1990

Binder 176, Plagiorchiidae L-M [Trematoda Taxon Notebooks]

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Genre **LAIOGONIMUS** nov.

Ce genre nouveau se justifie pour une espèce qui — par son aspect général, le rapport de ses ventouses, le système digestif, le système génital — rappelle les *Plagiorchiinae* Pratt 1902. Cependant, si l'aspect et la distribution des follicules vitellogènes est semblable à ceux des *Styphlodora* A. Looss 1899, quelques *Glypthelmins* J. Stafford 1905 et *Ochetosomatinae* Leao 1945, ont des follicules semblables.

Enfin, la position latérale de l'ouverture génitale et de la poche du cirre (relativement petite) et totalement anté-acétabulaire n'est pas rare chez maints *Plagioporinae* H. Manter 1947.

La position systématique de *Laiogonimus* est dans la sous-famille *Plagiorchiinae* Pratt 1902.

Diagnose: Corps élancé. Rapport longueur/largeur = 3/1. VO > Ac. Acétabulum au 1/3 antérieur du corps. Pharynx, œsophage et coeca épais. Les coeca vont jusqu'à l'extrémité du corps. L'utérus remplit tous les espaces post-ovariens, noyant les deux testicules. Ceux-ci sont obliques et au niveau du tiers postérieur du corps, à la plus grande largeur du corps. L'ovaire est près de l'acétabulum dans l'angle postérieur droit. La poche du cirre est à son opposé, devant l'acétabulum, et l'orifice génital est latéral à gauche. De gros follicules vitellogènes, peu nombreux et arrondis, sont disposés en manchons péri-coecaux externes, entre l'acétabulum et le testicule postérieur. Parasites de batraciens.

Générotype: *Laiogonimus mariavirginae* ~~n. sp.~~ Vercammen-Grandjean, 1960

Genus: *Laiogonimus* Vercammen-Grandjean, 1960
Syn: *Astiotrema* (*Biguetrema*) Deblock and Capron, 1962.

Revision of the genus Laiogonimus Vercammen-Grandjean, 1960: As this genus was originally erected for a single species, it owes its generic diagnosis to just that species. However, since it is now called upon to include the two additional species discussed above, its concept will have to be revised. Vercammen-Grandjean put emphasis on such features as the ratio of oral sucker to acetabulum and posterior limits of cecal ends, which should now be considered as specific variations only. He described the postion of the testes as in the posterior third of the body while his figures for the adult worm show this position to be well above the posterior third. In *L. tananarivense* the position is highly variable. So is also the position of the ventral sucker varying between the anterior third and the anterior half of the body. Both acetabulum and testes seem relatively to move anteriorly as the animal grows, for in both species these organs are more posteriorly placed in the juvenile than in the adult specimens. The position of acetabulum and testes cannot therefore be accepted even for specific differentiation. The position of the genital pore in relation to the intestinal ceca which is not mentioned at all by Vercammen-Grandjean, is actually an important feature of generic value.

Generic Diagnosis: Plagiorchiinae Pratt, 1902; spindle shaped, elongate; cecal termination from just behind posterior testis to posterior extremity of the body. Cirrus sac large, but never exceeding posteriorly beyond acetabulum, extending anteriorly from the middle of acetabulum to just outside the left cecum; genita

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pore opening in front of intestinal bifurcation to the left of esophagus. Acetabulum in the anterior half of body. Ovary very close to the acetabulum, its anterior edge lying beneath the posterior border of the latter. Pharyngeal glands present; esophagus short or moderately long; oral sucker larger or smaller than acetabulum. Type: *L. mariavirginiae* VERCAMMEN-GRANDJEAN, 1960.

Key to the species of Laiogonimus:

Oral sucker larger than acetabulum:

L. mariavirginiae VERCAMMEN-GRANDJEAN, 1960 from *Ptychadena* in Congo.

Oral sucker smaller than acetabulum:

(a) Esophagus longer than pharynx, eggs up to 28 by 18, maximum body length 3440 . . . *L. tananarivense* (DEBLOCK and CAPRON, 1962) FISCHTHAL and THOMAS, 1968 (syn. *Astiotrema* (*Biguetrema*) *tananarivense* DEBLOCK and CAPRON, 1962) from *Rana* and *Rhacophorus* species in the Malagasy Republic.

(b) Esophagus shorter than pharynx, eggs 30 to 32·75 by 12.5, maximum length 1700 . . . *L. vercammengrandjeani* n. sp. from *Ptychadena mascareniensis*, *P. erlengeri*, *Phrynobatracus natalensis* and *Rana angolensis* in Ethiopia.

FROM MESKAL, 1970

9. **Laiogonimus mariavirginiae** ~~n. g., n. sp. (*)~~ VERCAMMEN-GRANJEAN, 1960

[Figures 268 à 270].

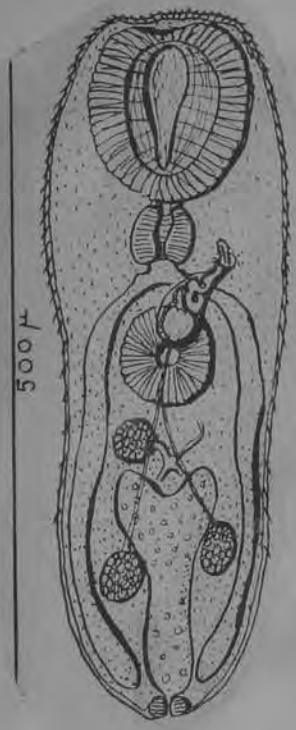
A. - DESCRIPTION.

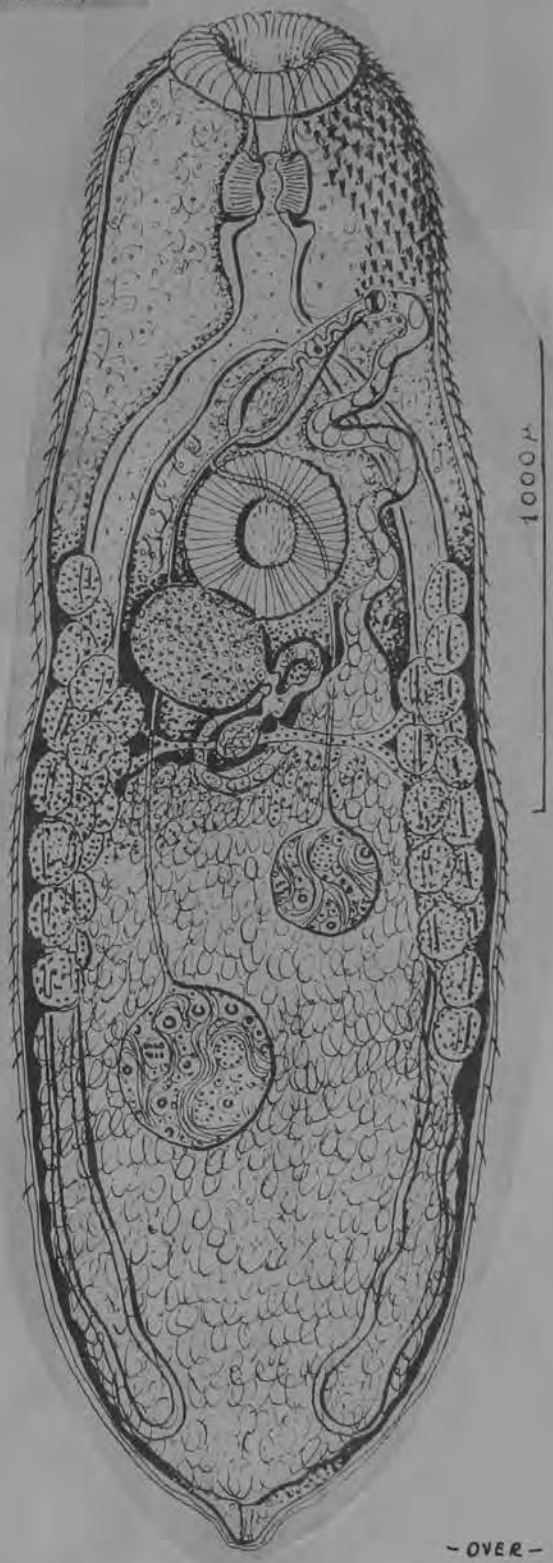
a. - *Mesures*: Moyennes des deux exemplaires (très semblables).

C		VO	Ac	Ph		oE	
L	l	Ø	Ø	L	l	L	l
2300	740	300	250	104	135	160	112

Ov		Ta	Tp	Oe	
L	l	Ø	Ø	L	l
210	174	170	240	34	22

(*) Espece dédiée à ma Mère.





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b. - *Morphologie*: Corps élancé dont la plus grande largeur est au tiers postérieur. VO > Ac > Tp > Ov > Ta (rapport diamétral).

Système digestif: La cavité orale est suivie par un pharynx plus large que long. De celui-ci part un œsophage, large et court, qui se divise en deux longs coeca épais allant jusqu'au bout du corps.

Système génital: *Mâle*: deux testicules placés en diagonale, le postérieur plus volumineux que l'antérieur. Les « vas deferens » s'unissent en un court court canal aboutissant à la poche du cirre antéro-latérale par rapport à l'acétabulum.

Femelle: Ovaire d'un diamètre moindre que celui de l'acétabulum voisin. Il y a un réceptacle séminal et un canal de Laurer peu distinct. L'utérus est vaste et envahit tous les espaces post-ovariens. Un canal de 25 µ de section mène les œufs vers l'atrium génital. Les œufs mesurent 33 à 36 µ de long sur 19 à 23 µ de large [270].

Système excréteur: La vessie n'est pas visible sur les individus âgés. Sur un individu immature la vessie est en Y et un petit sphincter évacuateur est visible [269].

Chaetotaxie: Une spinulation dense recouvre la région céphalique, elle se raréfie déjà au niveau de l'orifice génital et s'arrête après le testicule postérieur.

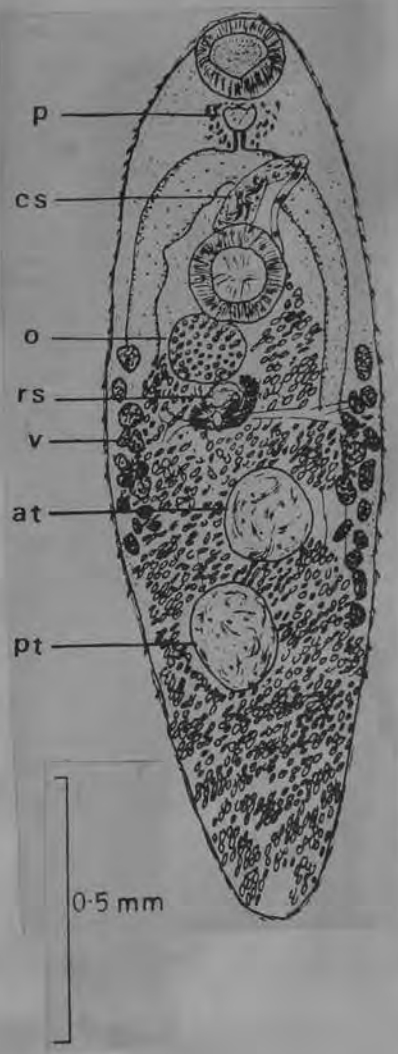
B. - Hôte et Distribution.

Trois exemplaires de cette espèce furent rencontrés le 5 mai 1958, dans l'intestin grêle d'un *Ptychadena* sp., capturé dans les étangs du Centre d'Alevinage de la riv. Nyakabera.

Laiogonimus vercammengrandjeani ~~n. sp.~~ MESKAL, 1970
(Text figs. 11—14)

Host: *Ptychadena mascareniensis* (DUMÉRIL and BIBRON, 1841)
P. erlengeri (AHL, 1923)
Phrynobatrachus natalensis (SMITH, 1849)
Rana angolensis (BOCAGE, 1866)
Habitat: Small intestine, rarely rectum.

Host			Intensity of infection				Locality	Date of collection
Species	Number		Total no. of worms	Load per host				
	Inspected	Infected		Min.	Max.	Mean		
Ptychadena mascareniensis	7	6	69	1	22	11.5	Awasa Marsh	8.8.68
"	12	11	61	2	10	5	Black River	8.8.68
"	10	8	58	1	20	7.3	R. Huluka	16.1.66
"	16	4	9	1	4	2.3	R. Huluka	?.9.66
Ptychadena erlengeri	13	4	150	1	80	37.5	Gogecha st.	7.7.68
Phrynobatrachus natalensis	4	1	1	1	1	1	Burka st.	7.7.68
Rana angolensis	5	2	29	7	22	14.5	L. Akaki	31.1.68
"	14	3	5	1	3	1.7	R. Dima	7.8.67
"	9	1	20	20	20	20	R. Dima	28.8.67
"	15	6	11	1	3	1.8	Fanta st.	24.8.68
"	15	2	1	1	1	1	Sebeta st.	24.7.67
"	14	1	15	15	15	15	Sebeta st.	26.11.68



Description

General Morphology: Body is elongate and more or less spindle shaped. The extremities are rounded, the posterior being narrower than the anterior. Body length in fixed mature individuals varies from 1350 to 1700 (1508). Maximum width, 138—197 (145), lies in the region between ovary and anterior testis. Integument is well marked and covered almost entirely with short spines. The latter are more densely distributed anterior to acetabulum and gradually become sparser posteriorly extending post-testicular on the dorsal surface and only up to the ovary ventrally. Suckers are well developed, the oral being slightly smaller than the ventral. Oral sucker is subterminal ventral, 136—177 (145) by 136—197 (160). Ventral sucker is situated in the anterior third of body length, 188—367 (226) posterior to the oral sucker. It measures 163—204 (192) by 150—218 (193). Ratio of oral sucker to acetabulum is about 1:1.2 to 1.3.

Digestive and Excretory Systems: The mouth opens into a very short prepharynx posteriorly. Pharynx is small but well developed. It measures 50—87 (64) by 50—109 (77) and leads to a short esophagus 41—68 (54) long. Both pharynx and esophagus are surrounded with gland cells. Intestine is simple and bifurcated, the ceca running posteriorly close to the hind end of the body, post cecal space not exceeding 110. The inner surface of the intestine is lined with distinct epithelial cells.

The excretory system (text fig. 12) consists of two lateral main tubes extending antero-posteriorly from the level of the pharynx to the posterior testis on either

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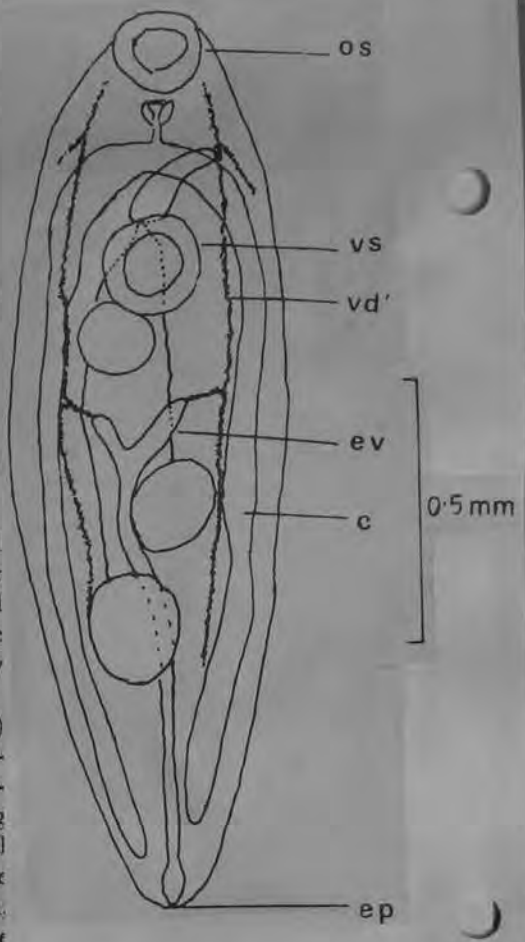
Reproductive System: The male system consists of two smooth surfaced almost spherical testes situated diagonally in the posterior half of the body length. The anterior testis is slightly to the left of the median line and 92—190 (131) posterior to the ovary. It measures 155—218 (184) by 143—190 (164). Intertesticular space varies from 48 to 109 (75). The posterior testis, 138—218 (189) by 113—218 (144), is slightly dextral to the median line and always in the same side of the ovary. Post-testicular space varies from 310 to 480 (381). Two narrow vasa efferentia arise from the anterior borders of the testes and extend anteriorly dorsal to the excretory vessel and acetabulum to enter the hind end of the cirrus pouch separately. The cirrus pouch is large and saccular extending from just beneath the anterior border of the ventral sucker to just over the outer edge of the left cecum. It measures 158—225 (205) in length by 48—70 in width. The posterior half of the cirrus pouch is almost entirely filled with a large convoluted seminal vesicle (text fig. 13). In the anterior third a globular dilation (probably *pars prostatica*) gives rise to the ejaculatory duct that leads to the common genital atrium. A few prostatic gland cells are dispersed in the anterior two thirds of the pouch outside the seminal vesicle and mainly around the ejaculatory duct.

Fig. 13. Cirrus pouch of *L. vercammengrandjeani*

Fig. 14. Female genitalia of *L. vercammengrandjeani*

The female reproductive organs (text fig. 14) consist of an almost spherical and smooth surfaced ovary, a relatively large saccular receptaculum seminis, follicular vitellaria and a long convoluted uterus. The ovary is situated dextral to the median line in the anterior half of the body length just posterior to the acetabulum, its anterior edge slightly overlapped by the posterior border of the ventral sucker. It is always smaller than the testes and measures 120—143 (132) by 100—150 (120). A short narrow oviduct leads from the posterior edge of the ovary to the ootype. The receptaculum seminis, about 81 by 50, is transversely elongate and, just posterior to the ovary touching the hinder border of the latter and directly in front of the anterior testis, ventrally overlapped by the Mehlis' gland. The latter is profuse almost filling the space between the anterior testis and the ovary and extending between the dorsal surface and the ascending limb of uterus ventrally.

The vitelline gland is made of well developed and relatively large globular to ovoid vitelline follicles distributed longitudinally along the external margins of the ceca between the level of the ovary anteriorly, and the posterior border of the hinder testis posteriorly. The number of follicles varies from side to side in single specimens, and the total number varies from individual to individual. Thus a count of vitelline follicles on the right and left sides in six individuals gave 12:10, 12:10, 10:12, 8:10, 6:10 and 9:10. In general, the number on the right side seems to vary more than that on the left, and the total number on the left is more than that on the right side. A transverse vitelline duct connects the vitellaria to a vitelline reservoir situated in the center of the ovo-testicular region.



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The uterus is made of both descending and ascending limbs. The former passes through the inter-testicular space up to the posterior extremity of the body. The ascending limb is quite long and meanders from left to right filling all available post-ovarian space. It even extends extracecally into intervitelline spaces and completely surrounds the posterior testis. The uterus does not seem to fill the space between the left edge of the anterior testis and the vitellaria on its side. From the hinder edge of the acetabulum the uterus extends in almost a straight line to the common genital pore. Eggs are numerous, mostly clear yellowish, operculate, elongate and less oval measuring 30—32.75 (31.3) by 12.5.

Discussion

The genus *Laiogonimus* was recently erected by VERCAMMEN-GRANDJEAN (1960) for a new trematode species from the intestine of frogs in Congo. A similar species was found by DEBLOCK and CAPRON (1962) from the Malagasy Republic, but it was described under the genus *Astiotrema* and new subgenus *Biguetrema*. Although this trematode has some resemblance to *Astiotrema* it is conspicuously different from this genus in several respects. First of all the cirrus sac in *Astiotrema* is always very long, extending far posteriorly behind the hinder margin of the acetabulum which is not the case in *A.* (*B.*) *tananarivense*. The genital pore in the latter species lies in front of intestinal bifurcation to the left of the esophagus. This structure in all other species of *Astiotrema* lies behind the intestinal bifurcation (see review of the genus by YEH, LIANG-SHENG and FOTEDAR, 1958). Another important feature of generic significance is the internal anatomy of the seminal vesicle. Position of ovary in relation to the anterior testis and ventral sucker is also of significance. In *Astiotrema* this gonad lies midway between the ventral sucker and anterior testis, while in *A.* (*B.*) *tananarivense* it is very much closer to the acetabulum than to the testis; in fact its anterior edge lies just behind the posterior border of the sucker. Because of these significant features *A.* (*B.*) *tananarivense* cannot be accommodated in the genus *Astiotrema*. The present author finds the genus *Laiogonimus* more appropriate to contain this species, and concurs with FISCHTHAL and THOMAS (1968) in their suggestion for the combination *Laiogonimus tananarivense* (DEBLOCK and CAPRON, 1962).

