.; posterior testis, 0.158 to 16 mm. Ovary, 0.0594—0.099 mm. in diameter; eggs operculated, easuring 0.029—0.0349×0.012—0.015 mm.

Host: *Dryophis mycterizans.* — Habitat: Intestine. — Locality: derabad, India. — Type specimens are deposited in the museum of Zoology Department, Osmania University, Hyderabad.

Isocoeliinae Price, 1939

Subfamily diagnosis. — Acanthostomidae: Body cylindrical, slender, oculate, spined. No circumoral spines. Esophagus moderately long, ceca terminating close to posterior extremity. Acetabulum small, in anterior third of body. Testes diagonal, intercecal, near posterior extremity. Ovary median, deeply lobed, in middle third of body. Vitellaria median, dorsal, divided by ovary into an anterior and a posterior group. Uterine coils between testes and acetabulum. Excretory vesicle Y-shaped, with long stem.

Isocoelium Ozaki, 1927

Generic diagnosis. — Acanthostomidae, Isocoeliinae: Body long, cylindrical, oculate, spinulate. No circumoral spines. Oral sucker comparatively large; esophagus moderately long; ceca terminating near posterior extremity. Acetabulum small, in anterior third of body. Testes diagonal, intercecal, near posterior extremity. Vesicula seminalis long, tubular. Genital pore immediately pre-acetabular. Ovary median, deeply lobed, toward midbody. Vitellaria median, dorsal, divided into two groups, one anterior to ovary and the other posterior. Uterine coils between testes and acetabulum, overreaching ceca laterally. Excretory vesicle Y-shaped, with long stem. Intestinal parasites of marine fishes.

Genotype: *I. mediolecithale* Ozaki, 1927 (Pl. 17, Fig. 219), in *Uranoscopus japonicus*; Pacific coast of Japan and Toyama Bay.

ISOCOELIUM Ozaki, 1927

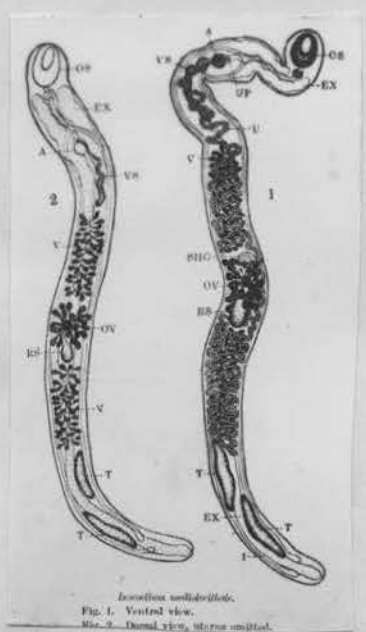
Submedian sized worms with long narrow body. Cuticle with spines. Acetabular aperture midventral, considerably preequatorial. Oral sucker larger than acetabulum; prepharynx and esophagus present. Intestinal ceca nearly symmetrical, reaching nearly to the posterior end of the body. Genital aperture preacetabular midventral. Testes one caudad of the other, intercecal, post-uterine, near posterior end; cirrus and cirrus pouch absent. Ovary in uterine zone, postacetabular, pretesticular, in the middle of the body. Receptaculum seminis and Laurer's canal present. Uterus with descending and ascending limbs, intercecal but extending into extracecal areas. Vitellaria median, under the dorsal surface. one anterior and one posterior to the ovary. Excretory vesicle roomy, long, Y-shaped. Type species: Isocoelium mediolecithale.

Isocoelium mediolecithale Ozaki, 1927

3.28 to 4.27 by 0.22 to 0.27. Cuticle with minute spines, no cephalic armature. Oral sucker with longitudinal opening; 0.167 to 0.205 by 0.130 to 0.160. Acetabulum 1/6 from anterior end; 0.06 to 0.07. Testes in last quarter of body, oblique, spindle-shaped, separated by excretory vesicle. Post-testicular portion about length of testis. Coiled seminal vesicle, 0.37 to 0.55 in length. Genital sinus small; genital pore median. Ovary with 20 to 42 deeply indented lobes. Sem. rec. large, slightly behind and dorsal to ovary. Uterus extends posteriorly to the anterior testis. Vitellaria like two bunches of grapes, one anterior one posterior to ovary, dorsal to excretory vesicle. Excretory vesicle Y-shaped, median stem long extending to near the seminal receptacle. The two limbs extend to pharynx.
Host: Uranoscopus japonicus Houttuyn
Locality: Japan.

Compared with Anisocoelium Luhe, 1900 and Anisogaster Looss, 1901 differing in position of testes and vitellaria.

Yamaguti records this species from the same host (1934) and adds that eye spots are constantly present and that there are cervical gland cells.



ISOCOELIUM Ozaki 1927

Submedium sized worm with long and narrow body. Cuticle with spines. Acetabular aperture midventral, considerably pre-equatorial. Oral sucker larger than acetabulum; pre-pharynx and esophagus present. Intestinal ceca nearly symmetrical, reaching nearly to the posterior end of body. Genital aperture preacetabular, midventral. Testes are one caudad of the other, intercecal, post-uterine, near posterior end. Cirrus and cirrus pouch absent. Ovary in uterine zone, post-acetabular, pre-testicular, in the middle of the body. Seminal receptacle and Laurer's canal present. Uterus with descending and ascending limbs, inter-cecal but extending into extra-cecal area. Vitellaria median under the dorsal surface, one anterior the other posterior to the ovary. Excretory vesicle roomy, long, Y-shaped.

Type species: I. mediolecithale

From: intestine of Uranoscopus japonicus Houttuyn a fish (Marine ?)

Locality: Takamatsu, Japan

Compared with Anisocoelium Luhe 1900
Anisogaster Looss 1901

NEOCLADOCYSTIS Manter & Pritchard, 1969

Family **ACANTHOSTOMATIDAE**

The genus *Cladocystis* POCHE, 1926, is of somewhat uncertain status. YAMAGUTI's (1958) diagnosis applies to the type species, *C. trifolium* (BRAUN, 1901) POCHE, 1926, described from a Brazilian bird, *Ardea cocoi* LINN. TRAVASSOS, ARTIGAS & PEREIRA (1928) state they found the same species in a fish, *Salminus maxillosus* (CUV. & VAL.). However, VAZ (1932) concluded that the specimens from *Salminus*, which he also collected at São Paulo, Brazil, was not *Cladocystis trifolium* but a species which he named *Cladocystis intestinalis*. It differed from *C. trifolium* in having body spines, shorter and unbranched arms of the excretory vesicle, less extensive vitellaria, larger suckers, and unlobed ovary. *Cladocystis tanganyikae* PRUDHOE, 1951 is like *C. intestinalis* in these differences from *C. trifolium*, as is the species described below. The smooth cuticula described for *C. trifolium* is probably a result of loss of spines, and the specimens may well have come from an ingested fish. Even so, the other characters mentioned above seem sufficient to separate *Cladocystis trifolium* from the other species named in that genus.

Neocladocystis n. gen.: Small, elongate to ovate Acanthostomatidae; spined; without special oral spines; oral sucker considerably larger than acetabulum; acetabulum may be withdrawn into body but a definite ventrogenital sac lacking. Testes in posterior third of body, ovoid, symmetrical or slightly diagonal; seminal vesicle a coiled tube, dorsal to or partly posterior to acetabulum; ejaculatory duct short. Genital pore median, immediately preacetabular; gonotyl lacking. Ovary immediately pretesticular, unlobed; seminal receptacle dorsal or posterior to ovary; uterus not extending posterior to testes, with diagonal, longitudinal, or transverse coils; vitellaria in lateral rows between testes and acetabulum. Excretory vesicle Y-shaped with long stem and unbranched arms extending to acetabulum or as far anterior as pharynx. In intestine of freshwater fishes. Type species: *Neocladocystis tanganyikae* (PRUDHOE, 1951) n. comb.; other species: *N. intestinalis* (VAZ, 1931) n. comb., and a new species described below.

Neocladocystis differs from *Cladocystis* in spined body, larger suckers, unbranched arms of the excretory vesicle, and unlobed ovary. It is closely related to *Brientrema* DOLLFUS, 1950, one species of which is from fishes in the Congo. *Brientrema* differs in having small oral spines (sometimes lost), spacious arms of the excretory vesicle reaching to the oral sucker, and a gonotyl. The gonotyl, or « genital sucker » was not described or figured. Type specimens of *Brientrema malapteruri* DOLLFUS, 1950, were kindly loaned by F. PUYLAERT. The gonotyl consists of a spined, thick-walled, anterior evagination of the genital atrium which is also thick-walled. It is conspicuous in some specimens but not apparent in others. The acetabulum is sunken into the body and small muscles of the body wall encircle it and extend around the atrium, but, as in *Neocladocystis*, a definite ventrogenital sac is not present.

DOLLFUS (1950) erected the subfamily Brientrematinae (Family Acanthostomatidae) for *Brientrema*. *Cladocystis* and *Neocladocystis* clearly belong in the same subfamily with *Brientrema*. These genera show the close relationship of the families Acanthostomatidae, Opisthorchiidae, Heterophyidae, and Cryptogonimidae. PRICE (1940) distinguished the Opisthorchiidae and Heterophyidae as having arms of the excretory vesicle not extending anterior to the ovary. The pretesticular uterus of the Brientrematinae separates it from the Cryptogonimidae.

NEOCLADOCYSTIS TANGANYIKAE (PRUDHOE, 1951) MANTER AND PRITCHARD, 1969

(Cyprinodontidae)

SYN. Cladocystis tanganyikae Prudhoe, 1951

Host: either Lamprichthys tanganicanus or some species of Cichlidae.

Locality: Lake Tanganika, Africa

Two specimens. Length 2.5 by 1 mm. Body with fine spines. Eggs 25 to 28 by 17 u.

In optical view it appears cup-shaped. In both examples the inner margin of the sucker appears to be slightly crenulated. A short prepharynx opens into a well-developed pharynx, which measures 0.2 mm in length and 0.12 mm in width. The œsophagus is about as long as the pharynx.