Of the two species of *Laiogonimus*, *L. tananarivense* comes closer to the present species, for the acetabulum in both is larger than the oral sucker, while in *L. mariavirginiae* VERCAMMEN-GRANDJEAN, 1960 the oral sucker is the larger. In the latter species the testes are completely surrounded by the uterus "L'utérus remplit tous les espaces post ovariens, noyant les deux testicules". In the other two species at least one of the testes is free of the uterus in its lateral margin. A big difference lies in the characteristic sizes of the eggs. In *L. mariavirginiae* eggs measure 34 by 22, while in the other two species they measure less. The seminal vesicle in the latter two shows a looping effect while in the former such a loop is not evident. Despite these close similarities between *L. tananarivense* and the present form certain conspicuous features distinguish one from the other. In *L. tananarivense* the esophagus is much longer than the pharynx while this structure is shorter in the present form. The two differ furthermore in the proportion of the suckers, size of body and eggs. Although *L. tananarivense* has a larger body its eggs are smaller than in the present species. These differences require the establishment of a new species *L. vercammengrandjeani* (after the author of the genus) for the present material.

LAIOGONIMUS
Vercammen-
Grandjean, 1960

Lechriorchis Stafford, 1905

Syn. *Mediorima* Nicoll, 1914

Generic diagnosis. — Plagiorchiidae, Styphlodorinae: Body lanceolate, spined. Acetabulum usually somewhat larger than oral sucker, in anterior half of body. Oral sucker and pharynx moderately developed; esophagus short, ceca usually half-long. Testes diagonal or symmetrical, post-equatorial, at or near cecal ends. Cirrus pouch overlapping acetabulum posteriorly, enclosing seminal vesicle, prostatic complex and protrusible cirrus. Genital pore median or slightly to one side of median line, at or behind intestinal bifurcation. Ovary dorsodextral to posterior margin of acetabulum. Uterus reaching to posterior extremity; ascending limb enormously distended. Vitellaria extending nearly whole length of intestine. Excretory stem bifurcating behind acetabulum into short arms. Parasitic in lung or oviduct of snakes.

Genotype: *L. primus* Stafford, 1905 (Pl. 53, Fig. 642), in lung of *Eutenia sirtalis;* Canada. Also in *Thamnophis sauritus* and *Natrix sipedon;* N. America.

Xiphidiocercaria develops in daughter sporocyst in *Physella gyrino, P. parkeri,* and *P. ancillaria,* with 6 pairs of penetration glands, short ceca terminating in front of acetabulum and Y-shaped excretory vesicle, whose arms encircle the acetabulum; flame cell formula $2\times6\times3$; cysts in *Rana clamitans* and *R. pipiens* — Talbot (1933).

Other species:

L. abduscens Byrd et Denton, 1938, in *Lampropeltis getulus holbrooki;* Louisiana.

L. insignis Parker, 1941, in *Thamnophis sirtalis sirtalis;* Florida.

L. megasorchis (Crow, 1913) Talbot, 1934, in *Natrix rhombifera;* U.S.A.

L. plesientera Sumwalt, 1926, in lung of *Thamnophis ordinoides* and *T. sirtalis;* San Juan Island.

L. proprius (Nicoll, 1914) Talbot, 1934, syn. *Mediorima p.* T., in *Thamnophis ordinoides;* N. America.

L. secundus Canavan, 1937, syn. of *Paralechriorchis natricis* Holl et Allison, 1935 — Byrd and Denton (1938), in oviduct of *Natrix sipedon;* Philadelphia Zool. Gard.

L. tygarti Talbot, 1933 in *Thamnophis sauritus* and *T. sirtalis;* West Virginia. *Physella gyrina, P. heterostropha; Rana clamitans, R. pipiens.*

L. inermis Lebour, 1913, and *L. validus* Nicoll, 1911, should be transferred to *Ochetosoma* Braun, 1901.

Plagiorchiidae

KEY TO THE GENERA OF THE SUBFAMILY RENIFERINAE

1. Uterus not coiled or only slightly coiled 2
   Uterus greatly coiled 4
2. Ceca clasped between testes or ends turn toward center of body ..... *Lechriorchis* ←
   Ceca not clasped between testes nor do ends turn toward center of body 3
3. Ceca long, vitellarian follicles diffuse, testes in posterior end of body ..... *Caudorchis*
   Ceca long, vitellarian follicles diffuse, testes not in posterior end of body ..... *Dasymetra*
4. Metraterm muscular and glandular, widely separated from cirrus pouch ..... *Zeugorchis*
   Metraterm weak or moderately muscular usually adherent to cirrus pouch 5
5. Genital pore anterior to intestinal bifurcation 6
   Genital pore not anterior to intestinal bifurcation ..... *Pneumatophilus*
6. Cirrus pouch long and slender, vitellaria posterior to ovary ..... *Macrodera*
   Cirrus pouch long and slender, vitellaria not posterior to ovary ..... *Renifer*

Genus *Lechriorchis* Stafford 1905

Generic diagnosis—Reniferinae. Body oval, more pointed posteriorly. Cuticula beset with spines. Acetabulum larger than oral sucker. Intestinal ceca extend to or between testes, ends turned in toward center of body. Genital pore median, close behind fork of intestine or midway between anterior margin of acetabulum and fork of intestine. Cirrus pouch rather large, cylindrical in shape anterior to acetabulum or extending across to its posterior margin. Vitellaria composed of large follicles, situated lateral to intestinal ceca in central third of body. Uterus, a descending and ascending limb, extending to posterior end of body. Metraterm short with fairly well developed musculature. Parasitic in lung of snakes.

Type species—*Lechriorchis primus* Stafford, 1905

To this genus as defined above belong *L. primus* Stafford, 1905; *L.* (= *Renifer*) *megasorchis* Crow, 1913; *L.* (= *Mediorima*) *propria* Nicoll, 1914; *L. plesientera* Sumwalt, 1926; *L. tygarti* Talbot, 1934.

Stafford (1905) in describing the type species of the genus Lechriorchis failed to give an adequate generic diagnosis. Probably the most important generic characteristic, included in the present diagnosis, is the character of the intestinal ceca. The intestinal ceca of the members of this genus may reach only to the testes or they may be clasped between them, but in either case their ends definitely turn toward the center of the body which is a characteristic not found in the members of any of the other genera of the Reniferinae.

Nicoll (1918) accepted Stafford's suggestion, Stafford (1905), that *Renifer elongatus* Pratt should be placed in the genus *Lechriorchis* and offered a revision of the generic diagnosis, redefining the position of the genital pore as midway between the edge of the body and the pharynx rather than close behind the intestinal bifurcation. This revised generic diagnosis, however, cannot be accepted since it excluded the type species *L. primus* Stafford and the two well described species *L. plesientera* Sumwalt and *L. tygarti* Talbot. Nicoll (1911) described the genus *Mediorima* which he considered to be closely related to *Lechriorchis* differing only in the position of the genital pore being posterior to the intestinal bifurcation. Since the description of the position of the genital pore in the genus *Lechriorchis* must remain as originally described by Stafford, I proposed to suppress the genus *Mediorima* and transfer its type species *M. propria* Nicoll, 1911 to the genus *Lechriorchis*.

FROM TALBOT, 1934

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Genus *Lechriorchis* Stafford, 1905

Generic diagnosis: RENIFERINAE. With the characters of the subfamily. Acetabulum larger than oral sucker. Ends of ceca usually directed toward midline of body. Ovary close behind acetabulum. Metraterm well developed, muscular, about one-third length of cirrus sac. Cirrus sac large, muscular, not extending posterior to acetabulum. Genital pore median or slightly displaced to right or left of midline, between bifurcation of ceca and anterior boundary of acetabulum. Testes close behind ovary. Parasitic in respiratory, digestive, and reproductive tracts of snakes.

Type species: Lechriorchis primus Stafford, 1905.

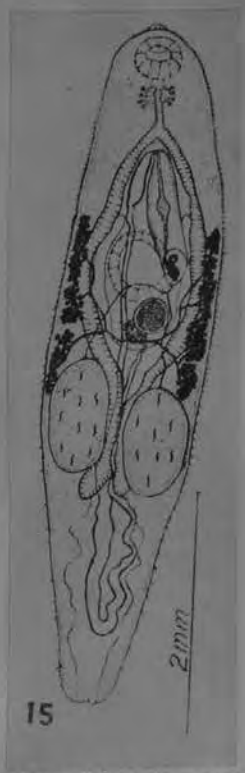
Additional species: L. megasorchis (Crow, 1913), *L. propria* (Nicoll, 1914a), *L. plesientera* Sumwalt, 1926, *L. tygarti* Talbot, 1933, and *L. abduscens* n. sp.

KEY TO THE SPECIES OF THE GENUS *Lechriorchis*

1. Intestinal ceca ending in advance of testes ..... 2.
   Intestinal ceca extending beyond testes ..... 3.
2. Acetabulum in first body third ..... *L. propria* (Nicoll, 1914a).
   Acetabulum in second body third ..... *L. tygarti* Talbot, 1933.
3. Body small, less than 7.00 mm long; testes less than 1.00 mm. long; cirrus sac less than 2.00 mm long ..... 4.
   Body large; testes large; cirrus sac long ..... *L. abduscens* n. sp.
4. Acetabulum considerably larger than oral sucker ..... 5.
   Suckers about the same size ..... *L. megasorchis* (Crow, 1913).
5. Acetabulum in first body third ..... *L. primus* Stafford, 1905.
   Acetabulum in central body third ..... *L. plesientera* Sumwalt, 1926.

FROM BYRD AND DENTON, 1938

Plagiorchiidae



FROM TALBOT, 1933

Lechriorchis primus Stafford, 1905

Description.—Body elliptical (fig. 12, A), 5.5 mm long by 1.4 mm wide; cuticule spiny. Oral sucker subterminal, 510μ long by 476μ wide; acetabulum 680μ long by 782μ wide, separated from oral sucker by a distance of 120μ. Prepharynx short; pharynx 200μ long by 185μ wide; esophagus 170μ long; intestinal ceca slender, partly obscured by uterus. Genital aperture median, immediately posterior to intestinal bifurcation. Cirrus pouch 1 mm long by 340μ wide, its base at level of center of acetabulum, containing numerous prostate cells and slender, somewhat folded seminal vesicle. Testes oval, about 560μ long, slightly oblique to long axis of body, party obscured by ascending limb of uterus. Ovary globular, 170μ in diameter, slightly to right of median line and at level of posterior margin of acetabulum. Vitellaria not clearly distinguishable, apparently extending from level of anterior margin of acetabulum to anterior poles of testes. Uterus consisting of a single loop; descending limb slender and extending to posterior end of body; ascending limb wide, becoming narrowed at level of acetabulum; metraterm about 1/2 as long as cirrus pouch, with relatively thick walls. Eggs oval, 52 to 55μ long by 26 to 29μ wide.

Specimen.—U.S.N.M. Helm. Coll. No. 6889 (labelled type), collected by J. Stafford from *Eutaenia sirtalis* L. (=*Thamnophis sirtalis*) at Montreal, Quebec.

The genus *Mediorima* Nicoll, as pointed out by Talbot (1934, Tr. Amer. Microsc. Soc., 53: 40-56), is congeneric with *Lechriorchis* Stafford, the type species, *M. propria* (=*L. propria*) differing from *L. primus* as described above in no essential detail other than in the size of the eggs (39μ long by 18 to 20μ wide, according to Nicoll).

FROM PRICE, 1936

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Lechriorchis primus (Stafford, 1905)

Observations were based on two mature and one immature specimens from the esophagus of three *Thamnophis sauritus*. There were no significant differences in the values given by Talbot (1933) and those recorded from this study. In addition to the measurements there was agreement with other features pointed out in the original description, such as the condition of the vitellaria, length of the intestinal caeca and the relative positions of the other internal organs.

From RABALAIS, 1969

Lechriorchis abduscens n. sp. BYRD AND DENTON, 1938

(Fig. 13)

BASED ON 2 SPECIMENS

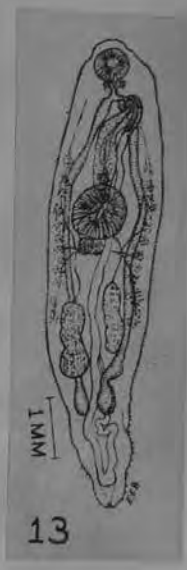
Specific diagnosis: Lechriorchis. Body much elongated, broadly rounded anteriorly, more pointed posteriorly, 7.60 mm long by 1.75 mm wide, widest at level of acetabulum. Cuticula with spines. Oral sucker 0.56 mm long by 0.60 mm wide. Acetabulum 0.84 mm in diameter, placed 2.30 mm from anterior margin of body. Prepharynx short. Pharynx muscular, 0.22 mm in diameter, with gland cells. Esophagus short, 0.16 mm long, slightly muscular, with gland cells. Ceca long, reaching a short distance beyond testes, ends dilated, may or may not be clasped between testes. Genital pore displaced to left of midline, close behind bifurcation of ceca. Testes smooth to irregular in outline alternating in the oblique position, one testis more advanced than the other by half its long diameter, 1.26 mm long by 0.44 mm wide, placed about 0.60 mm behind ovary. Vasa efferentia uniting on entering cirrus sac. Cirrus sac large, 2.12 mm long, extending from middle of acetabulum through a considerable loop to genital pore, containing much coiled vesicula seminalis, almost spherical pars prostatica with gland cells, long, slender ductus ejaculatorius, and slightly muscular cirrus. Excretory system typical for the subfamily. Ovary spherical, 0.24 mm in diameter, right of midline close behind acetabulum. Shell gland and Laurer's canal present. Vitellaria lateral and ventral to ceca, follicles form about eleven distinct clusters on each side of body, from midway between acetabulum and genital pore to middle of anterior testis. Uterus typical for genus. Metraterm well developed, muscular, about one-third length of cirrus sac. Ova numerous, operculated, 45 μ by 27 μ.

Host: Lampropeltis getulus holbrooki (Stejneger).

Habitat: Lung.

Locality: Raceland, Louisiana, U. S. A.

Type species: U. S. Nat. Mus. Helm. Coll. No. 9133.



13

Lechriorchis abduscens is described from two fully matured specimens taken from the membranous sack-like posterior portion of the lung of a king snake, *Lampropeltis getulus holbrooki,* from Raceland, Louisiana. The two specimens are so near the same size in every detail that it is difficult to distinguish one specimen from the other. The species appears to be more closely related to *L. tygarti* than to the other members of the genus. From this species *L. abduscens* can be distinguished by its larger body, the length and development of the cirrus sac, the slightly displaced genital pore, the larger testes, and the grouped follicles of the vitellaria. The present species resembles *L. megasorchis* in regard to the large size of the testes, but when the other features of the body are considered these two species are quite distinct.

GENUS LECHRIORCHIS STAFFORD, 1905

Lechriorchis insignis n. sp. PARKER, 1941

(Plate I, Fig. 2)

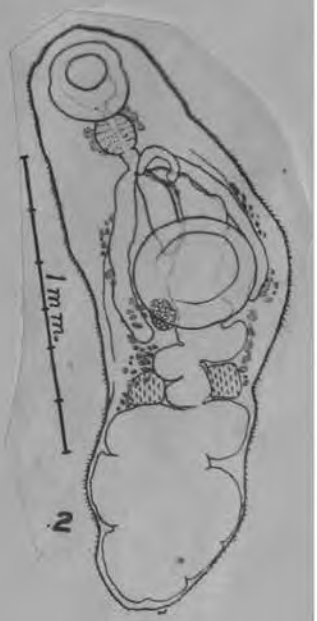
Specific diagnosis: Lechriorchis. Body elongated, rounded at both ends in fully mature individuals, otherwise somewhat pointed at posterior end; 2.00 (1.81-2.26)[1] mm. by 0.65 (0.57-0.68) mm., widest at level of acetabulum or just posterior to testes. Cuticula with spines throughout, spines scattered near posterior end. Oral sucker subterminal, 0.30 mm. in diameter. Pharynx muscular, 0.13 (0.12-0.14) mm. by 0.225 (0.105-0.13) mm. Ventral sucker 0.43 (0.35-0.49) mm. by 0.45 (0.42-0.49) mm., placed near anterior edge of middle third of body. Oesophagus shorter than pharynx, measuring about 0.08 mm. Genital pore on midline or slightly displaced to right or left of midline at posterior edge of bifurcation of caeca. Cirrus sac 0.31 (0.22-0.35) mm. by 0.11 (0.09-0.13) mm., extending posteriorly from the genital pore for a short distance and usually terminating over the acetabulum. Cirrus sac with a coiled vesicula seminalis, nearly spherical pars prostatica, and slender ductus ejaculatorius. Slightly muscular cirrus sometimes extruded. Testes irregularly rounded in shape, transverse zones overlapping, and separated one from the other by the descending and ascending limbs of the uterus. Left testis 0.20 (0.15-0.30) mm. by 0.13 (0.11-0.18) mm. Right testis 0.18 (0.15-0.22) mm. by 0.11 (0.09-0.16) mm. Ovary 0.12 (0.10-0.13) mm. by 0.09 (0.08-0.11) mm., oval and nearly smooth in outline, located dorsal to or partly dorsal to right posterior quadrant of acetabulum. Uterus typical. Vitellaria lateral and ventral to caeca, extending from just in front of acetabulum to posterior end of testes. Caeca terminating anterior to testes, with ends usually directed somewhat inward. Metraterm muscular, ⅓ to ½ length of cirrus sac. Operculated ova numerous, measuring 21-24 μ by 38-40 μ.

Host: Thamnophis sirtalis sirtalis (Linné). Location: Oesophagus. Locality: Twenty-four miles west of Melbourne, Florida.

Type Specimen: U. S. Nat. Mus. Helm. Col. No. 9399.

Remarks: The description of the present species is from five selected specimens of a dozen that are mostly immature or distorted. This species more closely resembles *L. tygarti* Talbot, 1933, and *L. propria* (Nicoll, 1914) than the other members of the genus. It may be easily distinguished from the former species by the smaller body size, the more coiled uterus, the larger suckers, and the smaller ovary. *L. propria* is much larger, has a more extended uterine pattern, and the acetabulum is set farther anteriorly than is noted for the present species.

[1] Unless otherwise noted in the text, measurements given are averages of ten unselected individuals with minima and maxima following in parentheses.



Lechriorchis megasorchis (Crow, 1913) Talbot, 1934

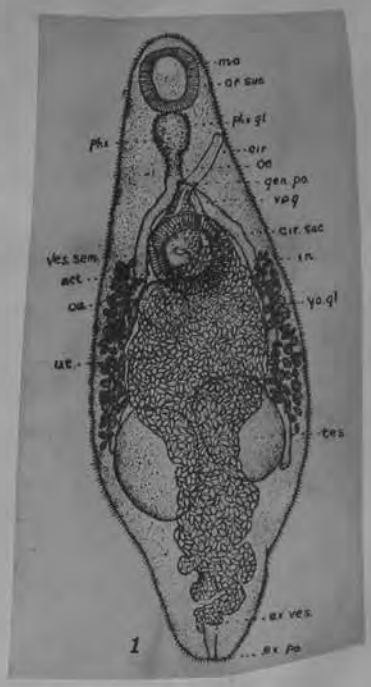
Renifer megasorchis sp. nov Crow, 1913

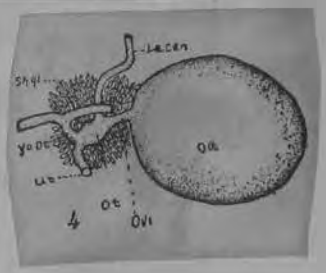
This worm was found attached to the wall of the uterus of a large *Natrix rhombifera*, a common nonpoisonous snake. It is a comparatively large worm, pinkish in color and slightly lanceolate in form. The body is widest just posterior of the middle and tapers to blunt points at both ends, but more rapidly to the posterior end. The ventral surface is flat or slightly elliptical, the dorsal surface cylindrical. In length the body measures 5 millimeters; the width at the widest point, 1.72 millimeters; thickness, .92 millimeter. The body is covered with short spines arranged in transverse rows, the spines in each row alternating with the row proximal to it. The spines are slightly longer and less numerous towards the posterior end of the body. The two suckers are sessile. The oral sucker is subterminal and measures .46 millimeter in length and .43 millimeter in width. The acetabulum is slightly larger than the oral sucker and is .48 millimeter in diameter. It is situated in the median line in the second fourth of the ventral surface.

The digestive tract consists of pharynx, œsophagus and intestinal cæca. The pharynx measures .247 millimeter in length and .226 millimeter in diameter. It is a very muscular organ, the radially disposed fibers constituting the principal part, with a very thin layer of circular fibers on the outside. The œsophagus is a small, round, straight tube, .06 millimeter in diameter and .32 millimeter long. Both the pharynx and œsophagus are surrounded by glands. The intestinal cæca are simple tubes, without lateral projections, extending to the beginning of the last fourth of the body. The right tube is slightly longer than the left. They lie in about the same plane and follow the general body outline. They are generally round, with an average diameter of .09 millimeter.