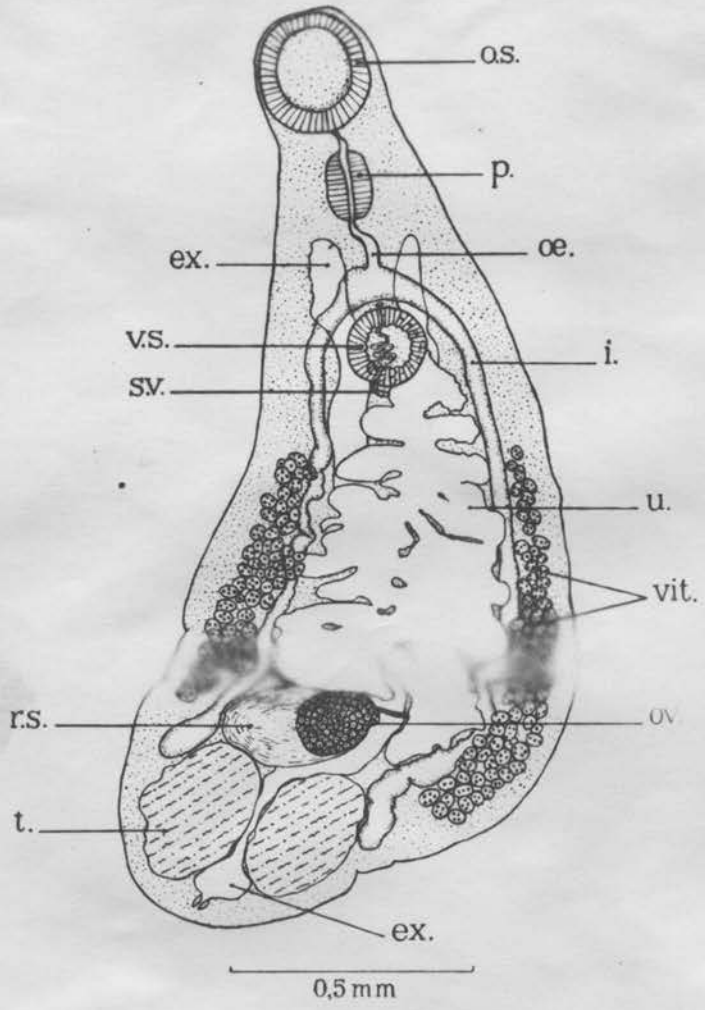


FIG. 1. — *Cladocystis tanganyikæ* n. sp.

Ventral view.

ex. = excretory vesicle; *i.* = intestinal cæcum; *œ.* = œsophagus; *o.s.* = oral sucker; *ov.* = ovary; *p.* = pharynx; *r.s.* = receptaculum seminis; *s.v.* = seminal vesicle; *t.* = testis; *u.* = uterus; *vit.* = vitellaria; *v.s.* = ventral sucker.

and somewhat bent, presumably owing to contraction of the body. It is lined with a relatively thick cuticle. The intestinal bifurcation occurs immediately in front of the ventral sucker, and the intestinal caeca extend posteriorly as far as the testes. In whole preparations it has not been possible to make out the excretory vesicle in its entirety, as it is partially hidden by the uterus. It appears however, to be Y-shaped, the main stem extending [illegible]

The genus *Cladocystis* Poche, 1926, contained hitherto two species *C. trifolium* (Braun, 1901) and *C. intestinalis* Vaz, 1932, both of which occur in the Characid fish *Salminus maxillosus* in Brazil. *C. trifolium* was, however, originally recorded from the oesophagus of a heron (*Ardea cocoi*) in Brazil, and had evidently been ingested with a fish swallowed by the bird.

The new form from Lake Tanganyika bears a considerable resemblance to both these species, but appears to differ from them in certain characters. From *C. trifolium* it differs mainly in the ratio of the diameter of the oral sucker to that of the ventral sucker and in the absence of a trilobed ovary, and from *C. intestinalis* principally in the size of the eggs and in the anterior extent of the vitelline follicles.

Price (1940), in his classification of the superfamily Opisthorchioidea, places the genus *Cladocystis* in the Opisthorchiinæ, a subfamily of the Opisthorchiidæ. It appears to be implicit in this classification that the anterior extent of the Y-shaped excretory vesicle is the main feature by which the family Opisthorchiidæ may be distinguished from the family Acanthostomatidæ. In the Opisthorchiidæ the limbs of the vesicle are short, extending only as far as the ovary, whilst in the Acanthostomatidæ the limbs reach to about the level of the pharynx. In the species described above, as well as in *Cladocystis trifolium*, the Y-shaped excretory vesicle extends well into the anterior region of the body. Thus, if the classification of Price be accepted, the genus *Cladocystis* Poche, 1926, should be transferred to the family Acanthostomatidæ. Of the genera ascribed to this family by Price, *Cladocystis* appears to be closely related to *Œsophagicola* Yamaguti, 1933.

NEOCLADOCYSTIS INTESTINALIS (VAZ, 1931) MANTER AND

Opisthorchidae

SYN. **Cladocystis intestinalis, n. sp.** Vaz, 1931

The representatives of this species are parasites of the fresh water fish *Salminus maxillosus*.

They are small worms, reaching 1,5-2,5mm. in length and 0,4-0,6mm. in breadth. The whole body is covered with small scale-like spines. The spines are longest at the posterior extremity, becoming gradually smaller towards the anterior end.

Oral aperture with two pairs of small papillae.

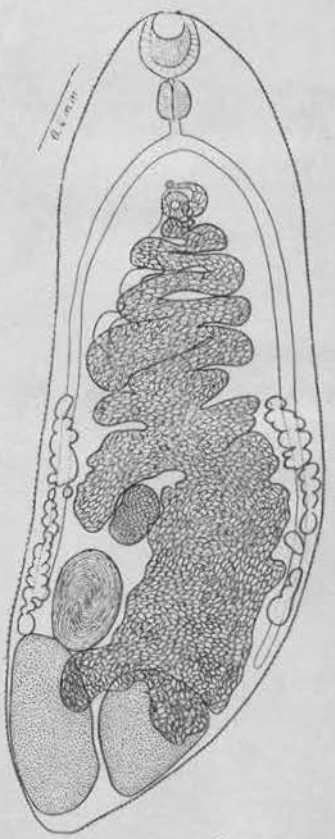
The oral sucker is 0,13-0,14mm. in diameter. The pharynx is 0,082 mm. in length by 0,049 mm. in breadth; the oesophagus 0,1 mm. in length. Intestinal bifurcation at the anterior third of the body; the intestinal caeca are equal and reach the seminal receptacle.

The testes are smooth, slightly elongated, unequal in size and shape; they lie, side by side, at the posterior extremity of the body; the right measures 0,3-0,32 mm. in length by 0,13-0,15 mm. in breadth, the left 0,24-0,26 mm. by 0,2 mm. The seminal vesicle long and coiled, runs in the middle line and reaches the genital pore.

The globular ovary, 0,1-0,2 mm. in diameter, lies in front of the seminal receptacle, which measures 0,12-0,16 mm. in diameter. Vitellaria cecal or extra cecal, reaching anteriorly the middle of the body and posteriorly just in front of testes. Uterus long, coiled, intercecal, sometimes covering the ceca. Eggs oval, 33 to 37 by 16 to 18 μ.

Host: intestine, Salminus maxillosus

S. Paulo, Brazil



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7. - **Neocladocystis congoensis** n. sp. - Nr. 33-714. Adults.

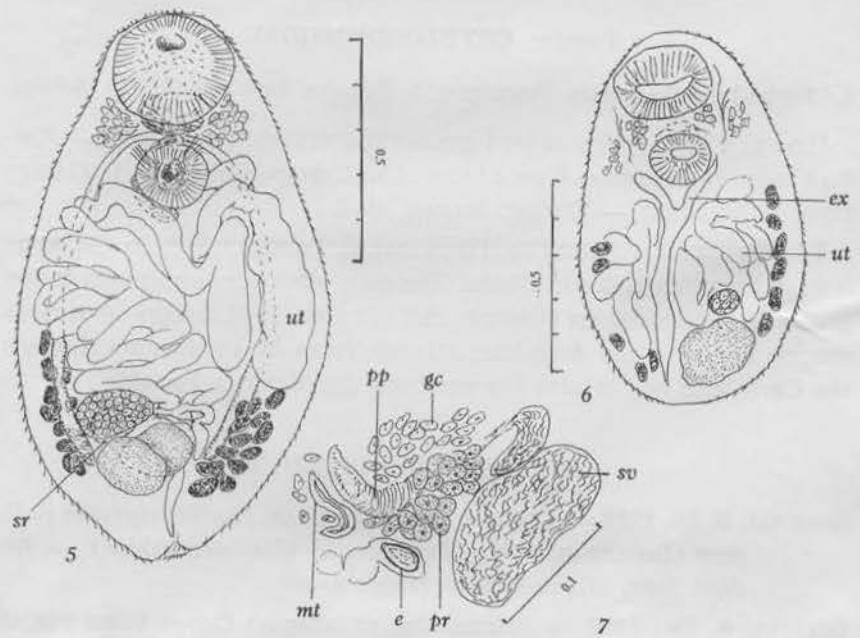
(Figures 5-7) Manter & Pritchard, 1969

Host: *Parauchenoglanis guttatus* (LÖNNBERG); (Bagridae). — Location: Intestine. — Locality: Ebogo, Cameroun. — Collector: F. PUYLAERT. — Date: August 1967.

Description (based on 11 specimens, more or less contracted, not killed under pressure; measurements on six specimens): Body plump, ovoid, widest just posterior to midbody, rounded at each end; covered with scalelike spines. Length 0.950 to 1.273 mm; width 0.690 to 0.855 mm. Suckers nearly circular in outline; oral sucker 0.268 to 0.281 mm in diameter. Acetabulum about 1/4 to 1/3 from anterior end; withdrawn into body; 0.147 to 0.193 mm in diameter A few diagonal muscles extending anterolaterally on each side of acetabular aperture. Sucker ratio 1: 0.52 to 0.72 usually 1: 0.67. Prepharynx practically lacking; pharynx wider than long, with both circular and radial muscles, extending diagonally backward and dorsally, 0.06 to 0.08 mm long (measured from ventral surface), 0.128 to 0.160 mm wide. Oesophagus very short; caeca curving lateral to acetabulum, not reaching posterior end of body by about 0.2 mm (ending at about midtestis level).

Testes two, ovoid, smooth, subsymmetrical to diagonal, near posterior end of body. Seminal vesicle tubular, becoming coiled, immediately postacetabular, sinistral or partly dorsal to acetabulum; pars prostatica with few, small gland cells; ejaculatory duct a narrow muscular tube. Genital atrium thick-walled, laterally extended. Genital pore median, immediately preacetabular.

Ovary unlobed, wider than long, about same size as testes, immediately anterior to right testis. Seminal receptacle large, dorsal or partly dorsal and partly posterior to ovary. Vitelline follicles large; lateral; in posterior half of body; not extending posterior to testes; not confluent; lateral, dorsal, and ventral to caeca. Uterus pretesticular, partly lateral to caeca, voluminous, with mostly diagonal coils in right half of body, mostly longitudinal coils in left half of body. Eggs ovoid but wider in posterior half, 24 to 29 by 14 to 16 microns. Metraterm short, thick-walled.



Figs. 5-7. — 5. *Neocladocystis congoensis*, holotype, ventral view. Abbreviations: *sr*, seminal receptacle; *ut*, uterus; - 6. *N. congoensis*, frontal section of paratype showing excretory vesicle (*ex*); - 7. *N. congoensis*, terminal genital ducts in frontal section immediately dorsal to acetabulum. Abbreviations: *e*, egg in uterus; *gc* gland cells of forebody; *mt*, metraterm; *pp*, pars prostatica; *pr*, prostatic gland cells; *sv*, seminal vesicle.

All figures drawn with the aid of a camera lucida with scales indicated in mms.

Excretory pore at posterior end of body; excretory vesicle Y-shaped with long stem and short arms, forking a little posterior to acetabulum; arms reaching to near midacetabular level.

Discussion: This species is most similar to *N. tanganyikae* but differs in being about 1/2 as large, in larger oral sucker, short esophagus, wider pharynx, and arms of excretory vesicle not extending anterior to acetabulum. It differs from *N. intestinalis* in its much larger acetabulum, uterus partly lateral to caeca, more posterior extent of the vitellaria, and smaller eggs.

MANTER (1963) has already noted that *N. tanganyikae* and *N. intestinalis* in strictly freshwater hosts are an indication of the former continuity of Africa and South America. *Neocladocystis congoensis* extends the distribution of the genus to western Africa.

Neotropicotrema ~~gen. nov.~~ Caballero and Caballero, 1975

DIAGNOSIS: Trematoda Digenea muy pequeños, con el cuerpo revestido de espinas muy finas en su parte anterior; ausencia de corona de espinas preacetabulares; ventosa oral grande y campanuliforme, musculosa; acetábulo más pequeño que la ventosa oral, musculoso, esférico, intercecal entre el poro reproductor y la bolsa del cirro. Presencia de prefaringe corta; faringe fuerte, ovoidea y musculosa; esófago ancho y muy corto; ciegos intestinales lisos, extendiéndose lateralmente hasta la porción caudal en donde se anastomosan para formar un arco intestinal; en los estados larvarios se ve claramente la unión de los ciegos intestinales para formar el arco intestinal posterior. El poro reproductor está por detrás de la bifurcación intestinal y por delante del acetábulo; bolsa del cirro, grande, fuerte, abrazando al acetábulo por el lado derecho y extendiéndose hasta cerca del ovario; vesícula seminal bipartida, la porción posterior ovoidea y grande, la anterior, casi esférica, se continúa con un conducto de paredes gruesas que se abre en un cirro corto inerme; ovario ovoideo o casi esférico, intercecal, más pequeño que los testículos; testículos, caudales, ovoideos o esféricos, intercecales, el anterior menor que el posterior y éste casi tangente al arco intestinal. El útero llena las áreas cecal e intercecal y con un asa ascendente del lado izquierdo del acetábulo que termina en el poro reproductor; huevecillos abundantes, operculados y pequeños. Las glándulas vitelógenas, fundamentalmente extracecales, con algunos lóbulos intercecales, se extienden desde la parte posterior de la bolsa del cirro hasta el borde posterior del testículo posterior. Son verdaderas bandas que se dirigen del borde del cuerpo hacia adentro. Poro excretor terminal posterior y tallo principal de la vesícula excretora en forma de Y.

GENEROTIPO: *Neotropicotrema bychowskyi* gen. nov., sp. nov.
HABITAT: Intestino de peces de agua dulce de la familia *Lepisosteidae* del Río Palizada, Campeche, Golfo de México, México.

DISCUSION

En el año de 1967 BARUS y MORAVEC (2), estudiando parásitos de *Lepisosteus tristoechus* (Bloch y Schneider, 1801) de la Isla de Cuba, Mar Caribe, establecieron el género *Perezitrema* que es muy parecido al género nuevo que aquí se propone, principalmente por el tamaño de la ventosa oral, pero se diferencia por tener un esófago largo y angosto, por no poseer una anastomosis de los ciegos intestinales que forman un arco posterior y por la forma y estructura de las glándulas vitelógenas. Se piensa que *Neotropicotrema* gen. nov. no pertenece a la familia Acanthostomidae Poche, 1926 atendiendo principalmente al arco intestinal posterior y a la forma de la vesícula excretora (4, 6).

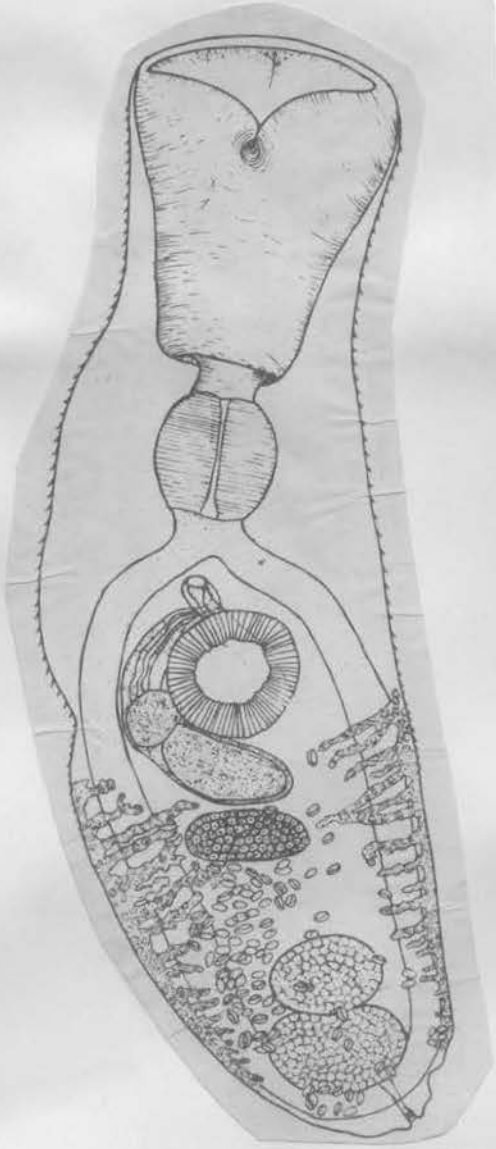
Neotropicotrema bychowskyi ~~gen. nov.~~, ~~sp. nov.~~ Caballero and Caballero, 1975

(Figs. 1, 2)

De un total de ocho ejemplares de *Lepisosteus tropicus* (Gill, 1863) examinados, en seis de ellos se colectó larvas y parásitos adultos del intestino. La presente descripción está basada en la observación de diez ejemplares adultos y en las medidas de dos de ellos.

Son parásitos pequeños de cuerpo alargado, de 1.596 a 1.732 mm de largo por 0.204 a 0.401 mm de ancho a nivel del acetábulo. La cutícula está cubierta por pequeñas espinas claramente visibles en la parte anterior y poco visibles y más pequeñas hacia la parte posterior. Están dispuestas irregularmente, posiblemente porque disminuyen hacia atrás, y se les observó únicamente cuando se examinó al parásito en vivo, pero se desprendieron durante la fijación y manipulación en el proceso de tinción y montaje.

Presentan una ventosa oral musculosa muy grande y terminal, en forma de trompeta o campana, con una longitud de 0.383 a 0.423 mm por 0.200 a 0.380 mm de ancho en su parte anterior, y de 0.171 a 0.222 mm de ancho en la parte posterior. El acetábulo se halla situado hacia la mitad del cuerpo y mide de 0.166 a 0.172 mm de largo por 0.154 a 0.192 mm de ancho. La prefaringe, que mide de 0.034 a 0.042 mm de largo por 0.085 a 0.107 mm de ancho, es cilíndrica, muy corta y de paredes musculosas. La faringe es ovoidea, fuertemente musculosa y mide de 0.128 a 0.192 mm de largo por 0.145 a 0.171 mm de ancho. El esófago es muy corto y ancho, con una longitud de 0.064 a 0.085 mm; se bifurca en dos ramas intestinales cilíndricas, anchas y lisas que se unen en la parte posterior del cuerpo por detrás de los testículos, formando un arco. Los testículos, de forma esférica u ovoidea transversalmente, se hallan hacia el extremo posterior por delante del arco intestinal; son intercecales, tocándose por sus bordes. El testículo anterior, más pequeño que el posterior, es tangente a éste y mide de 0.115 a 0.119 mm de largo por 0.102 a 0.170 mm de ancho. El testículo posterior mide de 0.128 a 0.148 mm de largo por 0.098 a 0.186 mm de ancho. La bolsa del cirro, de 0.205 a 0.357 mm de largo por 0.077 a 0.102 mm de ancho, es arqueada y abraza al acetábulo por el lado derecho y se extiende desde el poro reproductor que queda por detrás de la bifurcación intestinal y por delante del acetábulo, hasta muy próximo al ovario. El cirro es pequeño y cónico, de 0.042 a 0.064 mm de largo por 0.017 a 0.021 mm de ancho. La vesícula seminal es voluminosa y está divida en dos partes, la anterior, ligeramente esférica, mide 0.038 a 0.064 mm de largo por 0.051 a 0.072 mm de ancho, la posterior, alargada, mide 0.072 a 0.198 mm de largo por 0.051 a 0.105 mm de ancho, extendiéndose dorsalmente por detrás del acetábulo. El ovario es ovoideo, postacetabular, y situado por detrás de la bolsa del cirro en posición mediana, mide 0.077 a 0.107 mm de largo por 0.072 a 0.171 mm de ancho. El útero desciende desde el ovario por el lado derecho de la región intercecal hasta el nivel del arco intestinal y cruza por el lado izquierdo del acetábulo, dorsalmente, para terminar en el poro reproductor. Los huevecillos son ovoideos, de color amarillento, de cáscara lisa, operculados y numerosos, midiendo 0.029 a 0.034 mm de largo por 0.017 mm de ancho. No se observó