The excretory vesicle is a Y-shaped tube, with very thin walls—so thin that it can be traced only in sections. From the small opening at the extreme posterior end of the body the tube proceeds forward, gradually growing larger till it reaches the anterior end of the testes, where it divides, each branch passing forward just inside its respective intestinal cæcum to about the posterior edge of the acetabulum. From the bifurcation the crura grow rapidly smaller and terminate as blunt points. At the widest point the vesicle measures .91 millimeter in width, while the dorsoventral diameter at the same point is only .04 millimeter. At the neck, or just inside the pore, the diameter of the thin cylindrical tube is .036 millimeter. The neck is surrounded by glands which define its limits clearly. The position of the excretory vesicle is dorsal to all the other organs except the yolk ducts.

The testes are two very large oval bodies, situated in the third fourth of the body, and nearly filling the body cavity at its widest point. The left testis is slightly in advance of the right one. They are the same size and measure .98 millimeter in length, .61 millimeter in width and .77 millimeter in thickness. The *vasa efferentia* arise from the anterior surface of each testis and pass forward dorsal to the uterus and to the left of the ovary to the posterior end of the cirrus-sac, where they join to form the *vesicula seminalis*. The *vasa* are very small tubes, .0098 millimeter in diameter, and can be seen only in sections. The *vesicula seminalis* is entirely within the cirrus-sac, nearly filling it at the posterior end. In its course





it bends upon itself and is continued as a short *pars prostatica*. The cirrus which follows is a large, long organ, and extends through the cirrus-sac and outside the body wall a distance of .528 millimeter. Its length within the cirrus-sac is about equal to that outside the body. It measures .092 millimeter in diameter. The cirrus-sac is a large organ enclosing the cirrus, *vesicula seminalis*, *pars prostatica* and prostate glands. It measures .363 millimeter in diameter at the widest point—

meters wide, and .92 millimeter thick. Body covered with short spines. Oral sucker subterminal, .46 millimeter in length, .13 millimeter in width. Acetabulum sessile, .48 millimeter in diameter. Pharynx moderate; œsophagus moderately long; intestinal cæca simple, reaching to third fourth of body. Excretory vesicle Y-shaped; long, voluminous median portion; crura short and extend very little past the middle of the body. Testes two very large oval bodies; the left slightly anterior to right; behind ovary and acetabulum. Ovary immediately behind acetabulum; large and oval in shape. Uterus very voluminous; metraterm long and muscular, genital pore in front of acetabulum in median line. Egg .031 millimeter long and .016 millimeter wide. Laurer's canal small; no *receptaculum seminis*. Cirrus-sac large; cirrus extends .523 millimeter beyond body wall. Yolk glands lateral, occupying middle third of body. Parasite in the uterus of *Natrix rhombifera*.

Plagiorchidae

Lechriorchis megasorchis (Crow,1913)
(Synonym:Renifer megasorchis Crow)

Body lanceolate, widest just posterior to middle, 5. by 1.72 mm.,spined. Oral sucker 0.43, ventral 0.48 mm. Excretory vesicle Y-shaped, dividing at anterior end of testes. Testes in third fourth of body. Cirrus sac 0.363 mm in greateat width. Ovary to right of median line, oval, just posterior to cirrus sac. Seminal receptacle lacking, Lauers canal present. Vitelline glands of about 50 follicles, chiefly extracecal, over middle third of body. Uterus with serpintine coils to posterior end, ascending limb voluminous, metraterm to middle of cirrus sac, on its left. Genital pore median, a short distance in front of ventral sucker.

Host: uterus of Natrix rhombifera
Locality: Kansas

***Lechriorchis megasorchis* (Crow, 1913)**

Observations were based on two specimens from the mouth of one of 15 *Natrix fasciata fasciata* examined. The material from this study was considerably smaller in every respect than the original material, however, the material used by Crow (1913) was older than the present specimens. Both specimens were just beginning to produce eggs while those figured by Crow were fully mature.

The relative positions of the testes and vitellaria leave no doubt that this material is conspecific with *L. megasorchis*.

This represents the first report of *L. megasorchis* from Louisiana. The host, *N. fasciata fasciata*, represents a new host record.

FROM RABALAIS, 1969

Lechriorchis plesientera Sumwalt, 1926

(See reprint for complete description)

Host: Thamnophis ordinoides

Loc.: San Juan Island, Puget Sound, Wash.

Site: 83 in lung; 2 in (?) body cavity; 1 in lower esophagus or stomach

Body 2.99-6.85 x .86-1.40

Oral sucker (ave.) .345-.517 x.329-.475

Acetabulum (ave.) .375-.674 diam.

Ratio (ave.) 1: 1.14 (small worms) to 1.42 (large worms)

Pharynx .114-.160 long

Esophagus 1/10 to = pharynx in lingth

Ceca converge immediately anterior to testes, then usually pass between testes, diverge, and usually end about half the length of a testis beyond

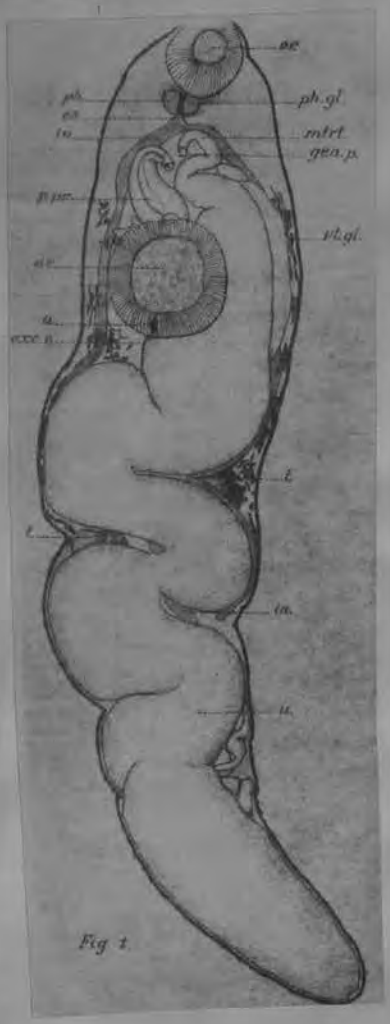
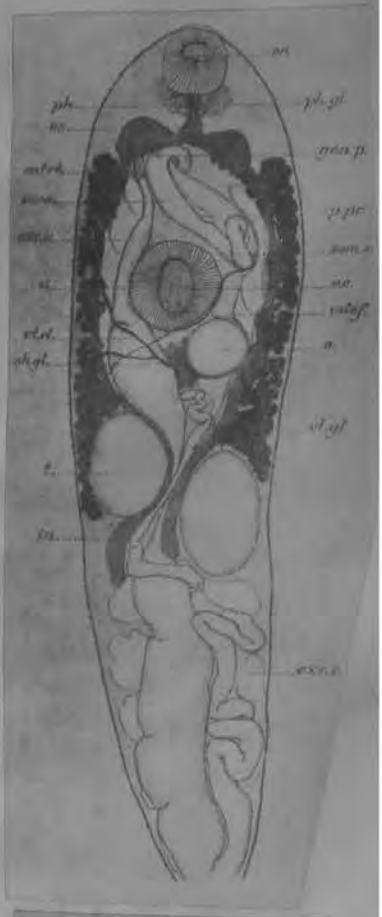


Fig 1.



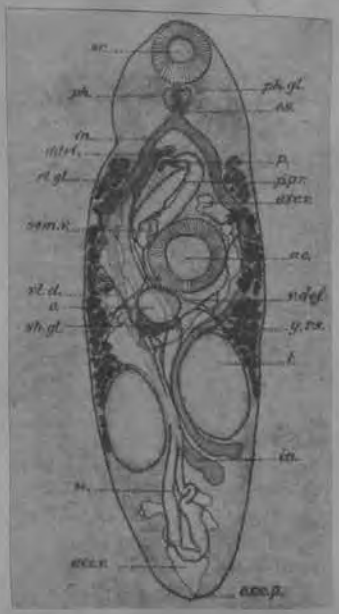
Cirrus sac never past middle of acetabulum

Metraterm ½ length of cirrus sac

Vitellaria lateral to ceca, usually from genital pore level to testicular region, but varies

Eggs 38-49 x 21-25 u

Excretory vesicle Y, dividing just behind ovary, arms extending to region behind genital pore



- OVER -

In the face of the conflicting opinions on the classification of the family Lepodermatidae Odhner, to which this species plainly belongs, it is difficult to find a taxonomic place for it. The form it most closely resembles is Lechriorchis primus, if Stafford's description is to be accepted. His phrase "close in the fork of the intestine," used in describing the location of the genital pore, would seem to mean just behind and median to the intestinal bifurcation. If this interpretation is correct the only points whereby the present species is distinguished from L. primus are its possession of oral and ventral suckers more nearly equal, its smaller pharynx and esophagus, the greater distance of its ovary from the cirrus sac, and its shorter eggs. Stafford's description is meagre; yet, in every respect save those listed above there is agreement with the form under consideration. Furthermore, L. primus is the only other species of the family in which the ends of the ceca converge and pass between the testes. Both worms are from the same host species. If only the grounds so far discussed are considered, the establishment of the present form as a new species of the genus Lechriorchis Stafford is a simple matter.

Lechriorchis plesientera differs from L. primus in the ways listed at the beginning of this discussion. From L. validus it is distinguished by the clasped ceca; the testes smooth in outline, or indented along their lateral margins; the genital pore median and posterior to the forking of the intestine; the position of the ovary posterior to the acetabulum; the slight coiling of the uterus; and the length of the metraterm. It differs from R. megasorchis in having a shorter pharynx and esophagus, clasped ceca, larger eggs, and a different habitat. Its lung habitat, the presence of spines, the small size, the typically clasped ceca, the smooth or laterally indented testes, the median genital pore, and larger eggs distinguish it from L. inermis. It is conceivable that in the event of a more detailed description of the type species, L. primus, L. plesientera may prove to be identical with it.

From Sumwalt, 1926

Plagiorchiidae

Lechriorchis proprius (Nicoll, 1914) Talbot, 1934

Nicoll, 1914

SYN. 1. Mediorima propria, ~~gen. et sp. n.~~ (Pl. I. fig. 1.)

This species is a typical member of the family Lepodermatidae, to which a large proportion of reptilian trematodes belong. One specimen was obtained from the intestine of a Striped Snake (*Tropidonotus ordinatus*). No. Am. Snake — London Zool. Gardens

It is an elongated, slightly flattened Trematode, both ends of which are rounded. The cuticle is beset with small spines, which extend throughout the whole length of the body. The length is about 6 mm., the greatest breadth, near the middle of the body, is 1·2 mm.

The globular oral sucker has a diameter of ·5 mm.; the ventral sucker, which is somewhat oval, measures ·7 × ·8 mm., and is situated 1·7 mm. from the anterior end.

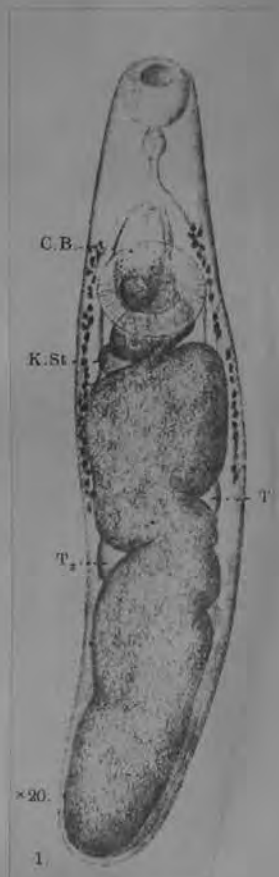
There is a very short prepharynx, and a pharynx measuring ·2 × ·17 mm. The œsophagus is about the same length as the pharynx. The intestinal diverticula are short, not extending very far (·4 mm.) beyond the ventral sucker. Their ends are obscured by the enormous mass of ova.

The genital aperture is median and is situated just behind the intestinal bifurcation. The cirrus-pouch is short and stout, measuring ·8 × ·34 mm. It is almost oval in outline. Within it there is a small convoluted vesicula seminalis, with a moderately long pars prostatica and a short ductus ejaculatorius. The vagina is somewhat shorter than the cirrus-pouch.

The small globular ovary is situated a short distance behind the ventral sucker on the right side and is largely concealed by the uterus. The anterior testis lies on the left about 1 mm. behind the ventral sucker, while the posterior testis lies a little further back on the right side. Both are almost entirely concealed by the uterus, so that their size and shape could not be determined. They are, however, apparently elongated oval in outline. The yolk-glands are scanty, consisting on each side of a little more than a single row of follicles external to the intestinal diverticula, and extending from midway between the genital aperture and the anterior edge of the ventral sucker to the level of the anterior testis.

The uterus fills up the greater part of the posterior two-thirds of the body. It consists of a narrow descending limb and a very greatly distended ascending limb, which is twisted into slight folds. The extremely numerous ova are dark brown in colour and measure ·039 × ·018–·020 mm.

This species bears a very close resemblance to the genus *Lechriorchis*, but is distinguished from it by the position of the genital aperture and the shape of the cirrus-pouch.



Lechriorchis tygarti ~~n.sp.~~ TALBOT, 1933

(Figs. 20 and 21.)

BASED ON 143 SPECIMENS

Specific diagnosis—*Lechriorchis*. Cuticula beset with small spines, more numerous anteriorly. Body 6·95 × 1·65 mm. in the largest specimen studied and 2·21 × 0·64 mm. in the smallest sexually mature specimen. Oral sucker slightly oval, 0·21–0·52 mm. wide. Acetabulum circular, 0·37–0·86 mm. in diameter, situated 2·45 mm. from anterior end in the larger specimen and 0·68 mm. in the smaller. Prepharynx short. Pharynx strongly muscular, 0·14–0·21 mm. wide. Oesophagus 0·11–0·50 mm. long. Intestinal caeca extend to or almost to anterior margin of testes with ends turned toward the centre of the body. Testes oval, 0·45–0·50 × 0·20–0·35 mm., situated in anterior part of posterior third of body. Cirrus pouch cylindrical, 0·45–1·31 mm. long, extending vertically across and never to centre of acetabulum, containing a large seminal vesicle which occupies approximately one half of the cirrus pouch. Ovary spherical, 0·18–0·27 mm. in diameter, situated to right of midline just posterior to acetabulum. Vitellaria composed of compact follicles, lateral to and slightly extending over intestinal caeca. Eggs oval, operculate, dark brown, 45–53 × 20–34μ.

Hosts: *Thamnophis sauritus, T. sirtalis.*

Habitat: Lung.

Locality: Randolph County, West Virginia, U.S.A.

Type specimen: U.S. Nat. Mus. Helm. Coll. No. 8625.

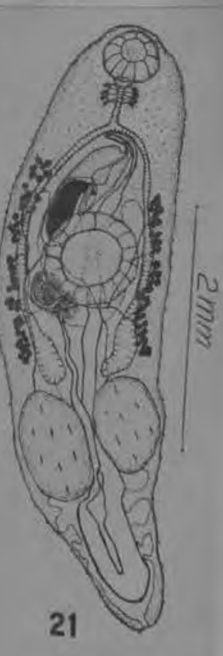
THE LIFE HISTORY OF *LECHRIORCHIS TYGARTI*, ~~N.SP.~~

The second species, of which the life history is to be considered, is also a member of the genus *Lechriorchis*. This trematode was found in the lung of two species of garter snakes, *Thamnophis sauritus* and *T. sirtalis*, collected in the vicinity of Tygart River, Randolph County, West Virginia. In general structure it is easily distinguishable from *Lechriorchis primus* Stafford 1905, the type species of the genus, chiefly in the size of the acetabulum and the length of the intestinal caeca. In many respects it is more closely related to *L. plesientera* Sumwalt, the other American species of this genus. The ratio of the diameter of the suckers is greater in *L. tygarti* n.sp. and the seminal vesicle is much larger, occupying about one-half of the cirrus pouch. In *L. tygarti* the intestinal caeca extend only to the testes, whereas in *L. plesientera* they extend between the testes and to a considerable distance beyond them. Since this trematode differs from *L. plesientera* in three major respects, I have considered it to be a new species and have assigned to it the name *L. tygarti* after the locality from which it was collected. The following description of *L. tygarti* is based on studies made upon 143 specimens, and all measurements represent the actual measurements of the smallest and largest sexually mature specimens selected from the entire group.

"L. near tygarti" reported from lung of T. ordinoides, Elegant Garter Snake, southern Saskatchewan by [illegible] 1953

20

Figs. 20–24.



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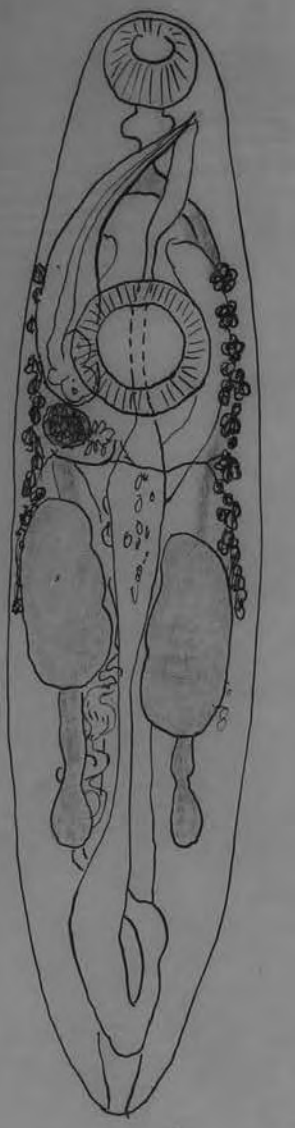
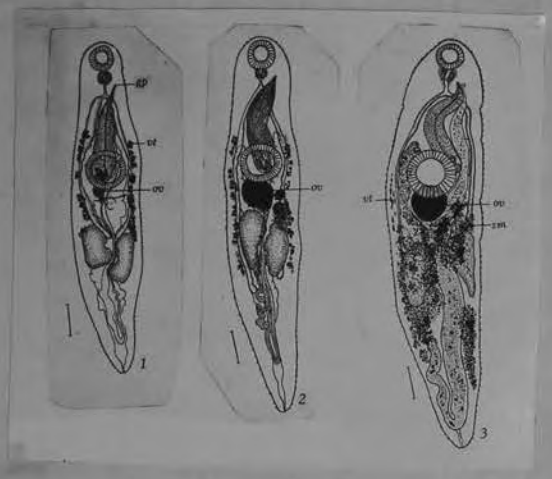


Lechriorchis mermis
from dark green
snake (Zamenis
gemonensis)
Europe



L. validus

Nicoll, 1911

LECHRIORCHIS

Leptophallinae Dayal, 1938

Subfamily diagnosis. — Plagiorchiidae: Body subcylindrical, spinose. Oral sucker and pharynx well developed, esophagus short. Ceca terminating some distance short of posterior extremity. Acetabulum rather small, pre-equatorial. Testes almost symmetrical or diagonal, in middle third of body or more posteriorly. Cirrus pouch preacetabular; seminal vesicle mainly outside cirrus pouch. Genital pore median or slightly submedian, immediately pre-acetabular or further in front. Ovary just posterolateral to acetabulum. Vitellaria largely in shoulder region or extending in anterior part of hindbody. Uterus mostly posttesticular, reaching posterior extremity. Excretory vesicle Y-shaped. Parasites of snakes.

Key to genera of Leptophallinae

Vitellaria in forebody, largely in shoulder region; genital pore submedian, immediately preacetabular ..... *Leptophallus*

Vitellaria in hindbody, from level of acetabulum to behind cecal ends; genital pore median, between acetabulum and intestinal bifurcation ..... *Metaleptophallus*

Leptophallus Lühe, 1909

Generic diagnosis. — Plagiorchiidae, Leptophallinae: Body small, subcylindrical, spined all over. Acetabulum comparatively small, pre-equatorial. Oral sucker and pharynx well developed. Esophagus very short. Ceca terminating some distance short of posterior extremity. Testes almost symmetrical or diagonal, postacetabular, in middle third of body. Cirrus pouch pre-acetabular. Vesicula seminalis outside of cirrus pouch for most part, lateral or dorsal to acetabulum. Genital pore almost median, pre-acetabular. Ovary posterolateral to acetabulum, in front of right or posterior testis. Receptaculum seminis small or absent. Laurer's canal present. Uterine coils mainly posttesticular, reaching to posterior extremity. Vitellaria in forebody, especially in shoulder region. Excretory vesicle with long stem and very short cornua. Parasitic in esophagus of snakes.