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el ootipo, ni la glándula de Mehlis, ni el reservorio vitelino. Las glándulas vitelógenas se extienden desde la parte posterior de la bolsa del cirro hasta el borde anterior del arco intestinal, ocupando las regiones extracecal, cecal y un poco intercecal; son bandas delgadas y angostas que se dirigen de afuera hacia adentro. La vesícula excretora, en forma de Y, se bifurca a nivel del segundo testículo en dos ramas largas, enmascaradas por las bandas vitelógenas que impiden determinar el nivel que alcanzan, posiblemente se extiendan hasta el nivel posterior del ovario; en los estados larvarios no se ve que las ramas lleguen hasta la bifurcación intestinal o más allá. El poro excretor es terminal posterior.

HUESPED: *Lepisosteus tropicus* (Gill, 1863).
LOCALIZACION: Intestino.
DISTRIBUCION GEOGRAFICA: Río Palizada, Isla del Carmen, Campeche, Golfo de México, México.
HOLOTIPO: Colección helmintológica del Instituto de Biología, UNAM, Nº de catálogo: 226-23.
PARATIPOS: Colección helmintológica del Instituto de Biología, UNAM, Nº de catálogo: 226-24.

Dedicamos la especie a la memoria del ilustre profesor, Académico Boris E. Bychowsky, de Leningrado, Unión Soviética.

Paraisocoelium Ozaki, 1932

Generic diagnosis. — Acanthostomidae, Anisocoeliinae: Body subcylindrical, oculate, spinulate. No circumoral spines. Oral sucker terminal. Esophagus of moderate length. Ceca terminating some distance short of posterior extremity. Acetabulum comparatively small, in anterior third of body. Testes diagonal, dorsolateral to ceca, in posterior half of body. Vesicula seminalis long, tubular. Genital pore just in front of acetabulum. Ovary slightly to one side of median line, toward midbody. Vitellaria forming a series of rosettes on each side of postacetabular region, commencing and terminating at different levels. Uterine coils between acetabulum and testes, overreaching ceca laterally. Excretory vesicle Y-shaped; arms reaching to pharynx. Intestinal parasites of marine fishes.

Genotype: *P. exorchis* Ozaki, 1932 (Pl. 18, Fig. 222), in *Uranoscopus japonicus;* Pacific coast of Japan.

PARAISOCOELIUM Ozaki, 1932

Diagnosis of Ozaki:

Acanthostomidae: slender worms, flattened dorso-ventrally and bluntly pointed at both extremities. Cuticule with spines. Acetabulum small, pre-equatorial. Oral sucker large, subterminal, esophagus long and slender; intestinal ceca symetrical, reaching nearly to posterior end of body. Genital pore pre acetabular, in midventral line. Testes exocecal, post-uterine, near posterior end; cirrus and cirrus pouch absent. Ovary in uterine zone, post acetabular, pretesticular, in middle of body. Seminal receptacle and Laurer's canal present. Uterus transversely coiled with descending and acending limbs, extending between acetabulum and testes. Vitellaria in two lines under dorsal surface, extending from acetabulum to ovarian zone. Excretory vesicle roomy, long, Y-shaped.

Type species: Parasicoelium exorchis Ozaki, 1932

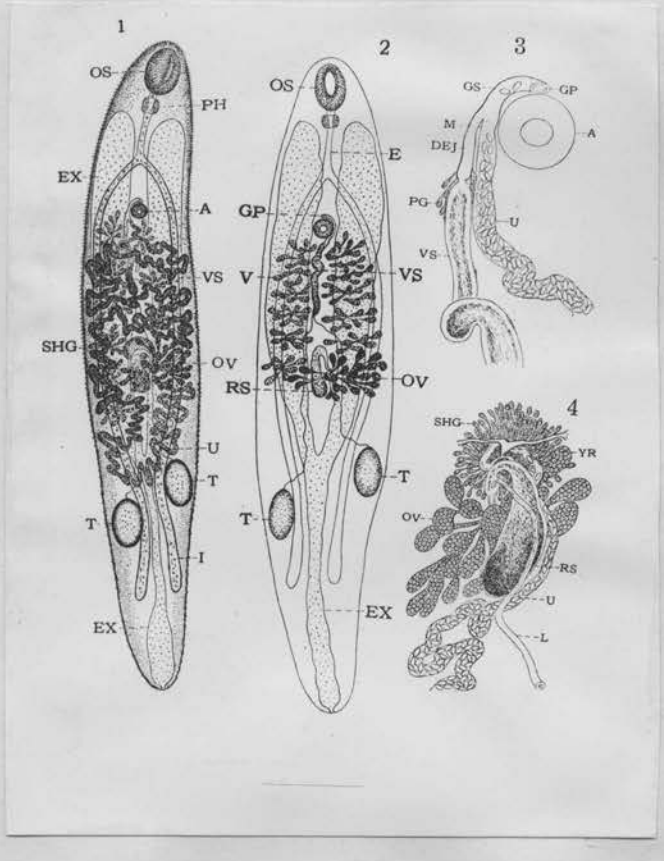
From intestine of Uranoscopus japonicus

Compared with Isocoelium but differing in distribution of vitellaria and position of testes.

P. exorchis

4.4 to 5.3 by 0.8 to 0.95 mm. Oral sucker 0.3 by 0.23. Ventral sucker $\frac{1}{4}$ from anterior end, 0.13 mm.
Ovary of 18-23 deeply indented lobes.
Eggs 16 to 18 by 9 to 10 μ
Vitellaria dorsal to intestine.

Reference: Proc. Imperial Academy. 8 (9): 450-453. 1932



Recorded by same host by Yamaguti, 1934. Adds presence of pigment granules and cervical glands.

PEREZITREMA Barus & Moravec, 1967

Family: *Acanthostomidae* Poche, 1926

Genus: *Perezitrema* gen. nov.

Generic diagnosis: *Acanthostomidae*. **Body very elongated, cuticle with fine spines. Circumoral crown of spines absent. Oral sucker well developed, bell-shaped. Prepharynx short, pharynx of medium size. Oesophagus short, branching about midway between suckers. Caeca long, terminating at posterior end of body. Cirrus pouch absent. Vesicula seminalis voluminous, extending dorsally behind the acetabulum. Genital pore immediately pre-acetabular. Uterus, forming an upward and downward loop, extends posterior to the lower margin of the second testis. Eggs oval, small. Vitellaria folicular, confined to the sides of the body from the acetabulum to almost the posterior end of the body. Excretory vesicle Y-shaped, branching off below the second testis. Parasitic in the digestive tract of freshwater fishes.**

Species typica: *P. viguerasi* sp. n.

Discussion: The genus *Perezitrema* gen. n. differs from the genera *Anisocladium* Lühe, 1900; *Pseudoacanthostomum* Caballero et Bravo, 1953; *Brientrema* Dollfus, 1950; *Acanthostomum* Looss, 1899; *Telogaster* Macfarlane, 1945 and *Anoiktostoma* Stossich, 1899, principally in the absence of the circumoral coronet of spines; from the individual genera, however, it differs in the position of the acetabulum, the length of the prepharynx, the length of the oesophagus, the situation of the testes, the uterus, vitellaria a. o. From the genera *Isocoelium* Ozaki, 1927 and *Anisocoelium* Lühe, 1900, the genus *Perezitrema* n. gen. differs principally in the position of the vitellaria. The differences between *Paraisocoelium* Ozaki, 1932 and *Perezitrema* gen. n. are found mainly in the position of the testes. For illustrating these differences a key to the genera of the family *Acanthostomidae* is added. The species *P. viguerasi* gen. n., sp. n. is the typical and, so far, the only representative of this genus.

The genus and species have been named in honour of professor Dr. J. Pérez Vigueras, who contributed greatly to the knowledge of the parasite fauna of Cuba.

The type and some paratypes are in the collections of the Biological Institute of the Cuban Academy of Sciences, Havana, the remaining paratypes in the collections of the Institute of Parasitology, Czechoslovak Academy of Sciences, Prague.