Genotype: *L. nigrovenosus* (Bellingham, 1844) Lühe, 1909 (Pl. 54, Fig. 659), syn. *Brachycoelium nigrovenosum* (Bell.) Looss, 1902; *Dist. natricis natricis torquatae* Dies., 1855, in *Tropidonotus natrix, Natrix viperina;* Europe, N. & S. Africa. Cysts in tadpoles, fed to snakes — Ercolani in Leuckart (1a, p. 171). *Limnaea stagnalis, L. limosa;* experimentally in *Vipera aspis* — Brumpt (1945, 46). see p. 558.

Other species: *L. ovalis* Fantham et Porter, 1950, in *Naja nivea;* S. Africa.

LEPTOPHALLUS Luhe, 1909

Small distomes with with elonggted posteriorly somewhat narrowed body of almost circular cross-section. Skin thickly spined/ Pharynx present, esophagus very short, ceca over-reaching the ventral sucker but not reaching the hind end of the body. Excretory vesicle Y-shaped with long stem and very short branches. Genital pore nearly median, between intestinal bifurcation and ventral sucker. Cirrus sac present, lying in front of the ventral sucker. Greater part of the seminal vesicle outside the cirrus sac near the ventral sucker. Testes about in the middle of the body, nearly symmetrical. Ovary to the right in front of them, partly beside the ventral sucker. Seminal receptacle small or lacking, Laurer's canal present. Vitellaria limited to the forebody. Uterus extending to hind end, between the testes and in part ventral to them, then extending foward in an S-shaped coil. Type species: L.nigrovenosus (Bellingham)

Leptophallus nigrovenosus (Bellingham) Luhe

1.1 to 1.8 by 0.40 to 0.43.
Oral sucker 0.21 to 0.26
Ventral sucker 0.18 to 0.22
Pharynx 0.06 to 0.08, spherical
Esophagus 0.03 to 0.04 long.
End of ceca 33 to 46% body length from hind end.
Vitellaria reaching to the ventral sucker, with pear-shaped follicles, anterior to pharynx, approaching mediänly.
Eggs 34 to 38 by 19 to 21 μ
In esophagus of Tropidonotus natrix (L.)

Fig. 3. *Leptophallus nigr*
(Bellingham 1844) adult
from Grabda-Kazubska, 1961

Plagiorchiidae

Leptophallus nigrovenosus (Bellingham, 1844)

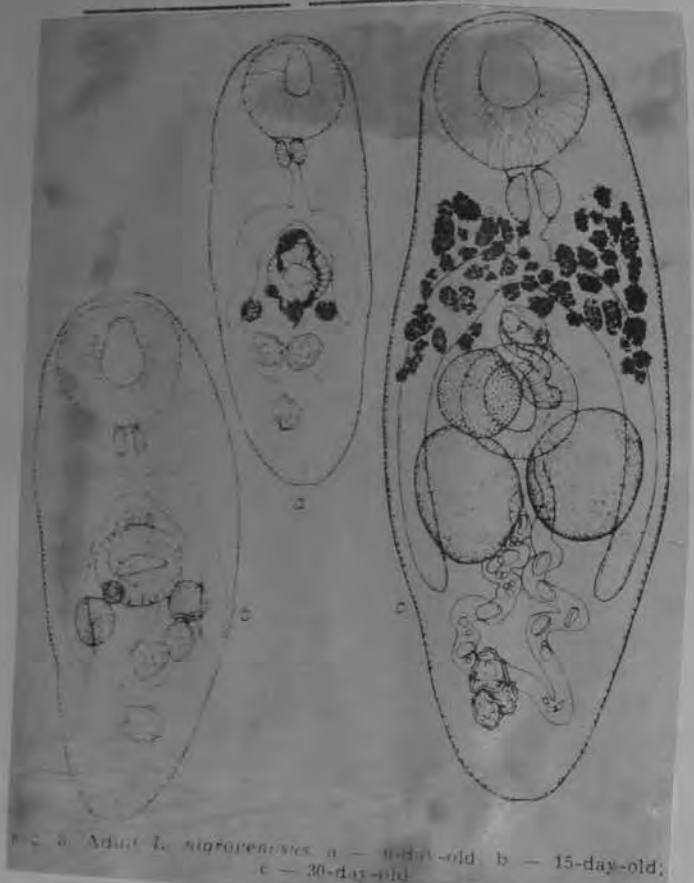


Fig. 6. Cercariae of *L. nigrovenosus*. a — living cercaria, b — stylet, c — stained cercaria

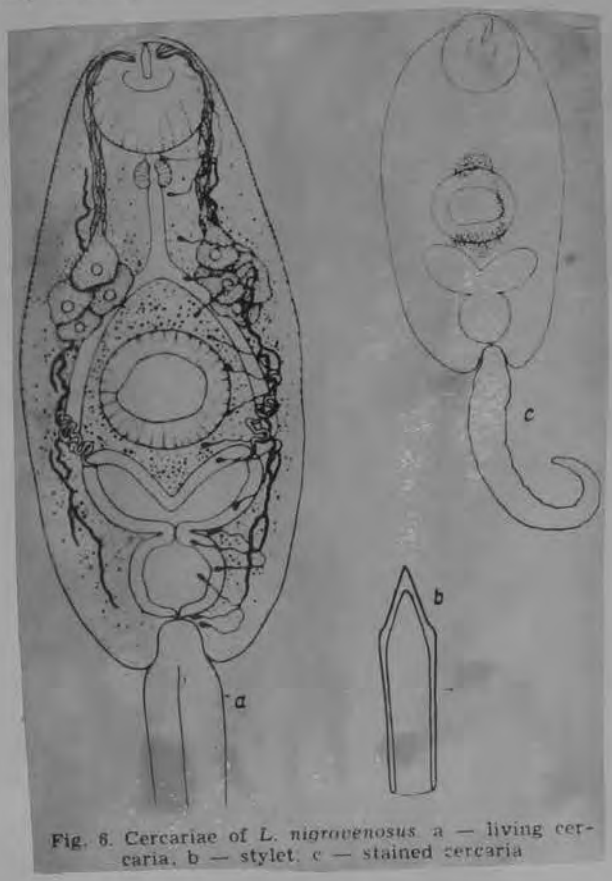


Fig. 8. Adult *L. nigrovenosus*. a — 8-day-old, b — 15-day-old, c — 30-day-old

From Grabda-Kazubska, 1963
(Acta Parasitologica Polonica)

Fig. 7. Metacercariae of *L. nigrovenosus*. a — 1-day-old, b — 3-day-old, c — 6-day-old, d, e — infective metacercariae, 25-day-old

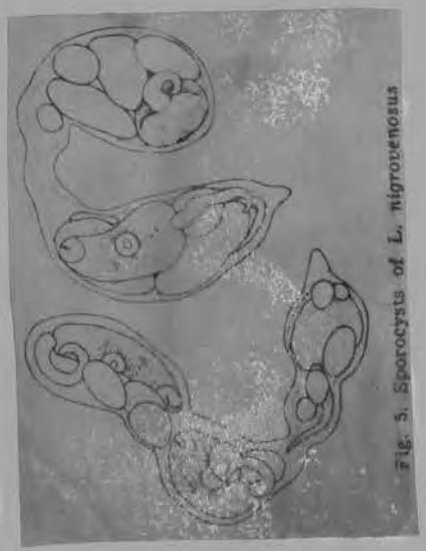


Fig. 5. Sporocysts of *L. nigrovenosus*

LEPTOPHALLUS

Leurosoma Ozaki, 1932

Generic diagnosis. — Allocreadiidae, Allocreadiinae: Body spatulate. Oral sucker subterminal, larger than acetabulum. Prepharynx distinct. Pharynx moderately developed. Esophagus short, ceca terminating at posterior extremity. Acetabulum small, situated nearer to midbody than to anterior extremity. Testes obliquely juxtaposed near posterior extremity. Cirrus pouch extending a little further back of acetabulum. Genital pore submedian, a little anterior to acetabulum. Ovary postacetabular, pre-equatorial. Receptaculum seminis postovarian. Vitelline follicles extending in lateral fields nearly whole length of ceca. Uterus occupying whole intercecal area between ovary and testes and overreaching ceca laterally. Parasites of freshwater turtles.

Genotype: *L. orientale* Ozaki, 1932 (Pl. 48, Fig. 591), in intestine of *Ocadia sinensis;* Japan.

Other species: *L. spinosum* Oguro, 1934, in liver or gall bladder of *Amyda sinensis;* Mukden.

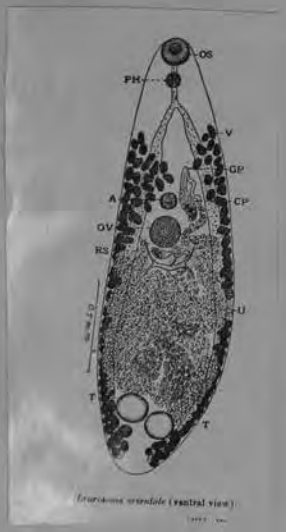
LEUROSOMA Ozaki,1932

Small-sized worms of elongate oval shape. Cuticle unarmed. Oral sucker subterminal. Acetabulum smaller than oral sucker, at junction of the first and middle third of body. Prepharynx, pharynx, and esophagus present; caeca reaching to posterior end of body. Testes globular, side by side,near the posterior end of body. Genital pore submedian, anterior to acetabulum. Cirrus sac long, extending to behind acetabulum. Uterus confined between ovary and testes. Seminal receptacle present. Vitellaria lateral, extending from behind the intestinal bifurcation to the end of the body.

Type species: Leurosoma orientale Ozaki,1932
from lung of the turtle,Ocadia sinensis
from Shanghai.

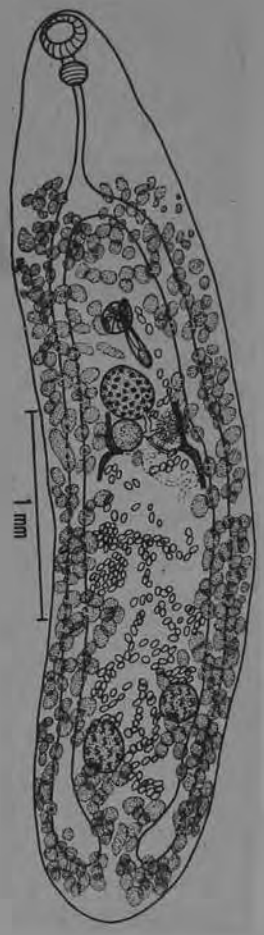
Stated as related to Brachysaccus Johnston and somewhat less closely to Dolichosaccus Johnston and Opisthioglyphe Looss. There are no convolutions of the uterus anterior to the ovary as in Brachysaccus. Differs from Opisthioglyphe in median position of ovary and in situation of testes. This genus is considered by Ozaki as a nucleus of a separate subfamily including Brachysaccus, Doliochosaccus, and Opisthioglyphe.

Ann. Mag. Nat. Hist., 10(10): 42 - 45, 1932



Leurosoma rudolfbarthi ~~sp. n.~~ KOHN AND FERNANDES, 1976

Allocreadiidae. Allocreadiinae. Corpo alongado, com extremidades arredondadas medindo 4,19 mm de comprimento por 0,92 mm de maior largura. Cutícula espinhosa. Ventosa oral subterminal com 0,21 mm de comprimento por 0,22 mm de largura. Pré-faringe curta, mede 0,03 mm de comprimento. Faringe arredondada, com 0,11 mm de diâmetro. Esôfago longo, mede 0,51 mm de comprimento por 0,13 mm de largura. Cecos intestinais retilíneos estendendo-se até a extremidade posterior do corpo. Acetábulo presente, menor que a ventosa oral, pré-equatorial, situado no inicio do têrço médio do corpo, medindo 0,15 mm de comprimento por 0,14 mm de largura. A relação entre o acetábulo e a ventosa oral é de 1:1,5. Poro genital situado imediatamente acima do acetábulo. Bolsa do cirro pequena, estendendo-se do poro genital para trás atingindo a zona ovariana, mede 0,33 mm de comprimento por 0,07 mm de largura e contém vesicula seminal globosa, região prostática e cirro. Testículos inter-cecais, de contôrno liso, mais ou menos arredondados, situados diagonalmente no terço posterior do corpo com campos afastados e zonas em contato. O testículo anterior mede 0,16 mm de comprimento por 0,18 mm de largura e o posterior 0,23 mm de comprimento por 0,20 mm de largura. Ovário arredondado, mediano, pré-equatorial e pós-acetabular, mede 0,26 mm de comprimento por 0,24 mm de largura. Espermateca situada imediatamente abaixo do ovário, medindo 0,14 mm de diâmetro. Glândula de Mehlis e canal de Laurer presentes, abaixo do ovário. Vitelinos com folículos desenvolvidos, de contôrno irregular ou arredondados, estendendo-se desde a bifurcação esofagiana até a extremidade posterior do corpo, nas áreas extra-cecais, cecais e intra-cecais. Útero intra-cecal, com alças sinuosas, situado entre o poro genital e a zona pós-testicular. Ovos operculados de casca rugosa com expansões superficiais papiliformes, medem 0,040 a 0,050 mm de comprimento por 0,030 a 0,034 mm de largura.



Habitat — Ureter de *Chironius fuscus* (L.) (*Herpetodryas fuscus* Boul.).

Proveniência — Angra dos Reis, Estado do Rio de Janeiro, Brasil.

DISCUSSÃO

Leurosoma rudolfbarthi sp.n. difere das de-

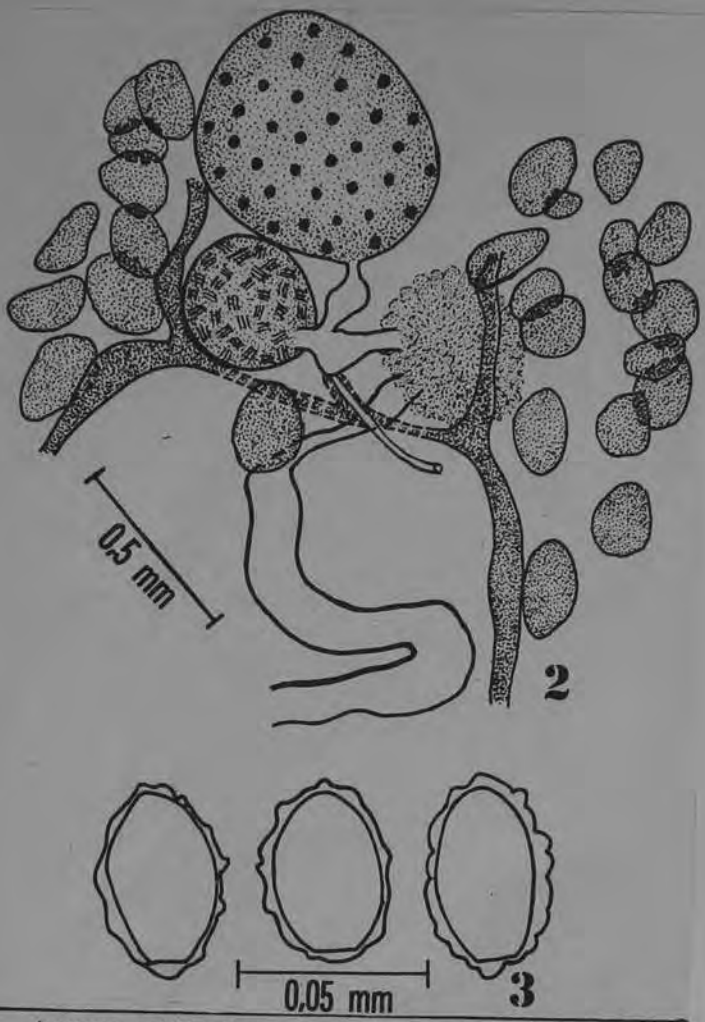
-OVER-

mais espécies do gênero principalmente pelo tamanho do ovo e aspecto de sua casca que se apresenta rugosa e com expansões superficiais papiliformes e também pelos vitelinos em maior quantidade invadindo a zona intra-cecal.

SUMMARY

"On a new species under *Leurosoma* Ozaki, 1932 (Trematoda, Allocreadiidae) parasite of a snake".

The authors propose in this note, *Leurosoma rudolfbarthi* n. sp. recovered from *Chironius fuscus* (L.) marking its occurrence for the first time in a snake and in Brazil. The new species differs from the others by the size of the egg and the peculiar aspect of its shell, wich is rough, presenting superficial papillae-like structures and by the great amount of vittelaria within the inter-cecal zone.



Leurosoma rudolfbarthi sp. n.: fig. 2: aparelho genital feminino; fig. 3: ovos.

LEPTOSOMA

Liophistrema Artigas, Ruiz et Leão, 1942

Generic diagnosis. — Plagiorchiidae, Opisthogoniminae: Body claviform, widest at anterior half, spinulate. Oral sucker subterminal, large; prepharynx distinct; pharynx small; esophagus short; ceca sinuous anteriorly, terminating in posterior third of body. Acetabulum smaller than oral sucker and well apart from it. Testes rounded, intercecal, situated in middle third of body one obliquely behind the other. Cirrus pouch small, between acetabulum and ovary, containing more or less convoluted seminal vesicle and unarmed tubular cirrus. Genital pore submedian, postacetabular. Ovary rounded, pretesticular. Receptaculum seminis present. Uterus with numerous irregular coils, reaching posterior extremity; metraterm well differentiated, narrow; eggs small. Vitellaria cecal and intercecal, dorsal, extending from pre-ovarian level to post-testicular level. Excretory vesicle Y-shaped, with very short stem. Parasitic in lungs of snakes.

Genotype: *L. pulmonale* Artigas, Ruiz et Leão, 1942 (Pl. 51, Fig. 624), in *Liophis miliaris;* Brazil.

Liophistrematinae (Artigas, Ruiz & Leão, 1942)

Teresina de Freitas (1956) Rev. Brazil. de Biol.

Opisthogonimidae. Corpo foliáceo, de contôrno elítico. Poro genital imediatamente pós-acetabular, intra-cecal, levemente afastado da linha mediana, pré-ovariano. Bolsa do cirro pequena, pós-acetabular e pré-ovariana, fracamente encurvada, com a porção distal dirigida para diante. Testículos arredondados, oblíquos, com campos e zonas em contacto. Ovário no campo do testículo posterior, levemente adiante do testículo situado mais anteriormente. Vitelinos pós-acetabulares.

Gênero tipo e único — *Liophistrema* Artigas, Ruiz & Leão, 1942, sòmente com a espécie tipo: *L. pulmonalis* Artigas, Ruiz & Leão, 1942.

Liophistrema, n. g.

Diagnose genérica: ARTIGAS, Ruiz, & LEÃO, 1942 Mem. Inst. Butantan

Plagiorchiidae: Corpo claviforme com maior largura na metade anterior. Cutícula espinhosa. Ventosa oral maior que o acetábulo, que é pre-equatorial. Esôfago curto. Cecos alcançando o terço posterior do corpo. Testículos arredondados, lisos, com campos e zonas muito próximos, situados no terço médio do corpo. Bolsa do cirro medianamente desenvolvida, contendo vesícula seminal mais ou menos enovelada e cirro tubular inermé. Poro genital post-acetabular, próximo deste órgão e ao lado da linha mediana do corpo. Ovário arredondado, liso, pre-testicular. Glândula de Mehlis e receptáculo seminal presentes. Útero desenvolvido, com numerosas alças irregulares atingindo a extremidade posterior do corpo. Vagina tubular, delgada. Vitelinos dorsais, intra-cecais e cecais, formados por numerosos cachos de ácinos volumosos, se estendendo desde a região pre-ovariana e post-acetabular até pouco além da zona testicular. Vesícula excretora em forma de Y com o ramo ímpar muito curto. Parasito do pulmão de ofídio.

Espécie tipo: *Liophistrema pulmonalis*, n. sp.

O presente gênero apresenta como caráter diferencial a situação do poro genital, caráter que, por si só, o afasta dos gêneros conhecidos e enquadrados na família *Plagiorchiidae*. A forma do corpo lembra *Glossidiella* TRAVASSOS, 1927; os vitelinos são semelhantes aos de *Opisthogonimus* LÜHE, 1900.

Liophistrema pulmonalis, n. sp.