Key to genera of the family *Acanthostomidae* Poche, 1926, parasitic in fishes (after Yamaguti, 1958, with our supplements):

1. Circumoral crown of spines absent 2
– Circumoral crown of spines present 5
2. Vitellaria divided by ovarian complex into two (one anterior and one posterior) median groups . . . . . *Isocoelium* Ozaki, 1927
– Vitellaria situated laterally in anterior or posterior part of body 3
3. Vitellaria anterior to acetabulum . . . . . *Anisocoelium* Lühe, 1900
– Vitellaria posterior to acetabulum 4
4. Testes tandem between intestinal caeca . . . . . Perezitrema gen. n.
– Testes diagonal, inside intestinal branches . . . . . *Paraisocoelium* Ozaki, 1932
5. Uterus extending to posterior extremity 6
– Uterus not extending to posterior extremity 7
6. Caeca unequal; prepharynx short, acetabulum close to anterior extremity; vitellaria anterior to ovary . . . . . *Anisocladium* Looss, 1902
– Caeca equal, reaching posterior extremity; prepharynx very long; acetabulum distinctly distant from anterior extremity; vitellaria anterior and posterior to ovary . . . . . *Pseudoacanthostomum* Caballero et Bravo, 1953
7. Prepharynx fairly long; oesophagus short 8
– Prepharynx very short or practically absent, oesophagus long 9
8. Vitellaria largely in ovariotesticular zone; uterus inter- and extracaecal . . . . . *Brientrema* Dollfus, 1950
– Vitellaria anterior to ovary and testes; uterus confined to intercaecal field; caeca opening usually outside at posterior extremity . . . . . *Acanthostomum* Looss, 1899
9. Oesophagus unusually long, bifurcating far behind acetabulum; caeca very short; vitellaria between testes and caecal endings; testes juxtaposed at posterior extremity . . . . . *Telogaster* Macfarlane, 1945
– Oesophagus bifurcating anterior to acetabulum; caeca long, terminating near posterior extremity; vitellaria extending along anterior part of caeca . . . *Anoiktostoma* Stossich, 1899

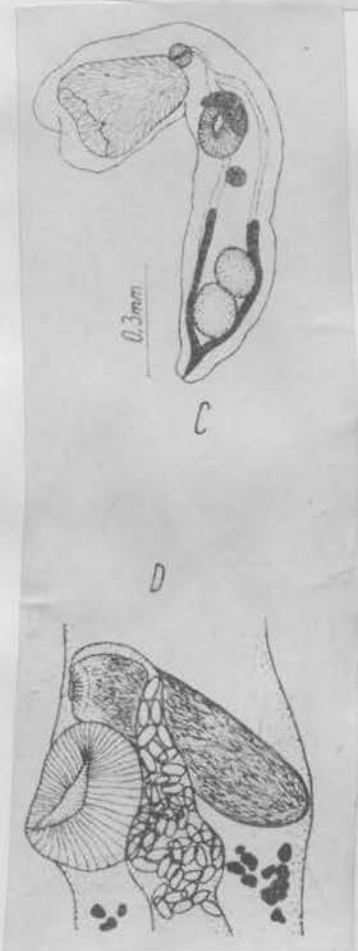
Perezitrema viguerasi Barys & Moravec, 1967

4. *Perezitrema viguerasi* gen. n. et sp. n., (Fig. 3)

Host: *Lepisosteus tristoechus (Lepisosteidae, Ginglymodi)*.
Location: intestine.
Locality: Santo Tomás, Ciénaga de Zapata (Province Las Villas).
Of the total of 6 *L. tristoechus* examined, trematodes of this species were found in three of these fishes (intensity of invasion 3,7 and 25 specimens).

Description of holotype: Body very elongated, of almost equal breadth throughout. Length of body 2.44 mm, maximum width at the level of acetabulum 0.353 mm. Cuticle entirely covered with minute spines, very fine and hardly visible at anterior part of body, but relatively big and well visible in the part from the genital pore to the posterior margin of the second testis. Their length is 0.006 mm. In the posterior end of the body below the testes the spines are sparse and more minute. Oral sucker very large, bell-shaped, length 0.394 mm, maximum width 0.312 mm at the distal end. Acetabulum much smaller than oral sucker, approximately median, spherical, 0.156 by 0.156 mm. Pharynx of medium size, very muscular, transversely elliptic in shape, measurements 0.099 by 0.120 mm. Prepharynx very short. Oesophagus, length 0.122 mm, bifurcates into two thin caeca extending to the posterior end of the body. Excretory vesicle Y-shaped, bifurcating behind the second testis; arms very long, extending almost to ovary level. Testes tandem, spherical, median, near posterior extremity. Anterior testis 0.149 by 0.176 mm, posterior testis 0.149 by 0.163 mm. Cirrus pouch missing. Vesicula seminalis voluminous, length 0.300 mm, width 0.105 mm, extending dorsally behind acetabulum. Genital pore median, closely pre-acetabular. Genital bursa developed. Ovary submedian, post-acetabular, approximately at the lower end of the first third of distance between acetabulum and anterior testis. Ovary almost spherical, distinctly smaller than testes, measuring 0.138 by 0.144 mm. Uterus winding in one upward and one downward loop, extending to posterior extremity, filling in the whole space below the testes. Eggs oval, yellowish brown, 0.033—0.036 by 0.018—0.020 mm. Vitellaria composed of numerous follicles, confined to the sides of the body, but extending sometimes further to median line, from the level of the lower margin of the acetabulum to the posterior margin of the second testis.

Paratype variability: Length of adult trematodes (uterus with eggs) 1.86—2.74 mm, mostly attaining maximum width at the level of acetabulum; only in one instance, the body was widest at the level of the testes. Maximum width 0.272—0.408 mm. In young specimens the cuticular spines are very fine and indistinct throughout the body; in older specimens, the spines between the acetabulum and the posterior testis are relatively large, such as in the holotype. Oral sucker 0.312—0.394 by 0.244—0.353 mm, acetabulum approximately median, sometimes slightly pre- or postmedian 0.135—0.190 by 0.150—0.190 mm. Pharynx spherical, transversely oval or pear-shaped, 0.066—0.108 by 0.066—0.136 mm. Oesophagus length 0.095 to 0.176 mm. Vesicula seminalis mostly covered by acetabulum; length of seminal vesicle 0.225—0.326 mm, width 0.068—0.095 mm. Ovary submedian or even lateral; in all specimens examined almost spherical in shape, size 0.093—0.122 by 0.095—0.126 mm. Anterior testis 0.144—0.176 by 0.149 to 0.186 mm, posterior testis 0.126—0.190 by 0.149—0.190 mm. Vitellaria starting in most specimens at the level of posterior margin of second testis or slightly below it. In some of our specimens the vitellaria terminated at a small distance from the end of the posterior extremity. Eggs of paratypes 0.030—0.036 by 0.015—0.018 mm.

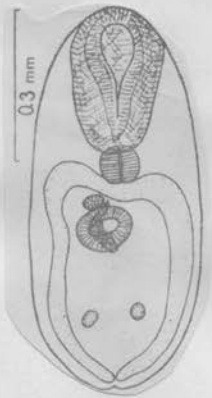


Fam. Acanthostomidae Poche, 1926

8. *Perezitrema viguerasi* Baruš et Moravec, 1967? — metacercariae (Fig. 3g)

Host: *Cichlasoma tetracantha* (Cuvier et Valenciennes).
Location: encysted in body cavity.
Locality: Laguna del Tesoro — Zapata (province Las Villas).
From a total of 31 hosts examined nine cysts were found in 1 of them.

Description: Elongate, transparent, thin-walled cysts measuring 0.653 to 0.748 × 0.286—0.408 mm. Liberated metacercaria of oval shape, length of body 0.680—0.707 mm, maximum width 0.272—0.286 mm. Anterior part of body covered with very fine spines. Oral sucker large, elongated, measuring 0.204—0.258 × 0.136—0.163 mm, oval acetabulum 0.099 × 0.075 mm. Pharynx or oesophagus not distinct; globular pharynx measuring 0.075 × × 0.060—0.069 mm, caeca extending to posterior end of body. Slightly diagonal or symmetrical testes measuring 0.030—0,033 × 0.024—0.027 mm situated at the posterior part of body. Oval ovary (0.033 × 0.027 mm) anterior to acetabulum. Seminal vesicle dorsally from acetabulum.



From Moravec and Baruš, 1971

Generic of diagnosis of *Proctocaecum* gen. nov.

Acanthostomatidae : *Acanthostomatinae* : Body small and spiny. Oral sucker terminal, funnel-shaped, with a crown of stout spines. Ventral sucker circular, smaller than oral sucker, and placed more towards the anterior end of the body. Prepharynx and pharynx present. Oesophagus short. Caecal bifurcation a short distance in front of ventral sucker. Intestinal caeca of normal size, opening directly to the exterior at the posterior end of the body by separate ani. Gonads in the posterior region of the body. Testes closely one behind the other, globular or oval, entire. Cirrus-sac absent. Vesicula seminalis extends far behind the ventral sucker. Ductus hermaphroditicus, ductus ejaculatorius and prostatic cells present. Genital pore situated in front of the ventral sucker. Ovary pretesticular, immediately in front of the testes. Laurer's canal, receptaculum seminis and shell-gland mass present. Vitellaria well-developed, follicular, lateral, extend from behind the ventral sucker up to the testicular region. Uterine coils pre-ovarian, mostly intercaecal. Eggs many. Excretory bladder Y-shaped. Parasites of fishes and reptiles.

Genotype : *Proctocaecum diploporus* (Stunkard, 1931)

Syn. *Acanthochasmus diploporus* Stunkard, 1931.

Proctocaecum gen. nov.

Stunkard (1931) created a new species *Acanthochasmus diploporus* for the trematodes obtained from *Alligator mississippiensis* which were previously referred to *Acanthochasmus coronarius* (Cobbold, 1861) as he found that in the specimens examined by him the intestinal caeca opened to the exterior through separate anal apertures. Later on Stunkard (1938) again described a new species. *Acanthostomum minimum*, with the two ani opening directly to the exterior, and he also transferred his previously described form, *Acanthochasmus diploporus* Stunkard, 1931, to the restored genus *Acanthostomum* Looss, 1899. Quite recently Yamaguti (1954) has added another species with anal apertures, viz. *A. crocodili* to this genus *Acanthostomum*. Thus among the existing species of the genus *Acanthostomum* Looss, there are at present three species, viz., *A. diploporus*, *A. minimum* and *A. crocodili* in which the ani open directly to the exterior. In the opinion of the writer, these species should be removed from the genus *Acanthostomum* on account of the presence of anal apertures to a newly proposed genus *Proctocaecum* under the family *Acanthostomatidae*. The new genus *Proctocaecum* is to be distinguished from the closely related genus *Atrophecaecum* Bhalerao, 1940, as emended by the writer (op. cit.) by the fact that both the intestinal caeca which open directly to the exterior are of normal magnitude in the genus *Proctocaecum* whereas in the genus *Atrophecaecum* one of them is always atrophied.

Pseudoacanthostominae ~~n. subfam.~~ YAMAGUTI, 1958

Subfamily diagnosis. — Acanthostomidae: Body cylindrical, spined. Oral sucker funnel-shaped, with circumoral crown of spines. Prepharynx very long, pharynx large, esophagus very short. Ceca terminating at posterior extremity. Acetabulum small, well apart from anterior extremity. Testes wide apart from each other, intercecal, in posterior half of body. Genital atrium wide. Ovary lobate, pre-equatorial. Uterine coils occupying entire postovarian region. Vitellaria between acetabulum and anterior testis. Excretory vesicle Y-shaped, with long wide arms.

Pseudoacanthostomum Caballero, & Bravo, 1953 AND GEROTT,

Generic diagnosis. — Acanthostomidae, Pseudoacanthostominae: Body small, cylindrical, covered with scale-like spines except for posterior region. Oral sucker terminal, infundibular, with a single circumoral crown of spines. Prepharynx long and wide, pharynx large, muscular, cylindrical; esophagus very short. Ceca wide, reaching posterior extremity. Acetabulum small, in anterior half of body. Testes intercecal, wide apart in posterior half of body. Seminal vesicle strongly winding between acetabulum and ovary. Genital atrium wide, opening immediately in front of acetabulum. Ovary 3-lobed, intercecal, pretesticular, pre-equatorial. Receptaculum seminis large, preovarian. Uterus occupying postovarian region; its terminal portion parallel to seminal vesicle; eggs small. Vitellaria extending in lateral fields from behind acetabulum to near anterior testis, occupying entire postovarian intercecal area. Excretory vesicle with wide arms reaching as far forward as pharynx. Intestinal parasites of marine fishes.

Genotype: *P. panamense* Caballero, & Bravo, 1953 (Pl. 36, Fig. 459), in *Galeichthys seemanni*; Panama, Pacific. AND GEROTT,

Pseudoacanthostomum ~~n.g.~~ CABALLERO, BRAVO, AND GROCOTT, 1953

Cryptogonimidae: Tremátodos de cuerpo pequeño, cilíndricos con los extremos redondeados; extremo anterior muy contráctil; extremidad cefálica llevando una corona de espinas oblongas, grandes, en número de 26 e insertadas en una sola hilera; cutícula armada de pequeñas espinas en forma de escamas las cuales se extienden hasta el nivel del testículo anterior, después se hacen escasas y desaparecen en el extremo posterior. Ventosa oral terminal, amplia, cilíndrica; acetábulo pequeño, de contorno circular, situado en la parte anterior del cuerpo y a cierta distancia de la bifurcación intestinal; prefaringe larga y ancha; faringe grande y musculosa y cilíndrica; esófago muy corto; ciegos intestinales anchos que se extienden dorsolateralmente hasta cerca del borde posterior del cuerpo. Poro reproductor a nivel de un pequeño gonotilo el cual se traduce por una pequeña invaginación por delante del acetábulo; testículos a la mitad posterior del cuerpo, en el área intercecal, uno detrás del otro y separados por un amplio espacio, oblongos y de bordes enteros; vesícula seminal grande, muy enrollada, extendiéndose entre el ovario y el acetábulo. Ovario pretesticular, en el área intercecal, separado del testículo anterior por un amplio espacio, trilobulado; receptáculo seminal preóvarico y grande; glándula de Mehlis pequeña y preovárica; útero muy desarrollado ocupando todo el espacio postovárico del cuerpo, asa uterina terminal paralela a la vesícula seminal; huevos muy numerosos, pequeños, alargados, de cáscara café-amarillenta y lisa. Glándulas vitelógenas constituídas por folículos de forma y tamaño irregulares, circunscritas principalmente a dos franjas laterales extra y cecales desde por detrás del acetábulo hasta por delante del testículo anterior, y ocupando todo el espacio intercecal postovárico pero sin llegar al testículo anterior. Poro excretor terminal y vesícula excretora con dos anchas ramas que se extienden dorsalmente hasta nivel de la faringe.

Especie tipo: **Pseudoacanthostomum panamensis** n.sp.

Localización: Intestino de peces marinos del Océano Pacífico tropical.

Discusión.—Pseudoacanthostomum presenta principalmente dos semejanzas con las especies del género **Acanthostomum** Looss, 1899, a saber: la corona cefálica de espinas y la forma y estructura de la vesícula seminal, pero difiere radicalmente de este género por la topografía de las glándulas reproductoras y del útero. Por la corona cefálica de espinas, sobre todo en ejemplares fuertemente contraídos, se asemeja a **Allacanthocasmus** Müller y Van Cleave, 1932, pero difiere principalmente de este género por el desarrollo del gonotilo, por la topografía de las vitelógenas y la extensión del útero. En **Cryptogonimus** Osborn, 1910, y **Paracryptogonimus** Yamaguti, 1934, la armadura cefálica pobremente desarrollada y la topografía de las glándulas reproductoras son caracteres estructurales muy distintos de los del género nuevo que aquí se propone.

detrás del otro, no contiguos sino muy separados por un área ocupada por asas uterinas transversales, son ovoideos, grandes, de contornos lisos, y miden, el anterior de 0.175 a 0.232 mm. de largo por 0.114 a 0.194 mm. de ancho, y el posterior de 0.194 a 0.285 mm. de largo por 0.125 a 0.228 mm. de ancho; la vesícula seminal ocupa el área intercecal media del cuerpo, entre el ovario y el acetábulo, es muy sinuosa pues presenta de seis a ocho circunvoluciones, y mide aproximadamente de 0.266 a 0.703 mm. de largo por 0.042 a 0.068 mm. de ancho; a nivel del gonotilo y en la terminación de la vesícula seminal se encuentran las células de la glándula prostática, las que están contenidas en el mesénquima. El ovario es grande, de diámetro transversal mayor que el anteroposterior, está situado en el área intercecal por delante del testículo anterior, presenta tres lóbulos redondeados y mide de 0.103 a 0.129 mm. de largo por 0.133 a 0.236 mm. de ancho; el receptáculo seminal es oblongo, ligeramente menor que el ovario, en dos ejemplares es francamente preovárico pero en otro se halla en la misma área y mide de 0.065 a 0.095 mm. de largo por 0.065 a 0.114 mm. de ancho; la glándula de Mehlis es difusa, preovárica, y mide 0.027 mm. de largo por 0.057 mm. de ancho; el útero está constituído por el asa descendente, la cual forma múltiples y pequeñas asas transversales que se extienden sobre el lado derecho del cuerpo hasta el borde posterior del mismo y de ahí constituyen el asa ascendente, la cual también con mútiples asas transversales, más cortas que las ya mencionadas, asciende por el lado izquierdo del cuerpo, cruza al ovario por el lado izquierdo, se hace media, alcanza a la vesícula seminal y continuando paralelamente a este órgano termina en el gonotilo; los huevecillos son numerosos, pequeños, de cáscara lisa y café-amarillenta, operculados, y miden de 0.019 a 0.021 mm. de largo por 0.009 a 0.011 mm. de ancho.

Las glándulas vitelógenas se extienden fundamentalmente en dos franjas laterales extracecales y cecales desde la porción anterior de la vesícula seminal hasta por delante del testículo anterior, y algunos gruesos folículos ocupan el área intercecal postovárica hasta cerca del testículo anterior. El poro excretor es terminal, se halla en el borde posterior y medio del cuerpo; los ciegos intestinales no desembocan a la vesícula excretora.

Hospedador: **Galeichthys seemanni** Günther. sea catfish
Localización: **Intestino.**
Distribución geográfica: **Panamá** Viejo, Océano Pacífico. Centroamérica.
Tipo: **Colección Helmintológica del Instituto de Biología. Nº 25-11.**

Pseudoacanthostomum **floridensis** ~~n.sp.~~ NAHHAS AND SHORT, 1965
Figure 4

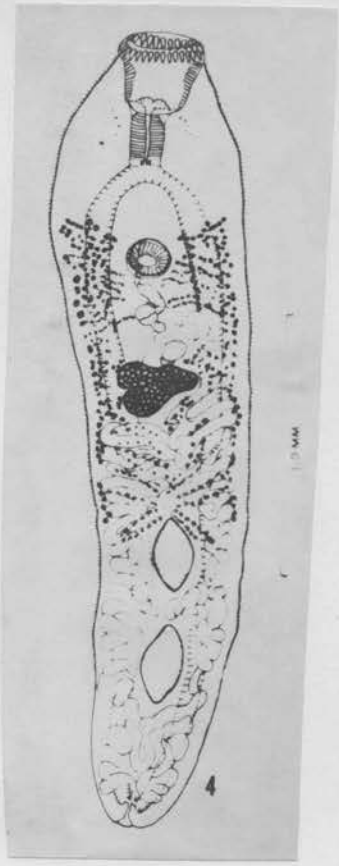
Synonym: *Pseudoacanthostomum panamensis* of Corkum, 1959, nec Caballero et al., 1953

Host: *Galeichthys felis*

Site: intestine

Locality: Alligator Harbor APALACHEE BAY, GULF OF MEXICO

Holotype: U.S.N.M. No. 60087



Description and measurements based on two specimens, one sectioned frontally. Body elongated, 2.63-3.00 long, 0.489-0.750 wide. Cuticle with spines extending to level of posterior testis; eye spot pigments present. Oral sucker like an inverted bell, 0.180-0.294 long, 0.309-0.330 in greatest width; mouth surrounded by single row of 28 perioral spines measuring 42-60 by 18-24 microns; ventral sucker in anterior third of body, 0.118-0.155 long, 0.155-0.170 wide; sucker ratio 1:0.54. Prepharynx contracted in holotype, longer than pharynx in paratype; pharynx 0.129-0.206 in diameter; esophagus very short; ceca extending to posterior end of body, and joining excretory vesicle by two narrow ducts a short distance anterior to excretory pore. Testes two, ovoid or rhomboid, tandem, well separated, 0.283-0.309 long, 0.180-0.283 wide; seminal vesicle tubular, sinuous, extending posteriorly to about halfway between ventral sucker and ovary; prostate cells free in parenchyma. Ovary trilobed, about midway between ventral sucker and anterior testis, 0.232-0.260 long, 0.298-0.309 wide; seminal receptacle spherical, preovarian; uterine coils extending to near posterior tips of ceca. Genital pore median, immediately preacetabular; gonotyl as large as ventral sucker, the two sometimes overlapping. Eggs 20-25 by 11-14 microns. Vitelline follicles small, sometimes granular, extending from anterior testis laterally and dorsally some distance anterior to ventral sucker but not reaching intestinal bifurcation. Excretory vesicle Y-shaped, wide arms extending from near posterior testis to mid-level of pharynx; pore terminal.