(Figs. 1, 2, 3) ARTIGAS, RUIZ & LEÃO, 1942

Diagnose especifica: Mem. Inst. Butantan

Liophistrema: Corpo de tamanho avantajado, alongado e claviforme, extremidade anterior arredondada e muito mais larga que a posterior; comprimento variando entre 9,310 a 17,290mm; largura ao nivel do acetábulo entre 1.330 e 2,660mm. Cuticula revestida de espinhos principalmente na extremidade anterior onde atingem um comprimento próximo de 0,030mm. Ventosa oral subterminal, voltada para a face ventral, circular, com um diâmetro de 0,931 a 1,729mm. Pre-faringe com 0,053 a 0,239mm. Faringe musculoso, envolto por células de natureza glandular, medindo 0,172 a 0,266mm no sentido do comprimento por 0,345 a 0,399mm no sentido da largura. Esôfago curto, atingindo o máximo de 0,452mm de comprimento. Cecos simples, de comprimento desigual, terminando a 1,729 a 3,325mm da extremidade posterior do corpo. Testículos arredondados ou ligeiramente piriformes, lisos, equatoriais, com os campos e zonas muito próximos, sub-iguais e com um diâmetro que varia entre 0,345 a 0,585mm. Vasos eferentes unindo-se ao nivel da base da bolsa do cirro. Esta é um órgão tubular de mediano desenvolvimento, situado obliquamente entre o acetábulo e o ovário; mede 0,665 a 1,197mm de comprimento, tendo uma largura próxima de 0,160mm; contem vesícula seminal tubular, sinuosa, às vêzes enovelada, seguida de longo *ductus* e cirro tubular e inerme. Poro genital lateral e post-acetabular. Aberturas masculina e feminina contíguas. Ovário arredondado, liso, para-mediano, pre-testicular, medindo de 0,425 a 0,585mm de diâmetro. Receptáculo seminal geralmente alongado, imediatamente abaixo do ovário, com dimensões variáveis, medindo de 0,345 a 0,532mm de comprimento por 0,159 a 0,266mm de largura. Glândula de Mehlis para-ovariana. Útero extremamente sinuoso e desenvolvido, ocupando toda a metade posterior do corpo; o ramo ascendente é bem dilatado antes de se diferenciar em vagina. Esta é um órgão tubular, delgado, medindo de 0,532 a 0,931mm de comprimento. Ovos numerosos, de casca delgada, operculados, medindo 0,025 a 0,030mm de comprimento por 0,014 a 0,019mm de largura. Vitelinos dorsais, intra-cecais, formados por ácinos volumosos reunidos em cachos, estendendo-se da região pre-ovariana à região post-testicular, ocupando todo o terço médio do corpo em extensão. Vesicula excretora em forma de Y com o ramo ímpar muito curto.

FIG. 2

Hospedeiro tipo: *Liophis miliaris* (L). Nome vulgar: "Cobra dágua".

Habitat: Pulmão

A descrição e medidas de *Liophistrema pulmonalis*, n. sp., foram baseadas em dez exemplares cotipos fichados sob o No. 2.444 na coleção da Seção de Parasitologia do Instituto Butantan. Mais seis lotes, oriundos de outras tantas necrópsias serviram para comparação e se acham depositados na mesma coleção sob os Nos. 5.530, 5.527, 5.523, 5.533, 5.525 e 2.443. Êste último pertence ao mesmo lote que os cotipos. Todas as medidas se referem a espécimes comprimidos e montados. Esta espécie foi por nós encontrada exclusivamente em *Liophis miliaris*, parece-nos haver neste caso uma estreita especificidade parasitária. O quadro seguinte dá conhecimento da origem das várias serpentes parasitadas e fornece os diferentes pormenores relativos ao material estudado:

Lote No.	Hospedeiro	Localização	Procedência		Data
			Cidade	Estado	
2.443	*Liophis miliaris* (L.)	Pulmão	?	?	4/4/935 (1)
2.444	*Liophis miliaris* (L.)	Pulmão	?	?	4/4/935 (1)
5.530	*Liophis miliaris* (L.)	Pulmão	Jacarezinho	Paraná	16/1/942
5.527	*Liophis miliaris* (L.)	Pulmão	Curitiba	Paraná	19/1/942
5.525	*Liophis miliaris* (L.)	Pulmão	Restinga Sêca	Rio G. do Sul	23/1/942
5.523	*Liophis miliaris* (L.)	Pulmão	Restinga Sêca	Rio G. do Sul	23/1/942
5.533	*Liophis miliaris* (L.)	Pulmão	Restinga Sêca	Rio G. do Sul	23/1/942

(1) Pertencem a uma só necrópsia.

Fig. 3
Liophistrema pulmonalis, n. g., n. sp. — Pormenor da bolsa do cirro. Desenho feito in vivo

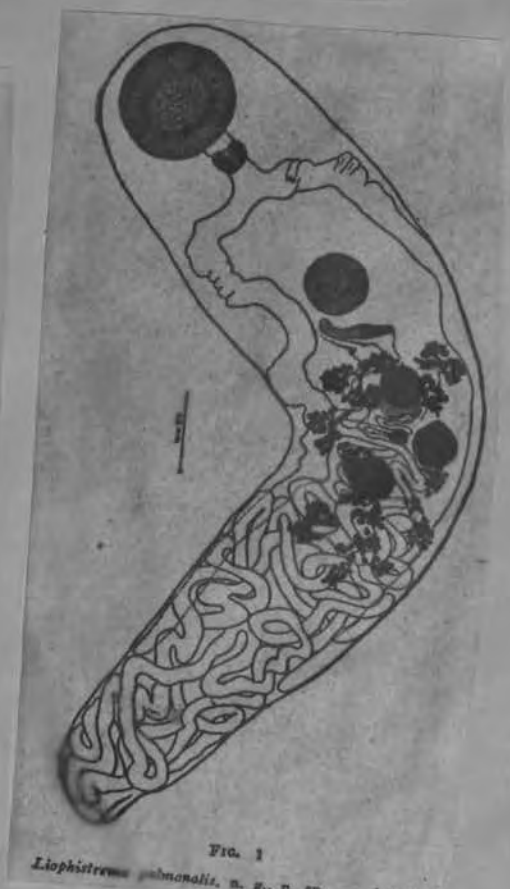


Fig. 1
Liophistrema pulmonalis, n. g., n. sp. — vista total.

Liophistrema pulmonalis Artigas, Ruiz et Leão, 1942

(Рис. 176)

Хозяин: змея — *Liophis miliaris*.

Локализация: легкие.

Место обнаружения: Южная Америка (Бразилия).

Описание вида (по Артигасу, Руишу и Леао, 1942). Тело удлиненное, с закругленным передним концом, который значительно шире заднего; длина тела 9,31—17,29 мм, а ширина на уровне брюшной присоски равна 1,33—2,66 мм. Кутикула покрыта шипиками, главным образом на переднем конце, где они достигают около 0,03 мм длины. Ротовая присоска субтерминальная, направлена вентрально, 0,9×1—1,729 мм в диаметре. Префаринкс 0,053—0,239 мм. Фаринкс мышечный 0,172—0,266 мм длины и 0,345—0,399 мм ширины, окружен железистыми клетками. Пищевод короткий, 0,452 мм длины. Кишечные стволы простые, неодинаковой длины и оканчиваются на расстоянии 1,729—3,325 мм от заднего конца тела. Семенники округлые или несколько грушевидные, гладкие,

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Plagiorchiidae

Liophistrema pulmonalis Ruiz y Leão, 1942
(Figura 6)

El cuerpo es alargado, de extremidades redondeadas, más fina y larga la posterior, con una longitud que varía entre 9.62 mm. y 12.40 mm. y con un ancho máximo ubicado en la zona infratesticular o muy por debajo de ella, comprendido entre 1.59 mm. a 2.25 mm.

Cutícula revestida ligeramente de espinas, cuyo número disminuye gradualmente para anularse en el extremo posterior del cuerpo. Miden de largo de 0.014 mm. a 0.020 mm. El acetábulo es mucho más pequeño que la ventosa oral, situado muy por encima de la zona ecuatorial y presentando un diámetro que varía entre 0.057 mm. a 0.71 mm. La zona acetabular media dista entre 2.22 mm. a 2.70 mm. del extremo más anterior del cuerpo.

La ventosa oral es subterminal, circular, con un diámetro que varía entre 1.59 mm. a 2.25 mm. La prefaringe es muy corta. La faringe es musculosa con un ancho que varía entre 0.32 mm. a 0.45 mm. y un largo comprendido entre 0.26 mm. a 0.39 mm.; presenta lateralmente numerosas células glandulares. El esófago es corto, con un largo que varía entre 0.28 mm. a 0.32 mm. y un ancho comprendido entre 0.22 mm. a 0.36 mm. Los ciegos intestinales son de desigual longitud, con fondos de saco situados en la zona terminal y distando entre 1.29 mm. a 2.85 mm. del extremo más posterior del cuerpo.

Los testículos son subiguales, redondeados, situados aproximadamente en la zona ecuatorial media, cecales o intracecales; el derecho siempre más anterior que el izquierdo mide de ancho entre 0.54 mm. a 0.66 mm. y de largo entre 0.39 mm. a 0.61 mm.; el izquierdo presenta un ancho que varía entre 0.39 mm. a 0.65 mm. y un largo comprendido entre 0.54 mm. a 0.65 mm. y dista del extremo anterior del cuerpo entre 3.14 mm. a 5.48 mm. La bolsa del cirro, situada en la zona infra y acetabular, bien desarrollada en algunos ejemplares, consta de una porción basal ensanchada, la vesícula seminal, y otra de forma tubular, el cirro, que se extiende transversal y ascendentemente de derecha a izquierda, en íntima relación con el borde lateral del acetábulo, para terminar en el poro genital, ubicado lateralmente a nivel de la zona acetabular anterior o en algunos ejemplares supraacetabularmente. Su longitud total varía entre 0.23 mm. a 3.53 mm. con un ancho de 0.24 mm. en su porción basal y entre 0.07 mm. a 0.16 mm. en su zona tubular.

El ovario situado en la zona preecuatorial, entre las zonas acetabular y testicular, ligeramente desplazado hacia el borde derecho del cuerpo, mide de ancho entre 0.40 mm. a 0.46 mm. y de largo entre 0.29 mm. a 0.45 mm. Glándula de Mehlis paraovariana. El útero consta de una rama descendente, con numerosas ansas, desplazada lateralmente a izquierda o derecha del cuerpo o llenando toda la región posterior en algunos ejemplares y una rama ascendente que termina en el poro genital. Las glándulas vitelógenas ocupan una posición dorsal, cecal e intracecal, extendiéndose desde la zona acetabular hasta muy por debajo de la zona testicular, presentándose en folículos grandes y agrupados.

Los huevos son de color castaño claro, operculados, miden de ancho 0.017 mm. y de largo 0.026 mm.

Habitat: Pulmón de *Liophis miliaris* (L.).

Procedencia: Bañado Tropa Vieja, Dto. de Colonia, Uruguay. 75 ejemplares depositados en la colección helmintológica del Museo Nacional de Historia Natural de Montevideo.

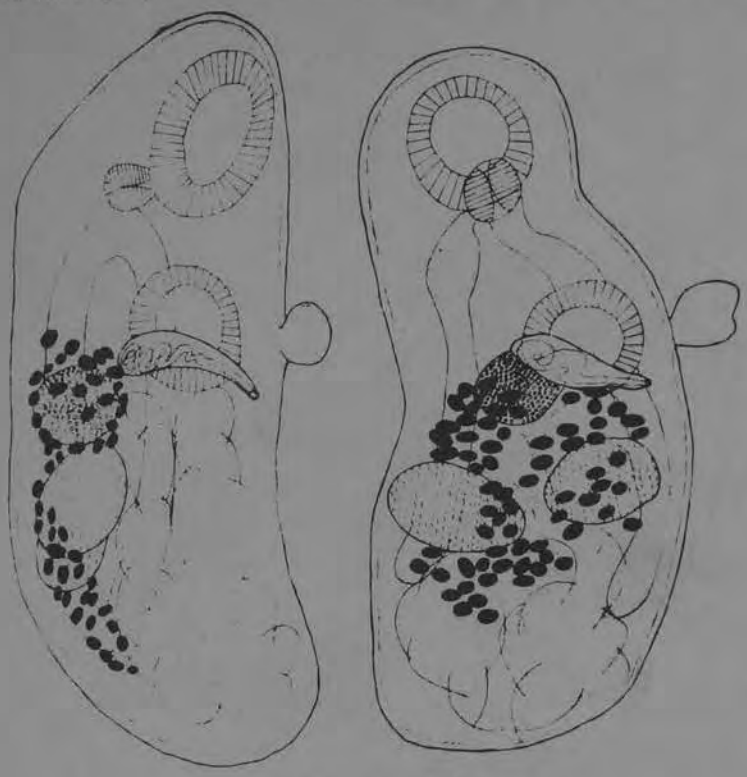
Discusión: Ruiz y Leão, 1942, describen esta especie para *Liophis miliaris* (L.), de múltiples ejemplares de dicho ofidio procedentes de los Estados de Paraná y Río Grande do Sul, Brasil. Podemos afirmar, como lo hacen dichos autores, que esta especie sólo la hemos encontrado en *Liophis miliaris* (L.), lo que confirma la alta especificidad parasitaria de *L. pulmonalis*. Nos ha llamado también la atención, el número elevado de ejemplares que parasitan a un mismo huésped, recubriendo prácticamente las paredes saculares del pulmón: en un huésped encontramos 42 y en otro 33 individuos.

FROM MAÑÉ-GARZÓN AND GORTARI, 1965

—OVER—

FROM MAÑE-GARZÓN AND GIORTARI, 1965

El ovario es igualmente ovoideo, pretesticular, mide 0,09 mm a 0,13 mm de diámetro antero-posterior por 0,11 mm a 0,16 mm de diámetro transversal. El receptáculo seminal se encuentra inmediatamente por detrás del ovario. Las glándulas vitelógenas, compuestas por folículos gruesos, intracecales, cecales y extracecales y se extienden desde una línea que pasaría a nivel de la mitad del acetábulo hasta llegar



Liophistrema buccalis n. sp.
Liophistrema buccalis

muy por detrás del testículo posterior, deteniéndose a 0,23 mm a 0,50 mm del extremo posterior del mismo. Los huevos son operculados, de color castaño, miden 0,015 mm a 0,017 mm de largo y 0,007 mm a 0,010 mm de ancho.

Habitat: Cavidad bucal de la culebra Thamnodynastes strigatus (Günther).

Procedencia: Artilleros, Departamento de Colonia, Uruguay, 45

FROM: B. HOLCMAN-SPECTOR and F. MAÑE-GARZÓN, 1973

SEE REPRINT

LIOPHISTREMA

Macroderinae n. subfam. Yamaguti, 1958.

Subfamily diagnosis. — Plagiorchiidae: Body very much elongated, attenuated in postacetabular region, spinose. Oral sucker small, esophagus short, ceca reaching to near posterior extremity. Acetabulum very close to oral sucker. Testes tandem or oblique, in posterior half of body. Cirrus pouch very long, slender, swollen distally in region of prostatic gland. Genital pore median, between two suckers. Ovary in midregion of body. Receptaculum seminis absent. Vitellaria bunch-like, extending in

lateral fields of midregion of body. Uterus reaching posterior extremity. Excretory vesicle? Parasites of snakes.

Macrodera Looss, 1899, nec *Macroderus* Croissandeau, 1893
Syn. *Saphedera* Looss, 1902

Generic diagnosis. — Plagiorchiidae, Macroderinae: Body very much elongated, attenuated in postacetabular region, rounded off behind, spined. Oral sucker subterminal, pharynx present, esophagus short, ceca reaching to near posterior extremity. Acetabulum very close to oral sucker, larger or smaller than latter. Testes tandem or somewhat oblique, in posterior half of body. Cirrus pouch long, slender, containing long seminal vesicle, extending far back of acetabulum, swollen distally by strongly developed prostate gland. Genital pore median, between two suckers. Ovary pretesticular, in midregion of body. No receptaculum seminis. Laurer's canal present. Vitellaria forming lateral bunches of follicles in middle third of body or more posteriorly. Uterus winding between and behind testes as well as in vitellotesticular region, but straight further anteriorly; eggs small. Excretory vesicle? Parasitic in lung of snakes.

[illegible] *M. longicollis* (Abildgaard, 1788) (Pl. 52, Fig. 630), syn. [illegible] Looss, 1899 *D. attenuatum* Rudolphi, 1814, [illegible] 1809 *D. pulmonale* [illegible] *gemonense*

Other species: *M. cantonensis* (Wallace, 1936), syn. *Saphedera cantonensis* Wallace, in lung of *Natrix piscator;* China.

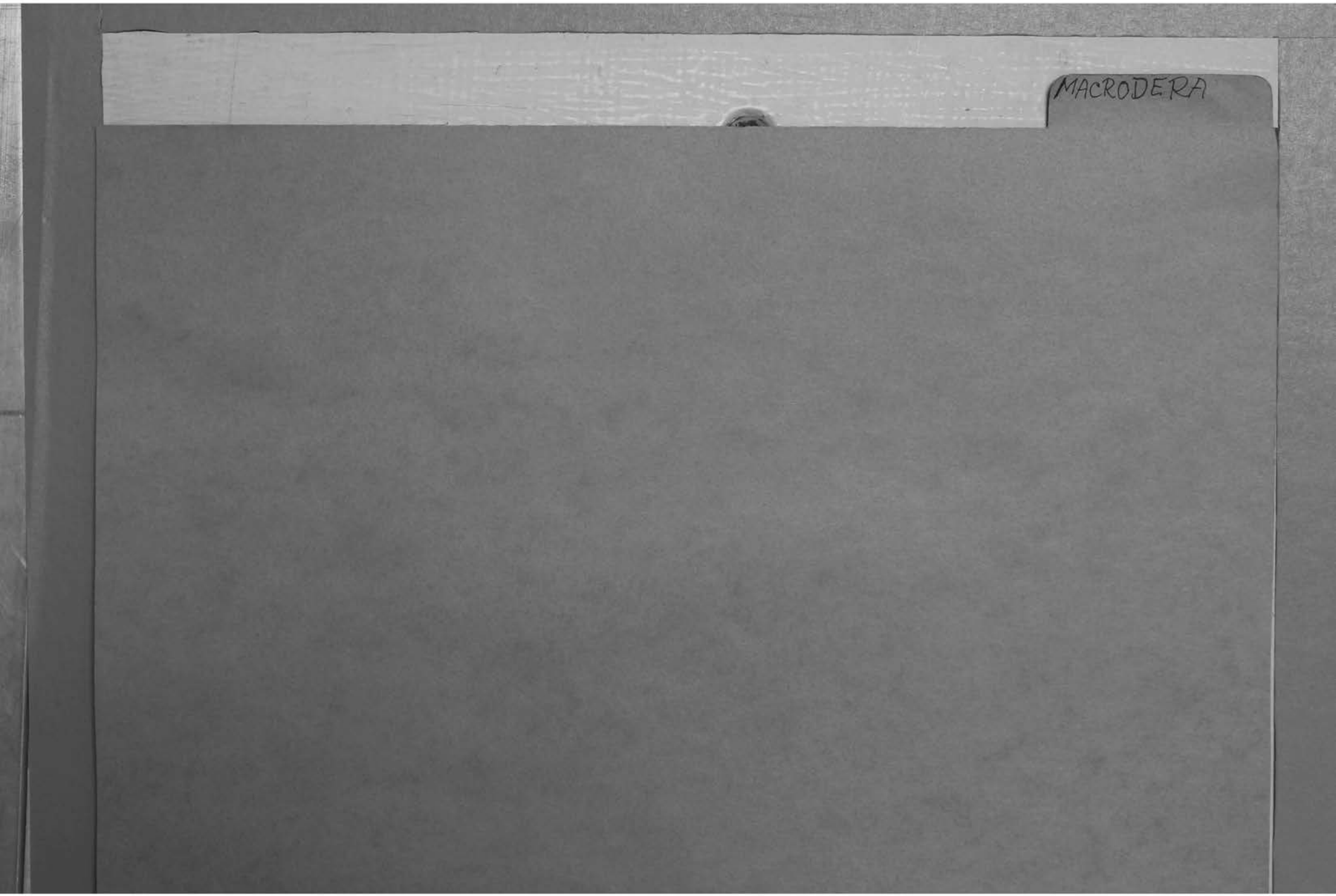
Macrodera Looss, 1899, nec *Macroderus* Croissandeau, 1893

Syn. *Saphedera* Looss, 1902

Generic diagnosis. — Plagiorchiidae, Macroderinae: Body very much elongated, attenuated in postacetabular region, rounded off behind, spined. Oral sucker subterminal, pharynx present, esophagus short, ceca reaching to near posterior extremity. Acetabulum very close to oral sucker, larger or smaller than latter. Testes tandem or somewhat oblique, in posterior half of body. Cirrus pouch long, slender, containing long seminal vesicle, extending far back of acetabulum, swollen distally by strongly developed prostate gland. Genital pore median, between two suckers. Ovary pretesticular, in midregion of body. No receptaculum seminis. Laurer's canal present. Vitellaria forming lateral bunches of follicles in middle third of body or more posteriorly. Uterus winding between and behind testes as well as in vitellotesticular region, but straight further anteriorly; eggs small. Excretory vesicle? Parasitic in lung of snakes.