? N+S have this classified as a cryptogonimid.

This is the second species in the genus *Pseudoacanthostomum*. *P.* **floridensis** differs from *P. panamensis* Caballero, Bravo H. and Grocott, 1953 from *Galeichthys seemani* from the Pacific Coast in the number of perioral spines (28 compared with 26), greater extent of the vitellaria, and the presence of a uroproct. This last feature was suspected in the live material and confirmed by frontal sectioning of the paratype.

Corkum (1959) reported a single specimen with 28 perioral spines as *P. panamensis* from *Galeichthys felis*. We have borrowed this specimen and found it to agree with our material also in the distribution of the vitellaria. The connections of the ceca with the stem of the vesicle could not be determined as they were concealed by the uterine coils. Figure 5 is a tracing of a photomicrograph of Corkum's material.

SACCULOESOPHAGIPHORA Changtung and Jiwei, 1978

Generic diagnosis: Acanthostomidae, Anisocladiinae. Body ribbon shaped, spiny. Oral sucker terminal. Oesophagus rather long and sac-like. Caeca terminating at posterior extremity. Acetabulum smaller than oral sucker, lying on a projection in posterior portion of anterior half of body. Testes tandem, lying in posterior half of body. Seminal vesicle long, tubular. Cirrus sac and cirrus present. Genital pore median of anterior border of acetabulum. Ovary pretesticular. Seminal receptacle rather large. Vitellaria follicular in cluster, between acetabulum and seminal receptacle. Uterine loops reaching posterior extremity. Ova small, numerous. Excretory system Y-shaped with wide arms. Stomach parasites of marine teleosts.

Type species: *Sacculocsophagiphora bipapillosa* sp. nov.

From Changtung and Jiwei, 1978

CHANGTUNG AND JIWEI, 1978

Sacculoesophagiphora bipapillosa ~~**gen. nov. et sp. nov.**~~ (fig. 4)

This species is characterized by the long sac-like oesophagus with two muscular papillae on the ventral lip of the oral sucker, in the presence of a cirrus sac enclosing a cirrus and the distribution of the vitellaria being separated from genus *Anisocladium* Looss, 1902. Therefore, it is suggested as a new genus and named *Sacculoesophagiphora bipapillosa* gen. nov. *et* sp. nov.

measurement in reprint - chart in Chinese

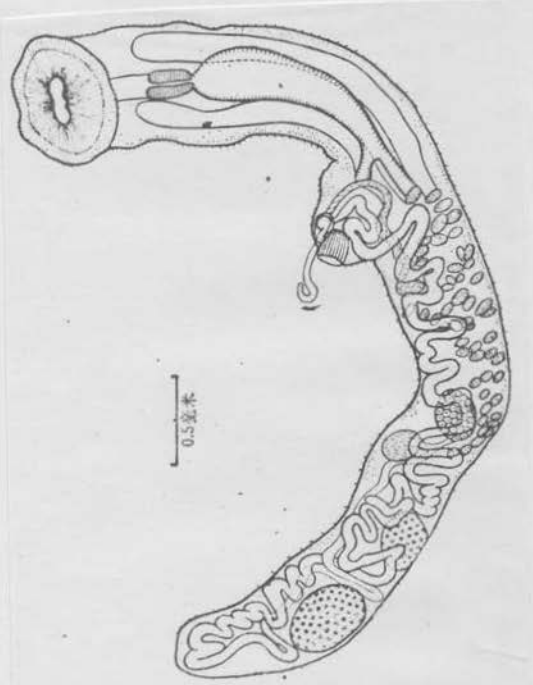
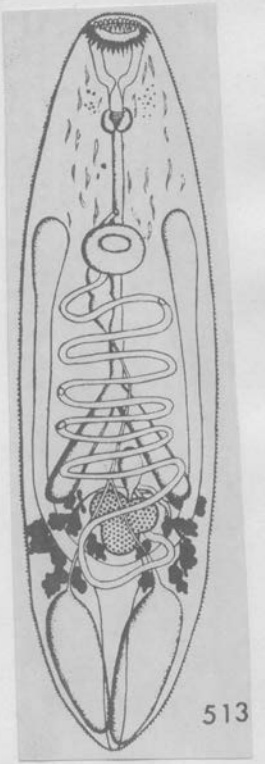


图 4　双突囊道吸虫，新属、新种 *Sacculoesophagiphora bipapillosa* gen. nov. *et* sp. nov. 整体腹面观

Telogasterinae ~~n. subfam.~~ YAMAGUTI, 1958

Subfamily diagnosis. Acanthostomidae. Body elongate, spinose, oculate. Oral sucker funnel-shaped, with circumoral crown of spines. Prepharynx distinct. Esophagus unusually long, bifurcating posterior to acetabulum. Ceca very short. Acetabulum about one third of body length from anterior extremity. Testes juxtaposed at posterior extremity. Seminal vesicle extending a short distance back of acetabulum. Ovary lobate, median, pretesticular. Vitellaria forming a group of bunches on each side of ovary anterior to testes. Uterus winding between testes and acetabulum. Excretory vesicle Y-shaped, bifurcating behind ovary; arms reaching to level of genital pore.

Telogaster opisthorchis Macfarlane, 1945



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Telogaster Macfarlane, 1945

Generic diagnosis. — Acanthostomidae, Telogasterinae: Body small, spinose, oculate. Circumoral spines present. Oral sucker funnel-shaped. Prepharynx distinct. Esophagus very long, bifurcating posterior to acetabulum which lies about one-third of body length from anterior end. Ceca very short. Testes elongate, juxtaposed at posterior extremity. Seminal vesicle bipartite, posterodorsal to acetabulum. No gonotyl. Genital pore median, pre-acetabular. Ovary trilobate, median, pretesticular, immediately postcecal. Receptaculum seminis pre-ovarian. Laurer's canal present. Vitellaria forming several bunches on each side of ovary between testes and cecal ends. Uterus not reaching posterior extremity; eggs small, embryonated. Excretory vesicle Y-shaped, bifurcating behind ovary; arms reaching to level of genital pore; flame cell formula in genotype: 2[(2+2)+(2+2)]. Parasitic in intestine of fishes.

Genotype: *T. opisthorchis* Macfarlane, 1945 (Pl. 38, Fig. 483), in *Anguilla dieffenbachii* and *A. australis schmidti*; New Zealand.

Oculate lophocercous cercaria with 23–26 pentration glands develops in *Potamopyrgus* spp., encysts in freshwater fish *Gobiomorphus* spp., *Galaxias* spp., and *Philypnodon* spp. — Macfarlane (1945).

TERMINOISOCOELIUM Changtung and Jiwei, 1978

Generic diagnosis: Acanthostomidae, Isocoeliinae. Body ribbon shaped, occulted, spiny. No circumoral spines. Oral sucker terminal. Acetabulum smaller than oral sucker. Pharynx developed. Oesophagus very short. Caeca terminating at posterior extremity symmetrically. Testes tandem, in median of posterior one-third of body. Genital pore median, opening far anterior to acetabulum. Ovary lobed, lying in posterior of mid-third of body. Vitellaria mostly extracaecal, in clusters, aggregated into two sets. Uterine loops intercaecal, and reaching posterior extremity. Excretory system Y-shaped, excretory arms united at intestinal fork and excretory vesicle tubular. Parasitic in stomach and intestine of marine fishes.

Type species: *Terminoisocoelium laterolecithale* sp. nov.

From Changtung and Jiwei, 1978

Terminoisocoelium laterolecithale ~~gen. nov. et sp. nov.~~ CHANGTUNG AND JIWEI, (fig. 3)

This species bears certain resemblance to *Isocoelium* Ozaki, 1932 but it differs fundamentally in the terminal oral sucker, in the distribution and arrangement of the vitellaria, in the uterine loops reaching nearly the posterior extremity of the body. There is no doubt that it represents a distinct genus in the subfamily Isocoeliinae Price, 1939. The name *Terminoisocoelium laterolecithale* gen. nov. et sp. nov. is suggested.

measurements in reprint - chart in Chinese

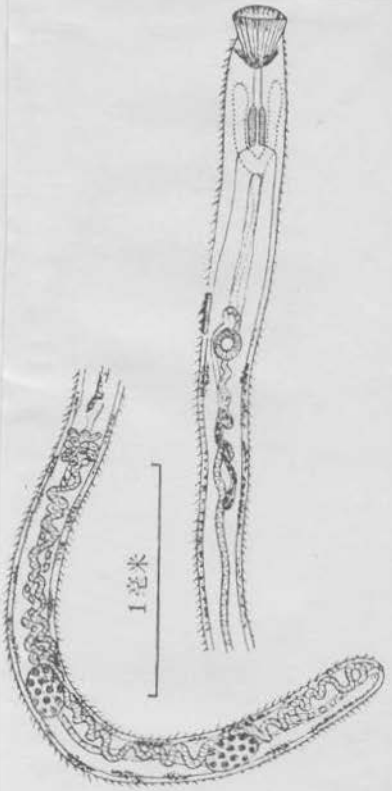


图3 侧腺端(口)等肠吸虫,新属、新种 *Terminoisocoelium latarolecithale* gen. nov. *et* sp. nov.

Timoniella ~~nov. gen.~~ REBECQ, 1960

Diagnose: (ACANTHOSTOMATIDAE Poche 1925. ACANTHOSTOMATINAE Nicoll 1914) — Allure générale d'*Acanthostomum* Looss 1899 à caecums unis en boucle entre testicule postérieur et extrémité du corps.

Générotype: *T. atherinae* nov. sp.

Synonyme: *Acanthochasmus imbutiformis* (Molin 1859, partim) Looss 1901 de Carrère (1938).