Genotype: *M. longicollis* (Abildgaard, 1788) (Pl. 52, Fig. 630), syn. *Dist. longicolle* (A.) Cobbold, 1860, *D. attenuatum* Rudolphi, 1814, *D. naja* Rud., 1819, *D. colubri natricis pulmonale* Rud., 1809, *D. pulmonalis colubri natricis* Viborg, 1795, in *Tropidonotus natrix, Coluber gemonensis;* Europe.

Other species: *M. cantonensis* (Wallace, 1936), syn. *Saphedera cantonensis* Wallace, in lung of *Natris piscator;* China.


MACRODERA

Macrolecithus Hasegawa et Ozaki, 1926

Generic diagnosis. — Allocreadiidae, Walliniinae: Body elongate, with blunt-pointed extremities, unarmed. Oral sucker and pharynx well developed. Esophagus short. Ceca terminating near posterior extremity. Acetabulum medium-sized, about one third of body length from anterior extremity. Testes tandem, at about middle of hindbody. Cirrus pouch comparatively small, in front of acetabulum or overlapping it, containing vesicula seminalis, prostatic complex and cirrus. Genital pore median, near intestinal bifurcation. Ovary median, just behind acetabulum. Receptaculum seminis present. Vitellaria extending in lateral fields from level of intestinal bifurcation to posterior extremity. Uterus extending back of testes or not. Excretory vesicle reaching to posterior testis or not. Parasitic in intestine of freshwater fishes.

Genotype: *M. gotoi* Hasegawa et Ozaki, 1926, (Pl. 8, Fig 91) in *Misgurnus anguillicaudatus*; Japan.

Other species:
M. elongatus Park, 1939, in *Phoxinus lagowskii*; Korea.
M. phoxinusi Park 1939, [1]) in *Phoxinus lagowskii*; Korea.

[1]) The specific name should have been inflected to *phoxini*.

MACROLECITHUS Hasegawa and Ozaki,1926

Type species M.gotoi Hasegawa & Ozaki

Others: M.elongatus Park,1939

M.phoxinusi Park,1939

This genus must be very close or identical to Allocreadium. At least, M.elongatus seems identical with Allocreadium and in fact very similar to Allocreadium hasu Ozaki,1926.

I believe Macrolecithus is a synonym of Allocreadium and that certainly M.elongatus Park,1939 belongs in the genus Allocreadium.

Plagiorchidae ? Allocreadiidae ?

Macrolecithus gotoi Hasegawa & Ozaki, 1926

Original description in Japanese, But with figure.
Type host: Misgurnus anguillicaudatus, [redacted]
Cobitidae

Yamaguti (1934):

45. *Macrolecithus gotoi* Hasegawa et Ozaki, 1926

In 1926 Hasegawa and Ozaki found this trematode in the intestine of *Misgurnus anguillicaudatus* and described it in detail. According to their description and figure which were based on flattened specimens, the cirrus pouch is situated in front of the acetabulum, but in all my specimens fixed without flattening from the same host species it extends farther backwards than the anterior border of the acetabulum and very often to the middle of the sucker or even farther posteriorly. The vesicula seminalis is very voluminous and occupies the greater part of the cirrus pouch. The short Laurer's canal arises directly from the receptaculum seminis near the junction of the latter with the germiduct (fig. 38). The tubular excretory vesicle extends forwards to the level of the hind end of the posterior testis, but sometimes it terminates at the middle of the posttesticular region as described by the original authors. The main collecting tubules originate a little behind the apex of the vesicle and pass forwards to give off a descending branch at the level of the acetabulum. Farther on they give off another inward branch in front of the acetabulum.

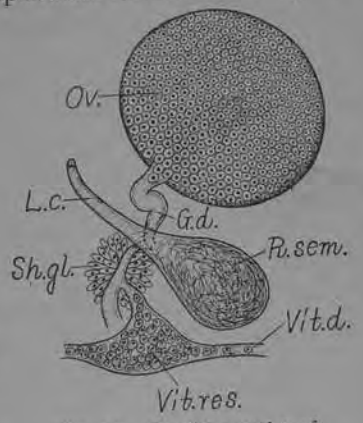


Fig. 38. Ovarian complex of *Macrolecithus gotoi* Hasegawa et Ozaki; dorsal view.

In the following are given the measurements in mm on seven whole mounts not subjected to pressure.

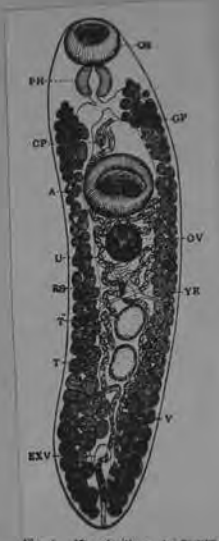


Fig. 1. Macrolecithus gotoi [illegible]
FROM HASEGAWA AND OZAKI, 1926

Body 1.29–2.5 × 0.42–0.75; oral sucker 0.17–0.26 × 0.2–0.3; pharynx 0.084–0.15 × 0.09–0.17; acetabulum 0.26–0.46 in diameter; testes 0.12–0.27 × 0.1–0.18; ovary 0.15–0.25 × 0.14–0.21.

The eggs measure 0.0947 × 0.047–0.05 mm in the living condition. — Egg size must be incorrect.

With regard to the taxonomic position of this genus Hasegawa and Ozaki express the opinion that it stands near *Brachysaccus*, *Dolichosaccus* and *Opisthioglyphe*, but these genera are all from amphibian hosts and their uterus never extends farther backwards than the testes. For these reasons *Macrolecithus* cannot be placed near them, but it might better be assigned to Plesiocreadiinae Winfield, 1929, which is clearly distinguished from all other known subfamilies of Allocreadiidae by the posttesticular extent of the uterus. ← +

Macrolecithus pakistanensis ~~new species~~ ZAIDI AND KHAN, 1977
(Fig. 17)

Host: *Mystus cavasius*
Location: Stomach
Locality: Shah Hasan (Manchar Lake)

Ten specimens of *Mystus cav sius* were examined at Shah Hasan located on Manchar Lake, in April, 1968. Only one fish yielded one worm from its stomach.

DESCRIPTION

The body of the worm is enlongated with rounded extremities. The tegument is unarmed. The maximum breadth of the body is at the equator. The oral sucker is subterminal and spherical in shape. It is well developed and muscular. A prepharynx is absent. The pharynx is well developed, muscular and spherical. The oesophagus is of moderate length. The ventral sucker is larger than oral, well developed and muscular. It is situated nearly at the junction of anterior third with the middle third of the body. The intestinal caeca are simple and terminate blindly near posterior end of the body. The testes are tandem, somewhat triangular in shape. The enterior testis is placed in the posterior most region of the middle third of the body, slightly intruding in the posterior third, while the posterior testis is placed in anterior portion of posterior third of the body. Both testes are of the same size. The small cirrus sac is preacetabular in position. The genital pore is median just behind the intestinal bifurcation.

The spherical ovary is pretesticular and submedian in position. It is almost in the middle third of the body. The vitelline glands are follicular and extensive, extending from posterior border of pharynx to near the posterior end of the body. The vitelline follicles of two sides become confluent at the anterior and posterior ends of the body. The uterus extends from the middle of the anterior testis to genital pore. The eggs are larger in size, few in number and almost oval in shape.

17

MEASUREMENTS (IN MM.)

Body length	1.769
Body width	0.840
Oral sucker	0.177×0.177
Pharynx	0.108×0.108
Oesophagus	0.059
Ventral sucker	0.187×0.197
Ovary	0.129×0.138
Anterior testis	0.129×0.148
Posterior testis	0.128×0.148
Eggs	0.146-0.148×0.023-0.026.

DISCUSSION

Macrolecithus indicus Gupta and Agrawal, 1967 differs from the species under study in that its uterine coils pass between the testes. The species under study differs from

Macrolecithus papilliger Rees, 1968

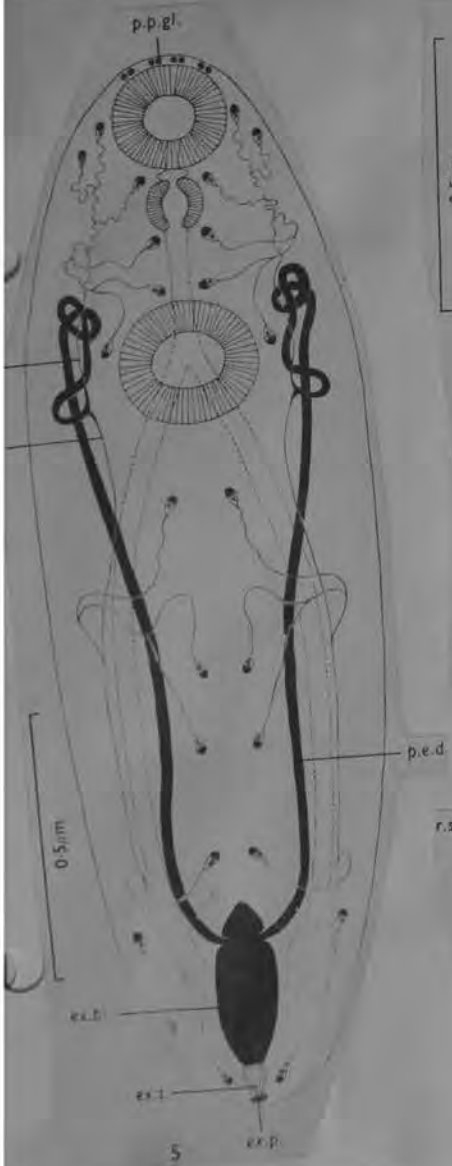
iagnostic features of *M. papilliger* sp. nov. are: small, oval, light brown stiges of larval eyes; papillae in a regular pattern around oral and ventral in preacetabular zone, and posteriorly; prepharynx present, oesophagus es dorsal to the ventral sucker; excretory bladder large, tubular, extends to r margin of posterior testis; genital atrium median, metraterm opening to cirrus; cirrus sac overlaps, only slightly, the anterior margin ot the ventral ovary median, subspheroidal; Laurer's canal opens on right side level with r end of ovary; uterus extends to anterior region of posterior testis; eggs 086 × 0·056–0·050 mm.

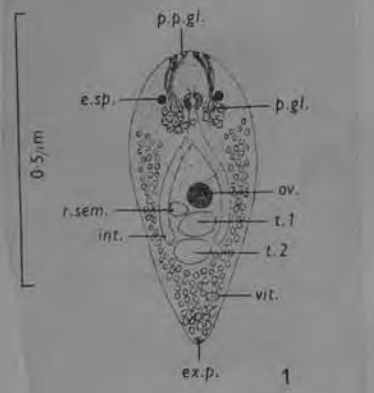
Phoxinus phoxinus (L.)

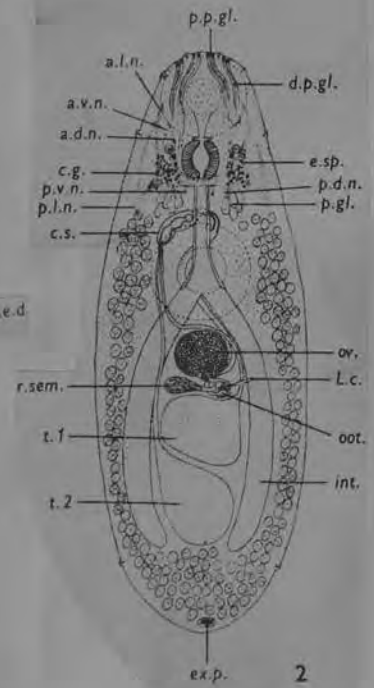
TION. Stomach and intestine.

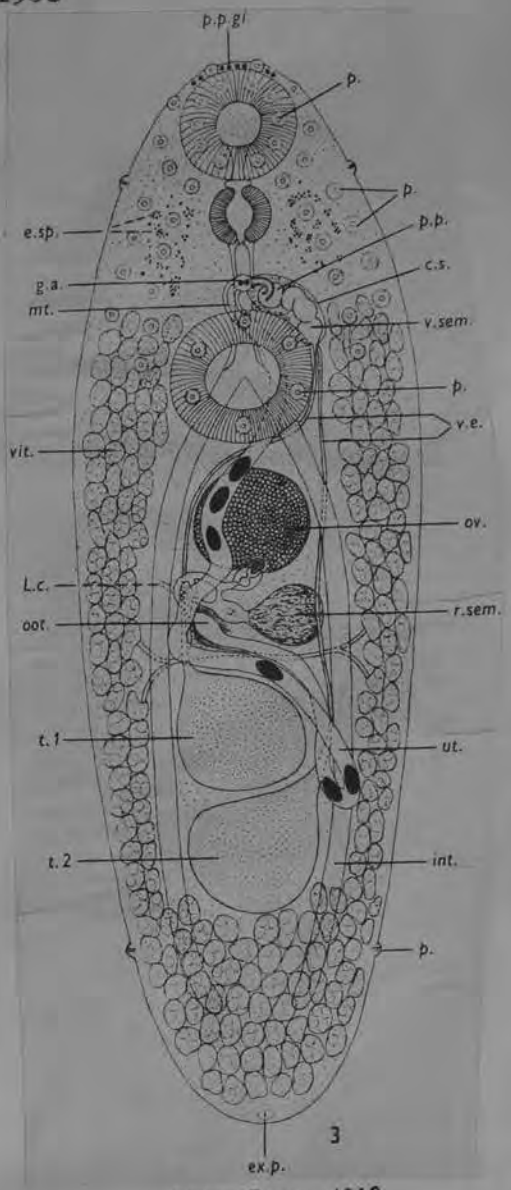
LITY. Britain.

SPECIMENS. Deposited in British Museum (Nat. Hist.), London. Specimen 7. 10.3.9–20.









From Rees, 1968

Body: immat. 0.631 X 0.285
mature 1.072 × 0.485
gravid 1.898 × 0.650

– OVER –

DISCUSSION

The systematic position of the genus *Macrolecithus* is uncertain. Hasegawa & Ozaki (1926) placed *M. gotoi*, the type species, in the family Allocreadiidae Stossich, 1904. They pointed out that it seems, also, to have an affinity with the family Plagiorchiidae Ward, 1917. It differs from the latter in the possession of a tubular excretory vesicle, unarmed tegument and in the fact that the uterus usually ends not far behind the posterior testis. These combined characters, among others, place it in the family Allocreadiidae, a family in which the morphological features are very varied. Park (1939) suggested that *Macrolecithus* may occupy a position intermediate between these two families.

Stunkard (1932) considered the family Allocreadiidae to contain a heterogeneous assemblage which would be better divided, a view which is supported by the fact that the cercariae, also, are very variable.

Yamaguti (1958) placed *Macrolecithus* in the new subfamily Walliniinae; Gupta & Agrawal (1967) agreed. The only essential difference between the Walliniinae and the Allocreadiinae is the extent of the uterus, which in the former is said to continue to the posterior end of the body. In other features the two subfamilies are remarkably similar. In *M. papilliger* the uterus does not extend beyond the posterior testis. This is true also, for *M. elongatus* and *M. phoxinusi*. In *M. indicus* it passes between the testes and also slightly beyond the posterior testis. In *M. gotoi*, the type species, the extent of the uterus, according to Hasegawa & Ozaki (1926), varies with age. In specimens measuring 1·91 mm the uterus is restricted to the area in front of the anterior testis while in large ones, measuring 4·13 mm, the uterus extends proportionately further back. A wide variation, therefore, exists in the extent of the uterus, a somewhat rare feature in Digenea. It seems that there is little justification, on the basis of the extent of the uterus, for including *Macrolecithus* in the subfamily Walliniinae. The genus, also, possesses some features of the Allocreadiinae not present in the Walliniinae, namely, the circular fold around the ventral sucker and the presence, sometimes, of bulbous swellings on the oral and ventral suckers. In other respects *Macrolecithus* resembles both subfamilies equally. One wonders, therefore, if the existence of the subfamily Walliniinae is really justified.

The genus *Macrolecithus* most closely resembles the genus *Allocreadium* and possibly also *Crepidostomum*. The distinguishing features of *Macrolecithus* are: elongated, bluntly pointed, unarmed; suckers and pharynx well developed; acetabulum one-third the way down the body: caeca terminating near posterior end; testes tandem near middle of hind body; genital pore median or near oesophageal bifurcation: uterus may extend a short distance beyond the posterior testis. The similarities of *Macrolecithus* and *Allocreadium* are so marked that the discovery of a greater variation in one or the other might require a review of the existing arrangement to decide whether *Macrolecithus* is a valid genus. It differs from *Allocreadium* in having a shorter oesophagus, smaller cirrus sac, median ovary and in the extent of the vitellaria. In *Allocreadium* the vitellaria do not extend to the anterior margin of the ventral sucker.

In *A. angusticolle* (Hausmann, 1896) Odhner, 1901, from the Miller's thumb in Britain, the vitellaria do extend as far forwards as the pharynx. This is a contradiction of one of the diagnostic features of *Allocreadium* and the subfamily Allocreadiinae. A species of *Allocreadium*, namely, *A. isoporum* (Looss, 1894), has been recorded from the minnow and other fresh water fishes in Britain (Dawes, 1946). It resembles *Macrolecithus papilliger* in several respects, namely, yellow colour, brown pigment granules or vestiges of larval eyes, short prepharynx and long caeca, large vitelline follicles and short uterus. It differs from it in that the oesophagus bifurcates in front of the ventral sucker, the vitellaria do not extend forwards beyond the posterior level of the ventral sucker, the worm is larger and so are the eggs.

It is possible, as Mr Prudhoe (personal communication) has suggested, that the present species may be closely related to the genus *Crepidostomum* Braun, 1900, especially as some helminths of trout occur in minnows, but not in other cyprinid fishes. The oral sucker in *Crepidostomum* is surmounted by a half circle of six head lobes, the two outermost being very prominent and formed by the anterolateral corners of the sucker. It was thought that possibly the papillae in the present species might be modified processes but as they occur in a complete circle around oral and ventral suckers and also on the preacetabular region of the body they do not occupy the same position; they have been identified, by their structure, as sensory papillae. Park (1939) noted papillae on the oral sucker of *M. elongatus* but makes no mention of their number, size or structure. *Macrolecithus* differs from *Crepidostomum* in some other features also, namely, the oesophagus in the latter bifurcates in front of the ventral sucker, the excretory vesicle extends to the anterior end of the first testis, the vitelline follicles are smaller and more numerous and the flame cell formula is $2(2+2+2)\times(2+2+2)$ in those species in which it is known.

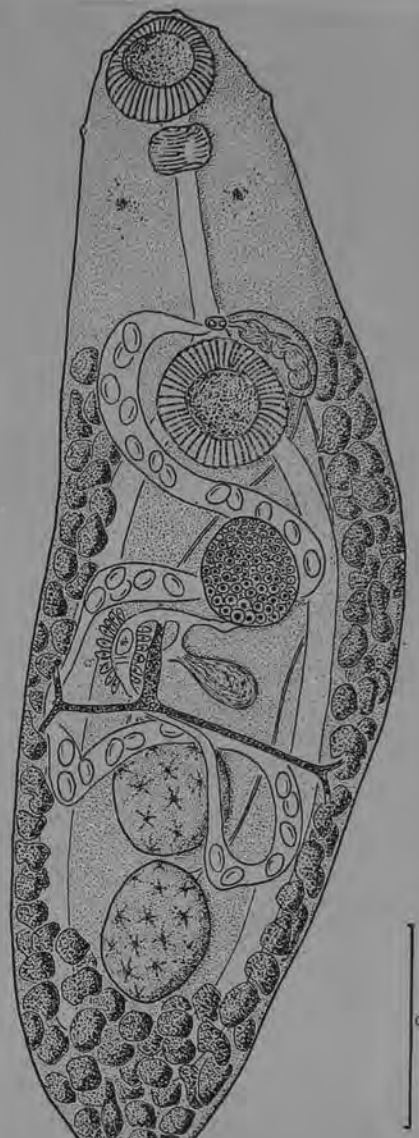
The present form, therefore, is retained for the time being in the genus *Macrolecithus*. It differs from *M. gotoi*, *M. indicus* and *M. elongatus* where the oesophagus bifurcates in front of the ventral sucker. The first two are larger and their vitellaria more extensive. In the last named the testes are much smaller and Laurer's canal opens on the left. The egg measurements differ in all.

M. papilliger most closely resembles *M. phoxinusi*. In the latter, however, the oesophagus is shorter but it does bifurcate dorsal to the ventral sucker. Traces of spines have been described in *M. phoxinusi*, the genital pore opens to the left of the mid-line and the cirrus sac extends further back over the ventral sucker. The ovary, also, is transversely ellipsoidal instead of almost spherical and the anterior testis very much smaller than in *M. papilliger*. The eggs, also, are smaller.

Pigment spots or vestiges of larval eyes have not been described in any of the other species.

Gupta & Agrawal (1967) considered *M. phoxinusi* to be synonymous with *M. elongatus* but this is doubtful in view of differences in certain morphological features.

Macrolecithus papilliger Rees, 1968



1 — **L'adulte** (fig. 1 et 2).

Macrolecithus papilliger Rees, 1968.

Hôte : Phoxinus phoxinus (L.) : le Vairon.

Habitat . Tube digestif.

Localités : Bonnevaux (Lozère), Ceilhes (sur l'Orb).

Sur le vivant, le corps est allongé, arrondi aux deux extrémités et aplati dorso-ventralement. La taille varie avec l'état de maturité sexuelle. Les individus gravides mesurent en moyenne, d'après les préparations *in toto* 2,94 mm (2,31 mm à 3,64 mm) de longueur et 0,86 mm (0,70 mm à 1,4 mm) de largeur.

La ventouse orale (0,28/0,24 mm) est plus petite que la ventouse ventrale (0,36/0,33 mm) située dans le tiers antérieur du corps. Les vers possèdent toujours au niveau du pharynx, des restes de pigmentation correspondant aux taches oculaires. Ceux-ci paraissent d'autant plus dispersés que les individus sont plus âgés. C'est à ce niveau que l'on observe sur le corps les papilles cuticulaires caractéristiques de l'espèce.

La bouche, qui s'ouvre au centre de la ventouse orale, se continue par un court prépharynx auquel fait suite un pharynx musculeux de 0,14/0,12 mm de diamètre. L'œsophage se bifurque dorsalement au niveau de la ventouse ventrale en deux cæcums latéraux qui se prolongent, dans la région postérieure, jusqu'à la limite antérieure de la vessie.

Metraterme et cirre débouchent de chaque côté de l'atrium génital qui s'ouvre sur la ligne médio-ventrale, à une courte distance en avant de l'acétabulum.

L'appareil génital mâle comprend deux testicules globuleux subsphériques, situés l'un derrière l'autre, dans le tiers postérieur du corps. Les dimensions apparentes du testicule antérieur sont 0,35/0,29 mm, celles du postérieur 0,35/0,30 mm. Un canalicule déférent part de la région antérieure de chaque testicule, du côté droit pour le testicule antérieur, gauche pour le testicule postérieur. Ces canalicules se rejoignent juste avant de pénétrer dans la poche du cirre, qui est située sur le côté gauche du corps, dorsalement par rapport à la ventouse ventrale. A l'intérieur de la poche du cirre, le canal déférent s'élargit et forme une vésicule séminale. La partie prostatique correspond à une deuxième dilatation. Le cirre aboutit sur le côté gauche de l'atrium génital.

L'ovaire médian, subsphérique (0,29/0,26 mm) est situé en arrière de la ventouse ventrale. Après l'ovicapte, l'oviducte forme une chambre ciliée séparée par une légère constriction de l'arrivée du réceptacle séminal. L'oviducte reçoit alors le vitelloducte médian, puis se dilate en un ootype entouré de nombreuses glandes de Mehlis. Le réceptacle séminal est en général rempli de spermatozoïdes. A son point de jonction à l'oviducte se détache le canal de Laurer qui s'ouvre dorsalement sur le côté du corps, au dessus du cæcum intestinal droit. L'utérus sinueux, qui fait suite à l'ootype, est assez court. Il ne descend jamais au dessous du deuxième testicule. Il remonte après une boucle postérieure vers la région acétabulaire et s'ouvre par un métraterme dans l'atrium génital, sur le côté opposé à la poche du cirre.

Les vitellogènes s'étendent de chaque côté du corps en deux zones latérales qui se rejoignent en arrière du deuxième testicule pour occuper toute la région postérieure. En avant, les follicules vitellogènes ne dépassent pas l'acétabulum. Les vitelloductes transverses résultant de l'union des vitelloductes longitudinaux donnent le vitelloducte médian qui s'élargit entre l'ovaire et le premier testicule en réservoir vitellin avant de déboucher dans l'oviducte. Les œufs peu nombreux dans l'utérus, mesurent 0,087/0,060 mm.

— over —

Chez les jeunes adultes non gravides, où l'état de développement des vitellogènes permettait l'observation précise des protonéphridies et des canaux excréteurs, nous avons établi la formule suivante :

$$2[(3 + 3 + 3 + 3) + (3 + 3 + 3 + 3)] = 48$$

Les canalicules des flammes vibratiles aboutissent dans les canaux collecteurs longitudinaux antérieurs et postérieurs qui se rejoignent de part et d'autre de l'acétabulum pour donner deux canaux très contournés qui s'abouchent de chaque côté de la partie antérieure de la vessie tubulaire.

Rees (1968) dans la description originale donne pour le système excréteur de l'adulte de *Macrolecithus papilliger* la formule suivante :

$$2[(3 + 3) + (3 + 3)] = 24$$

ce qui représente la moitié des protonéphridies que nous avons observées.

Malgré les différences relevées pour les données métriques et la structure de l'appareil excréteur, nous avons assimilé ce Digène à *Macrolecithus papilliger* car les caractères anatomo-morphologiques correspondent à la description originale de Rees (1968).

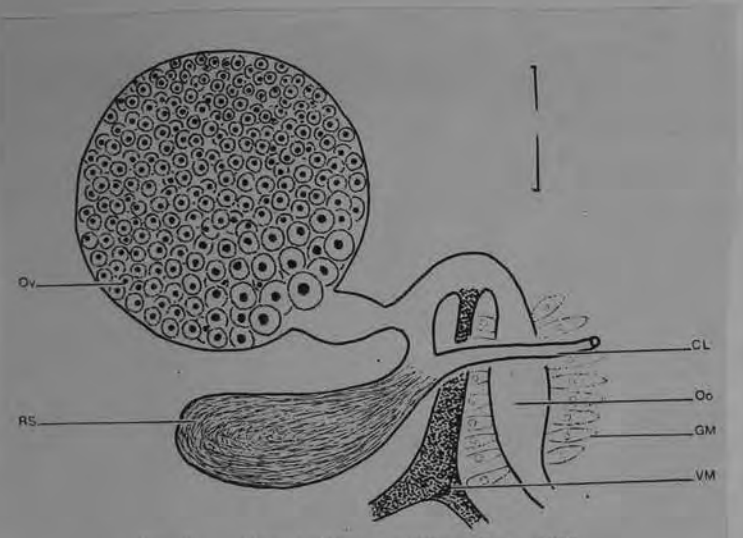


Fig. 2. — *Macrolecithus papilliger* Rees, 1968.
Détail du carrefour génital, vue dorsale. Echelle : 0,1 mm.

From LAMBERT, 1974

MACROLECITHUS

ALLOCREADIIDAE Stossich, 1903

WALLINIINAE

Magnivitellinum, gen. n. Kloss, 1966

Corpo alongado recoberto de pequenas cerdas na extremidade bucal que caem com muita facilidade durante o manuseio do helminto. Ventosa oral sub-terminal, relativamente pequena; esôfago curto e faringe bem desenvolvida; os cecos não atingem a extremidade posterior. Acetábulo pràticamente do mesmo tamanho da ventosa oral, situado na metade anterior do corpo. Testículos pós-acetabulares colocados em posição oblíqua. Bôlsa de cirro muito reduzida; poro genital pré-acetabular, mediano. Ovário submediano entre o testículo anterior e o acetábulo. O útero passa entre os dois testículos e estende-se até a extremidade posterior, cobrindo os cecos na zona pós-testicular; ovos muito pequenos, operculados, de casca lisa. Vitelinos foliculares, muito desenvolvidos, situados lateralmente ao longo dos cecos. Parasitos intestinais de peixes de água doce.

Espécie tipo: *Magnivitellinum simplex* sp. n.

Gênero próximo de *Macrolecithus* Hasegawa & Ozaki, cujas espécies foram, até agora, referidas para o Japão e a Coréia. O gênero presentemente descrito difere do gênero asiático no número menor de glândulas vitalinas que todavia são mais desenvolvidas, faringe menos musculosa e posição dos testículos que no gênero asiático se localizam ao longo do eixo longitudinal do corpo.

Magnivitellinum simplex, sp. n. Kloss, 1966

Figs. 2 a 4

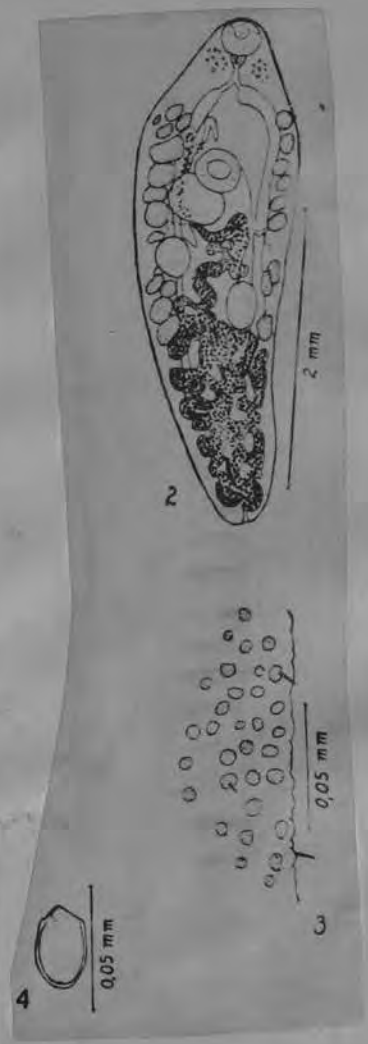
Trematóides pequenos, alongados, com pequenas cerdas na extremidade anterior que caem com muita facilidade. Ventosa pràticamente do mesmo tamanho do acetábulo, seguida de uma faringe musculosa e um esôfago curto; os cecos intestinais não chegam a atingir a extremidade caudal do trematóide. Acetábulo situado nos limites entre o têrço anterior e médio do corpo. Dois testículos globosos, o posterior a meia distância entre o acetábulo e a extremidade caudal e o outro ligeiramente à frente, em posição oblíqua um ao outro e localizados mais ou menos na zona cecal; vesícula seminal e bôlsa de cirro muito reduzidos, localizados logo adiante do acetábulo. Ovário maior do que os testículos, globoso, em posição mediana entre o testículo anterior e o acetábulo; o útero dirige-se para a extremidade posterior, passa entre os testículos e vai até a extremidade caudal, ultrapassando a área intercecal; na extremidade cefálica estende-se até a altura da vesícula seminal; vitelinos foliculares, muito desenvolvidos, situados do lado externo dos cecos intestinais, desde a altura da vesícula seminal até o testículo posterior.

Medidas em mm:

comprimento	3,543	2,307	2,678
largura	1,071	0,824	0,742
ventosa oral	0,268	0,257	0,203
acetábulo	0,300	0,268	0,225
faringe	0,107	0,096	0,086
ovos: comprimento	0,036	0,036	0,047
largura	0,023	0,021	0,021
testículos	0,214	0,182	0,192
ovário	0,342	0,300	0,321

Habitat e proveniência: intestino de *Astyanax bimaculatus* (L.), Characidae, de Cachoeira de Emas, rio Mogi-Guassú, Estado de S. Paulo, Brasil.

Tipo e parátipo na Coleção Helmintológica do Departamento de Zoologia (Secretaria da Agricultura) de S. Paulo sob o número 2.010.



Ref. Pap. Avul. Dept. Zool. Sec. Agric. São Paulo, Brasil vol. 18, art. 17, p. 192-194. 1966

MAGNIUTELLINUM

Manodistomum Stafford, 1905

Syn. *Plagitura* Holl, 1928, partim

Generic diagnosis. — Plagiorchiidae, Plagiorchiinae: Body elongate, flattened elliptical, with blunt or pointed extremities, spinulate. Acetabulum larger than oral sucker, usually pre-equatorial. Oral sucker and pharynx well developed, prepharynx present. Esophagus usually short, ceca half-long or longer. Testes symmetrical, just posterior to cecal ends, nearer to caudal end than to midbody. Cirrus pouch may overlap acetabulum posteriorly. Genital pore median, postbifurcal. Ovary postacetabular, more or less out of median line. Vitellaria probably extending along ceca, though not observed by Stafford in the genotype. Uterus intercecal, posttesticular, reaching to posterior extremity. Excretory stem with short arms behind ovary. Parasitic in alimentary canal of amphibians.

Genotype: *M. occultum* Stafford, 1905 (Pl. 43, Fig. 534), in *Diemyctylus viridescens* and *Rana virescens;* Canada.

Other species:

M. parvum (Stunkard, 1933) in *Triturus viridescens;* U.S.A.

Experimentally infected laboratory bred snails (*Helisoma antrosa*) yielded xiphidiocercariae in about five weeks. Metacercaria found encysted in larvae of *Corydalis, Lymnaea stagnalis, Pseudosuccinea columella* and *Campeloma* species. Experimentally infected intermediate hosts have been fed to newts, and young worms recovered. Sexual maturity is attained in 2 to 3 weeks — Stunkard (1933, 36).

M. salamandra (Holl, 1928), syn. *Plagitura salamandra* Holl, in *Triturus viridescens;* U.S.A.

Primary and secondary sporocyst in *Pseudosuccinea columella;* metacercaria in *Helisoma anceps, Pseudosuccinea columella* and insect larvae — Owen (1946). *Gyraulus* sp. infected in nature, free excystation observed in from 32 minutes to more than 4 hours. — Etges (1953).

Plagiorchiidae

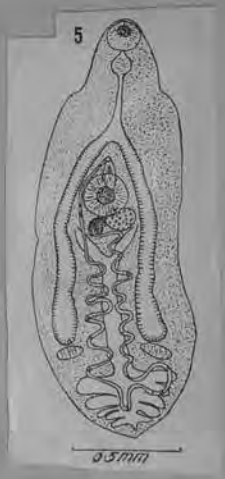
Genus MANODISTOMUM Stafford, 1905

Stafford founded this genus for a single species, *M. occultum*. The genus is poorly defined and has not been recognized again until Price (1930) pointed out that *Plagitura* Holl (1928) was a synonym of *Manodistomum*. In the following discussion I show that other forms should also be referred to this genus.

MANODISTOMUM OCCULTUM Stafford, 1905

This is the type species of the genus and was reported originally from two hosts, *Diemyctylus viridescens* and *Rana virescens*. The description, however, was based solely on material from the former host. In his discussion of the species, Stafford states that its habitat in the newt was unknown to him, but certain forms, which he had found encapsuled in the muscles of the frog, appeared to be the same, although slightly less mature. My material of this species consists of four specimens, two of which were found in *Triturus viridescens* (=*Diemyctylus viridescens*) at Elizabethtown, N. Y., and two from *Triturus meridionalis* at Houston, Tex. In both cases they were in the intestine, and while the Texas specimens, one of which is figured, were barely mature, the New York specimens were fully mature. All differences noted between the two lots of material could easily be explained on the basis of age differences or individual variation. When these forms were compared with Stafford's description of *M. occultum* and Holl's description of *Plagitura salamandra*, no differences of importance could be noted. It is, therefore, probable that *Plagitura salamandra* Holl, 1928, should fall as a synonym of *Manodistomum occultum* Stafford, 1905.

At the close of the discussion on *Manodistomum occultum*, Stafford makes the following statement: "The worms bear many resemblances to Nr. 86 from the snake of which, indeed, they may be the young." From my experience (outlined above) it seems probable that *M. occultum* was described from material in its definitive host; but it is only possible at this time to suggest a probable relationship between the type material and the specimens which Stafford found encysted in the frog. "Nr. 86" is described in the same paper as *Zeugorchis aequatus*, a parasite of the garter snake. *Z. aequatus* is poorly described, and while it seems to be specifically distinct from *M. occultum*, I am unable to find valid generic differences. Furthermore, if we examine Sumwalt's excellent description of *Zeugorchis syntomentera*, the only other species referred to the genus *Zeugorchis*, we are still unable to find generic differences. Therefore *Zeugorchis* appears to be a synonym of *Manodistomum*, and it is possible that the encysted forms from the frog are the young of *Z. aequatus*. Accordingly *Zeugorchis aequatus* Stafford, 1905, becomes *Manodistomum aequatum* (Stafford, 1905); *Zeugorchis syntomentera* Sumwalt, 1926, becomes *Manodistomum syntomentera* (Sumwalt, 1926); and *Manodistomum occultum* Stafford, 1905 (=*Plagitura salamandra* Holl, 1928), stands as the genotype.



From: Harwood, 1932

MANODISTOMUM

MAWSONOTREMA Angel, 1973

Generic diagnosis

Prosthogonimidae. Plump-bodied worms. Cuticle spinose. Oral sucker generally larger than acetabulum. Acetabulum with deep cavity opening by small aperture on surface of body. Male and female ducts uniting just before genital pore. Genital pore median, immediately against anterior border of acetabulum. Cirrus pouch lacking; pars prostatica well-developed. Ovary nearly round, unlobed. Receptaculum seminis lacking. Other characters as for family. Parasitic in liver of penguins.

This trematode is assigned to the Prosthogonimidae although it differs from other genera in the family in the more backward position of the genital pore and in the different disposition of the uterus. It agrees with the definition given for the family by Yamaguti (1971) in the following characters: presence of body spines; caeca terminating short of posterior extremity; testes symmetrical, postacetabular; ovary between acetabulum and testes; Laurer's canal present; vitellaria forming grape-like bunches; excretory vesicle Y-shaped; eggs small, numerous. It differs from this definition in the genital pore being away from the oral sucker; in the absence of a cirrus pouch and receptaculum seminis; in having a well-developed pars prostatica; and in the uterine coils occupying less of the hindbody.

The only other plump-bodied trematodes attributed to the family are *Coelomotrema antechinomes* Angel and *Cylindrotrema cygni* Angel. It is interesting that these three are confined to Australia.

Mawsonotrema resembles *Cephalotrema* Baer and *Coelomotrema* Angel in having an unlobed ovary.

Mawsonotrema eudyptulae ~~gen. nov., sp. nov.~~ ANGEL, 1973

(*See* Figs. 4–7 *on page* 856)

Host. *Eudyptula minor* (Forster), the fairy penguin.
Localities. Goolwa Beach, South Australia, 1 July 1972. Brighton Beach, South Australia 11 July 1972.
Location in host. Ducts of liver.
Incidence. 17 specimens in one bird from Goolwa; more than 100 specimens in one bird from Brighton.
Holotype. SAM. E996 (in spirit).
Paratypes. SAM. E997; six specimens in spirit, one sectioned specimen (on seven slides), one balsam mount of terminal portions of reproductive ducts. Some specimens in Institute of Medical and Veterinary Science, no. K11949.

The genus is named for my colleague Patricia M. Mawson, in recognition of advice and help given me over many years.

The specimens recovered from the penguin from Goolwa were not in good condition, and only five of the 17 were received intact. Of these, the largest measured 3·6 by 3·3 by 2·6.

The following description is based on the specimens from Brighton. I am indebted to Dr. G. E. Ford, of the Institute of Medical and Veterinary Science, South Australia, for providing me with these. Of the 89 specimens that I received, 34 were broken; this was partly due to the fragility of the specimens, but largely due to damage done in extracting them from the host liver. Others were unsuitable for study because of distortion, and some were immature.

Size

Smallest egg-bearing specimen (in alcohol) 2·3 by 1·9 by 1·2; largest 3·9 by 3·0 by 1·7.

All other measurements are from sections, or from stained or unstained specimens, in cedarwood oil, which have lost some of their plumpness in the clearing process, and are more or less wrinkled.

Description

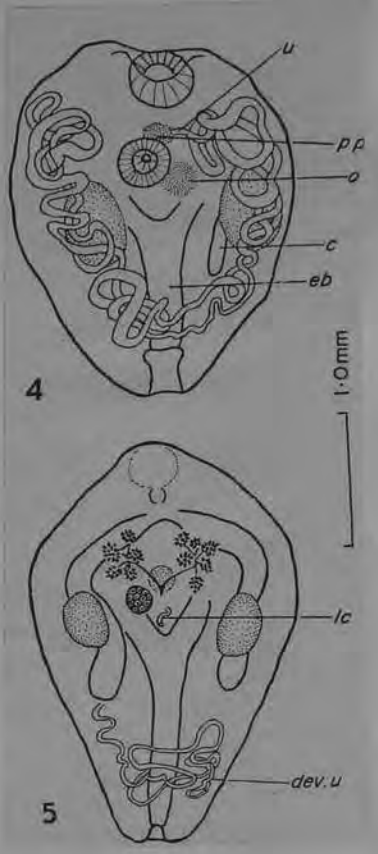
Body plump oval, often coming to a point anteriorly, and sometimes posteriorly; greatest diameter anterior to mid-length. Thickly spined; spines (from sections) up to 26 μm.