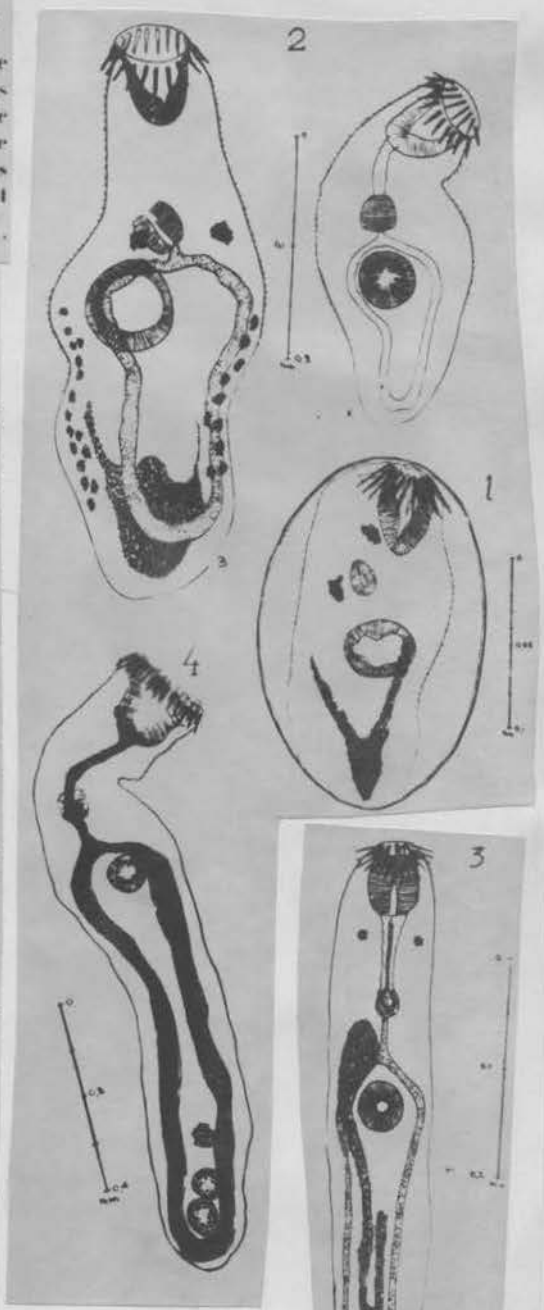
Localité: Etang du Vaccarès (Camargue, France). 8 Decembre 1955.

A l'état de métacercaire dans les muscles d'*Atherina mochon*.

Description du Kyste et de la metacercaire de *Timoniella atherinae* ~~nov. gen. nov. sp.~~ REBECQ, 1960

L'infestation est généralement plus intense dans les muscles compris entre l'anus et la queue. Les Kystes sont comme noyés dans la masse musculaire mais ils peuvent en être facilement isolés. Leur forme est ovoïde et leur paroi, simple et très mince, laisse voir par transparence l'allure générale de la métacercaire que l'on observe repliée sur elle même (Fig. 1). Les dimensions extrêmes des kystes sont 0.19 à 0.30 mm / 0.12 à 0.21 mm; ces dimensions sont légèrement inférieures, en moyenne, à celles données par P. Carrère (0.25 — 0.38 mm / 0.16 — 0.24 mm). Ces variations amènent à penser qu'il doit s'opérer une "maturation" de la larve sous sa paroi kystique; dans ces conditions les mesures de P. Carrère correspondraient à des individus, en moyenne, plus "agés".

Des variations analogues sont à noter entre les dimensions de la métacercaire données par P. Carrère (1.1 — 0.7 mm) et celles que j'ai pu mesurer (1.38 — 0.24 mm). Le corps de la métacercaire est allongé, mais chez les plus petits exemplaires (0.24 mm) il peut prendre une forme plus trappue avec l'extrémité antérieure moins large que la postérieure. Cuticule finement épineuse jusqu'au niveau du bord postérieur de la ventouse ventrale. La ventouse orale a la forme générale d'un "entonnoir", on en voit bien les parois musculaires épaisses; elle mesure de 0.03 à 0.105 mm du bord antérieur au "fond". L'orifice oral est entouré d'épines droites et finement aiguisées dont le nombre, sur 12 exemplaires, varie de 18 à 22. P. Carrère avait signalé 18 épines de 0.03 à 0.4 mm, mais les mesures que j'ai faites donnent 0.018 à 0.042 mm. L'insertion de ces épines est très régulière autour de la ventouse, à faible distance du bord antérieur. Le pré-pharynx, peu visible, mesure 0.033 — 0.060 mm (depuis le bord postérieur de la ventouse orale jusqu'au bord antérieur du pharynx). Le pharynx, puissant, affecte une forme en "tonneau"; il mesure 0.025 — 0.034 mm / 0.027 — 0.060 mm et, sur les exemplaires fixés, il est le plus souvent incliné par rapport à l'axe de l'individu. De chaque coté de ce pharynx on voit, même au travers de la paroi kystique, deux "taches oculaires" noires dont les positions ne sont pas exactement symétriques par rapport à l'axe du pharynx. L'oesophage est très court, presqu'absent sur les exemplaires fixés; il mesure 0.04 mm sur une métacercaire de 0.30 mm. Les caecums digestifs, présentent sur tous les exemplaires quelque soit leur forme, une anastomose médiane et postérieure; les branches latérales sont bien semblables entre elles; la région de l'anastomose, qui est légèrement élargie, est à une courte distance de l'extrémité postérieure du corps. L'acetabulum, circulaire, mesure de 0.030 à 0.088 mm (P. Carrère donne 0.08 à 0.09 mm); sa position varie avec l'"âge" (Fig. 2, A et B): chez les plus petits spécimens le bord antérieur de cette ventouse est situé un peu en dessous du milieu du corps tandis que chez les métacercaires mesurant entre 0.35 et 0.52 mm il se trouve approximativement au milieu du corps; chez la métacercaire de 1.38 mm il se trouve au niveau du tiers antérieur. Au cours de la "maturation" de la larve il y a donc allongement plus important de la partie postérieure à l'acetabulum que de la partie antérieure. La vessie excrétrice, invisible sur les individus fixés et colorés, est, par contre, très visible sur les larves fraîches même au travers de la paroi du kyste grace à de nombreuses granulations foncées; sa forme générale est en Y (fig. 3): le tronc impair est deux fois moins long environ que chacun des troncs pairs qui, symétriques, atteignent approximativement le niveau du pharynx. Les ébauches génitales, déjà très visibles sur les petites métacercaires, sont bien individualisées sur les gran



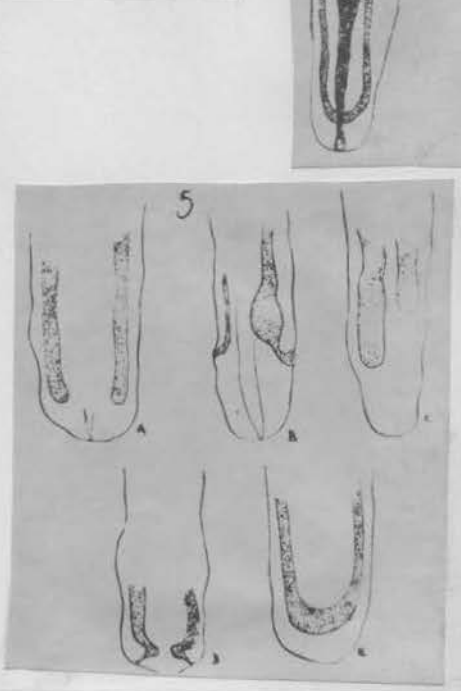


FIG. 1. Kyste de *Timoniella atherinae* nov. gen. nov. sp. Muscles d'*Atherina mochon* C. V. (Etang du Vaccarès, 8 Décembre 1955). FIG. 2. Métacercaires de *Timoniella atherinae* nov. gen. nov. sp. extraites de leur kyste, remarquer la position de la ventouse ventrale plus postérieure chez l'individu A que chez l'individu B. Muscles d'*Atherina mochon* C. V. (Etang du Vaccarès, 8 Décembre 1955). FIG. 3. Métacercaire "avancée" de *Timoniella atherinae* nov. gen. nov. sp.; remarquer l'extension de la vessie excrétrice et les "taches oculaires". Muscles d'*Atherina mochon* C. V. (Etang du Vaccarès, 8 Décembre 1955). FIG. 4. Grande métacercaire de *Timoniella atherinae* nov. gen. nov. sp. (1.380 mm); remarquer les ébauches génitales. Muscles d'*Atherina mochon* C. V. (Etang du Vaccarès, 14 Novembre 1958). FIG. 5. Extrémité postérieure de quelques Acanthostomatidae: A, *Acanthostomum imbutiformis*; B, *Atrophecaecum burminis*; C, *Anisocoelium capitellatum*; D, *Atrophecaecum diploporum*; E, *Timoniella atherinae* (A, B, C, D, d'après Skrjabin, 1957).

— over —

des larves: chez un exemplaire de 1.38 mm les testicules, situés l'un derrière l'autre très postérieurement dans la boucle formée par l'anastomose des caecums, sont circulaires et mesurent 0.084 (le postérieur) et 0.070 mm (l'antérieur); l'ovaire, prétesticulaire, mesure, chez la même individu 0.038 mm de diamètre (Fig. 4).

DISCUSSION

J'assimile cette métacercaire à la forme que P. Carrère (1937) a rattachée aux *Acanthostomidae* Poche 1925 puis qu'il a, sans en donner de figure, attribuée (1938) à *Acanthochasmus imbutiformis* (Molin 1859, *partim*) Looss 1901 observé par lui dans la même région chez *Labrax lupus* C. V.

Elle présente une telle disposition anatomique qu'il faut admettre que P. Carrère n'a pas eu affaire à *A. imbutiformis* et que ses observations sont en partie inexactes; il semble d'ailleurs que cet auteur ait eu quelques doutes pour sa détermination: "Cette diagnose sera justifiée ultérieurement, mes échantillons se rapprochant suffisamment de la description de Looss pour éviter la création d'une espèce nouvelle (C. R. Ac. Sc. 1938, 206, p. 1038)." L'attribution à la Famille des Acanthostomatidae Poche 1925 ne fait cependant aucun doute.