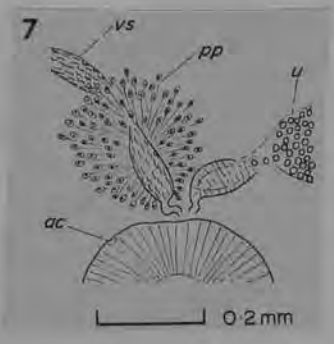
Oral sucker terminal or ventro-terminal, rounded, from 0·34 by 0·37 to 0·54 by 0·56, average (11 specimens) 0·39 by 0·43. Acetabulum smaller than or occasionally equal to oral sucker, situated in anterior third or half of body, 0·24 long by 0·29 wide to 0·44 by 0·44, average (11 specimens) 0·33 × 0·37; rounded, with deep cavity opening to surface by small round aperture, 44–85 μm dia. Ratio of width of oral sucker to width of acetabulum from 1:0·79 to 1:1 (average 1:0·83).

No prepharynx; pharynx (in sectioned specimen) 94 × 80 μm. Oesophagus short, travelling dorso-posteriorly. Caeca varying in width, 0·26 in greatest diameter, terminating behind mid-length of body, generally behind posterior border of testes; nearly always containing many eggs (which are also found in the cavities of the suckers).

Excretory bladder circular in section, Y-shaped, with arms diverging posterior to acetabulum; terminal part of stem forming a small chamber which may be in- or evaginated. Pore terminal.

Testes smooth, oval, generally symmetrical, although one sometimes in advance of other, separated widely, lying dorsal to caeca at about mid-length of body. Vasa deferentia (16 μm wide in sectioned specimen) beginning at medial side of anterior border of testes, uniting close to Mehlis' gland. Vesicula seminalis not coiled, running forward dorsally or dorso-ventrally to level of anterior border of acetabulum, then turning sharply to travel ventrally just anterior to acetabulum. (In a dissected specimen, vesicula seminalis 0·78 long; posterior part 0·48 by 0·13, anterior part 0·30 by 0·055. In a sectioned specimen, posterior part 0·076 wide, anterior part 0·13). Cirrus sac absent. At level of anterior, inner border of acetabulum, vesicula seminalis narrowing to open into thick-walled tube (0·10 by 0·047 in sectioned specimen) surrounded by prominent pars prostatica consisting of long, closely-packed cells extending 0·092 into parenchyma. Male duct continuing as short, non-glandular tube, presumably cirrus, which unites with uterus just before genital pore. Genital pore, inconspicuous, opening in mid-line against anterior border of acetabulum.





—OVER—

Ovary rounded, entire; partly anterior, partly dorsal to testes; nearer to one or other testis, seldom medial. Mehlis' gland and Laurer's canal present. Receptaculum seminis lacking. Vitellaria near dorsal surface, in acetabular region or partly anterior to it; five to eight groups of follicles, compacted or separated, on each side. Transverse vitelline ducts uniting in a short common trunk, without obvious reservoir.

Uterus forming loops on either side of hind body ventral and posterior to testes, but rarely between these (this area being occupied by excretory bladder); passing forwards laterally, sometimes as far as pharyngeal level; posteriorly and ventrally crossing over to other side. Ascending uterus may lie on left side, but more often on right; near genital pore becoming strongly muscular. Eggs small, almost round; average of 10 of largest eggs 0·024 by 0·021.

Measurements of holotype

2·65 by 2·1 by 1·5. Oral sucker 0·46 long by 0·46 wide; acetabulum 0·37 by 0·37. Testes 0·78 apart; right testis 0·61 by 0·44, left testis 0·58 by 0·44. Ovary 0·27 by 0·24. Left caecum terminating 0·85 from posterior end; (right caecum obscured by uterus). Right vitelline group 0·51 by 0·61; left vitelline group 0·44 by 0·44.

MAWSONOTREMA

Mediogonimus Woodhead et Malewitz, 1936

Generic diagnosis. — Prosthogonimidae: Body pyriform, small, spinose. Oral sucker terminal, subequal to acetabulum. Pharynx large, muscular. Esophagus short. Ceca reaching to near posterior extremity. Acetabulum pre-equatorial. Testes slightly lobed, situated symmetrically behind acetabulum in middle third of body, overlapping ceca. Cirrus pouch cylindrical, placed longitudinally between two suckers. Genital pore median, postoral, prebifurcal. Ovary multilobed, slightly overlapping acetabulum on its right side. Receptaculum seminis and shell gland postacetabular. Uterus forming voluminous egg reservoir in center of body, occupying most of hindbody, overreaching ceca laterally. Vitellaria extending in lateral fields from level of intestinal bifurcation to testicular zone. Excretory vesicle Y-shaped, pore terminal. Parasitic in liver (?) of mammals.

Genotype: *M. ovilacus* Woodhead et Malewitz, 1936 (Pl. 96, Fig. 1160), in *Microtus pennsylvanicus pennsylvanicus*: Michigan.

MEDIOGONIMUS

Metahaematoloechus ~~n. g.~~ Yam., 1971

Generic diagnosis: Haematoloechidae. Body elongate, unspined. Oral sucker small; prepharynx present; esophagus short; ceca reaching to near posterior extremity. Acetabulum small, closer to midbody than to anterior extremity. Testes slightly oblique, deeply lobed, largely in extracecal fields of middle third of body. Cirrus pouch sigmoid, long, slender, containing tubular seminal vesicle, indistinct pars prostatica, and eversible cirrus. Genital atrium opening midventrally at level of esophagus. Ovary nearly median, postacetabular, level with anterior ends of testes. Seminal receptacle large, oval, extending from behind ovary to beyond acetabulum. No Laurer's canal. Uterus describing a short longitudinal extracecal loop on each side; ascending portion winding in intercecal field; metraterm differentiated; eggs small. Vitellaria forming three (two anterior and one posterior) groups of rosette-shaped bunches; anterior groups symmetrical, extending from behind intestinal bifurcation to ovarian level; posterior bunches, though paired, are connected with median vitelline duct which unites with paired anterior ducts behind shell gland complex. Excretory vesicle Y-shaped. Parasitic in lungs of frogs.

Type species: *M. exoterorchis* (Rees, 1964) n. comb. (Fig. 821), syn. *Haematoloechus e.* R., in *Rana occipitalis*; S. Ghana. 6.5-8.55 X 1.46-1.53 (25-29 X 15-18).

synonym: Parahaematoloechus Maeder, 1973

Plagiorchiidae

Parahaematoloechus Maeder, 1973

syn of Metahaematoloechus Yamaguti, 1971

Type species of each genus is the former Haematoloechus exoterorchis Rees, 1

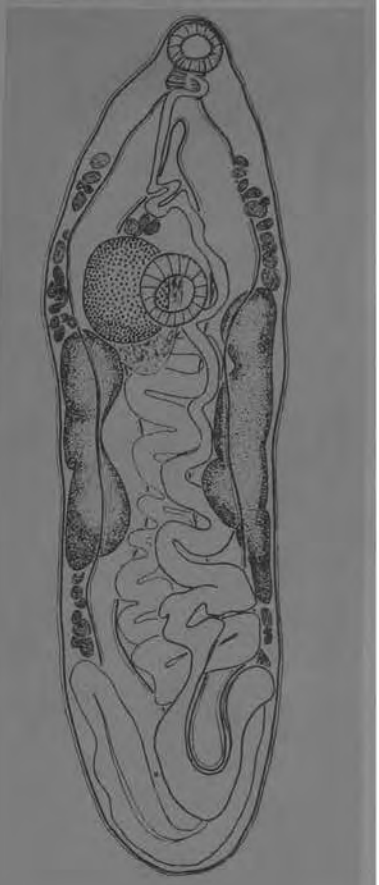


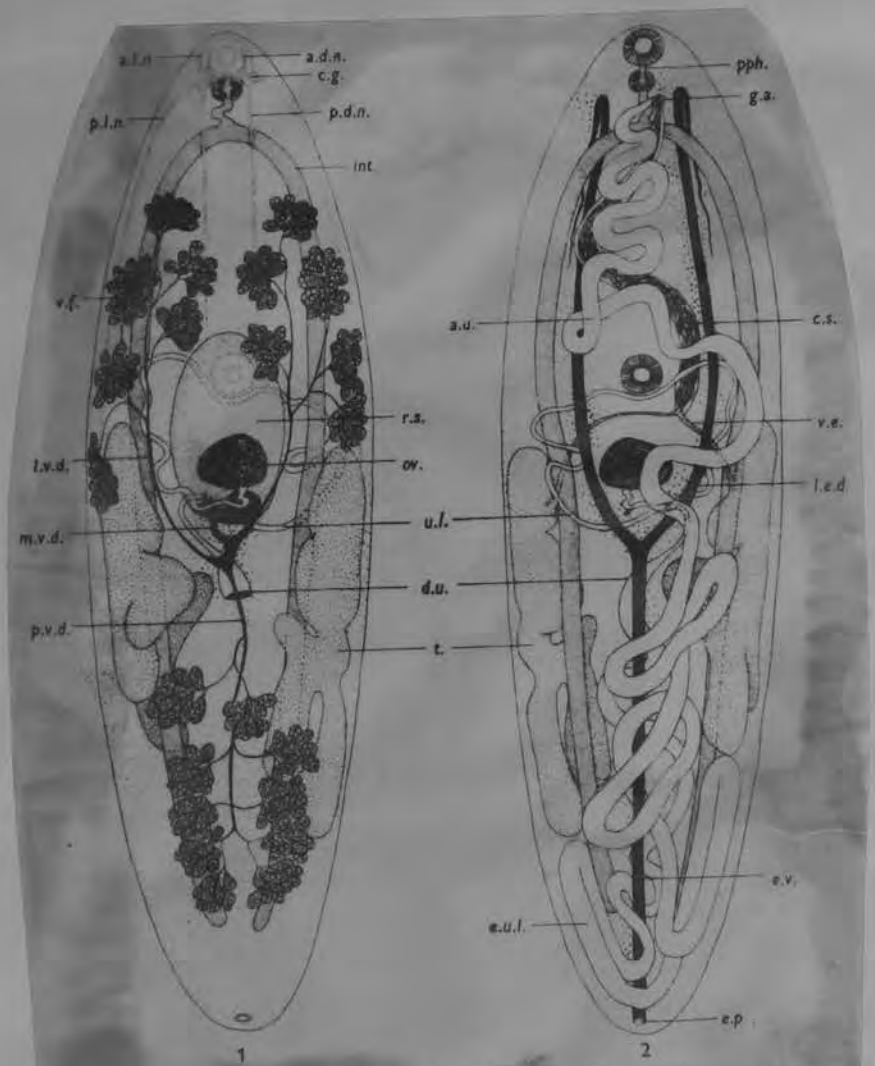
FIG. 22.

Parahaematoloechus n. gen. *exoterorchis* (Rees, 1964) chez *Dicroglossus occipitalis*. Préparation totale.

FROM MAEDER, 1973

Haematoloechus exoterorchis ~~sp.nov.~~ REES, 1964

DIAGNOSIS. Elongated, almost cylindrical, tapering slightly to both extremities; length 6·50–8·50 mm., breadth 1·46–1·53 mm., depth 1·35–1·41 mm., cuticle unarmed; ventral sucker 0·41 × 0·44 mm., slightly larger than the oral sucker 0·30 × 0·33 mm., ratio of ventral sucker to oral sucker 1·26 : 1; prepharynx very short, oesophagus bifurcates some distance in front of ventral sucker, caeca long, relatively wide, extending almost to the posterior extremity; excretory vesicle Y-shaped: genital atrium ventral, to left of pharynx; cirrus sac long, tubular, extending to just behind ventral sucker; testes in posterior half of body on outer side of



Text-figs. 1, 2. *Haematoloechus exoterorchis* sp.nov.

Text-fig. 1. Dorsal view to show testes and vitellaria. Excretory ducts, cirrus sac and most of uterus omitted.

Text-fig. 2. Ventral view to show testes, male ducts, uterus and excretory system. Vitellaria omitted.

—OVER—

intestinal caeca, left 2·20 × 0·64 mm., in front of right 2·33 × 0·60 mm., elongated, irregularly and deeply lobed, some lobes dorsal to caeca and some ventral; ovary pear-shaped 0·50 × 0·25 mm. near centre of body a short distance behind ventral sucker; vitellaria in three main groups two anterior and one posterior, anteriorly five to six rosette-like groups each of nine to fifteen follicles on either side, two lateral vitelline ducts, posteriorly five to six pairs of rosette-like groups of follicles near centre of body, one posterior vitelline duct; uterus with initial loop around ovary, descending and ascending limbs median and much coiled, extracaecal uterine loops short and limited by testes; eggs dark brown 0·025–0·029 mm. × 0·015–0·018 mm.

HOST. *Rana occipitalis* (Gunther).

LOCATION. Alveoli of lungs.

LOCALITY. Southern Ghana.

TYPE SPECIMENS. Deposited in British Museum (Natural History), London. Specimen no. 1963.12.9.1.

SEE REPRINT FOR MORE DETAILED DESCRIPTION.

METAHAEMATOLDECHUS

M[illegible]phallus Yamaguti, 1958

Generic diagnosis. Plagiorchiata. Leptophallinae: Body [illegible] small, tapered toward extremities. Acetabulum near [illegible] oral sucker pre-equatorial. Oral sucker relatively large, esophagus short [illegible] short, reaching very little beyond acetabulum, terminating some distance short of posterior extremity. Testes diagonal, in hindbody, postovarian. Cirrus pouch small, pre-acetabular. Seminal vesicle mostly outside cirrus pouch, dorsal to acetabulum. Genital pore median, between acetabulum and intestinal bifurcation. Ovary pretesticular, on the same side as posterior testis. Receptaculum seminis apparently absent. Laurer's canal? Vitellaria forming a bunch of several follicles on each side ventral to ceca from level of acetabulum to behind cecal ends. Uterus descending as far as posterior extremity. Excretory vesicle? Parasitic in esophagus of snakes.

Genotype: *M. gracillimus* (Looss, 1909), syn. *Distomum gracillimus* Lühe, 1909, in esophagus of *Tropidonotus natrix*: locality [illegible] no figure given.

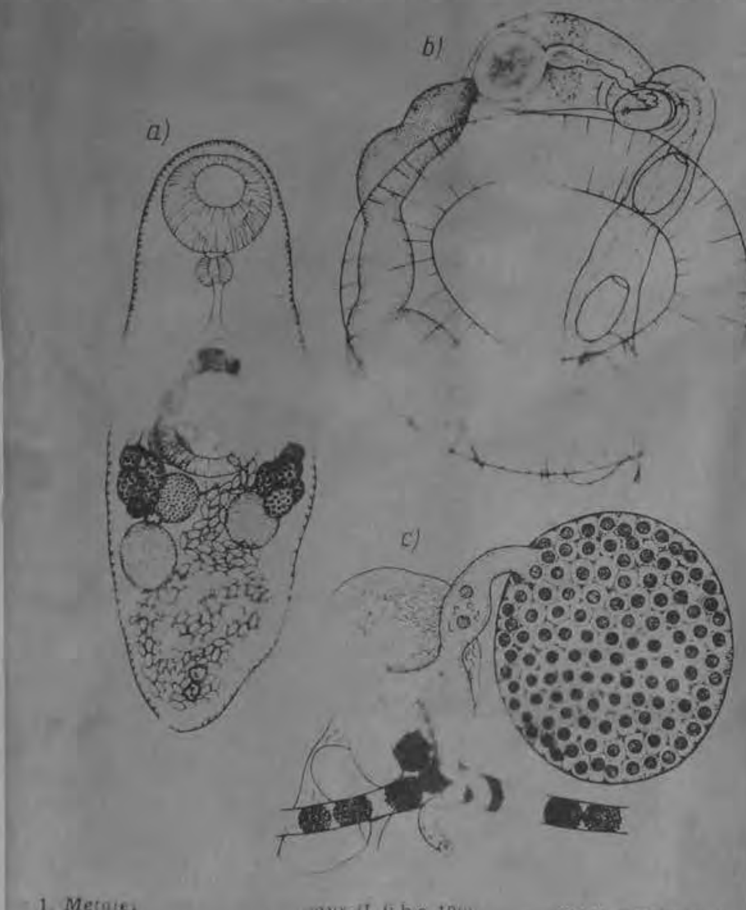
This genus differs from *Leptophallus* Lühe chiefly in the position of the vitellaria.

from Grabda-Kazubska, 19

Metaleptophallus gracillimus (Luhe, 1909) Yamaguti, 1958

pharynx	0.069 – 0.090 × 0.073	0.09[illegible]	mm.
ventral sucker	0.24 – 0.33 × 0.24	0.34	mm.
ovary	0.09 – 0.13 × 0.10	[illegible]	mm.
right testis	0.17 – 0.22 × 0.12	[illegible]	mm.
left testis	0.16 – 0.22 × 0.13	[illegible]	mm.
eggs	0.042 – 0.046 × 0.021	[illegible]	mm.

The trematodes are elliptical in sh[illegible] [illegible]longated, [illegible] their rear end more markedly pointed than the fron[illegible] [illegible] the body [illegible] [illegible]tro-dorsally flattened. The cuticle densely covered w[illegible] [illegible]nes all over [illegible] [illegible]rface. A large muscular oral sucker, situated te[illegible]lly with the op[illegible] [illegible] ventrally. Somewhat larger is the ventra[illegible] [illegible]ker situated fronta[illegible]



1. Meta[illegible] [illegible]mus (L ü h e 190[illegible]) [illegible] — young specimen, b [illegible]stem, c — ootyp[illegible] [illegible] the dorsal side

Fig. 2. *Metaleptoph[illegible] gracillimus* (L ü h e 1909) adul[illegible] [illegible]ecimen

mately at 1/3 body length; it is shifted towards the middle of the body in younger trematodes.

Clusters of glands, fine-grained in structure, are disposed on the sides of the pharynx in front of the intestinal branches. Isolated or grouped ducts of these glands open to the exterior around the oral sucker, and to the ventral side of the fore part of the body.

[illegible]igestive tract. A very short praepharynx, visible in the more considerably [illegible]outstretched specimens only. A large, very muscular pharynx. Short oesophagus. The intestin[illegible] bifurcation is situated halfway between the suckers or closer to the ve[illegible]tral one. Relatively short intestinal ramifications, ending not far off be[illegible]d the ventral sucker.

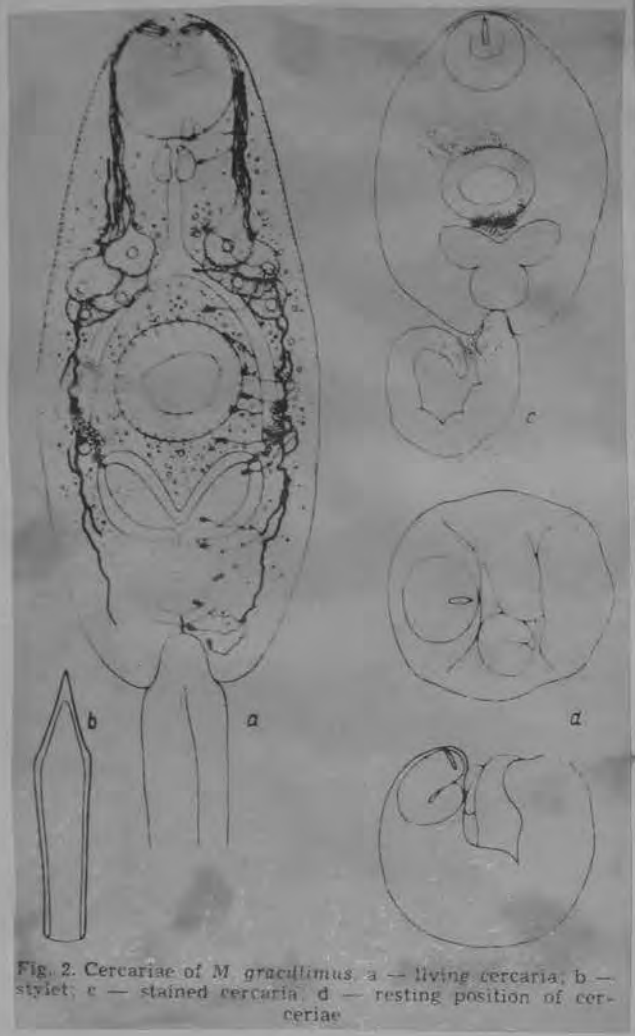


Fig. 2. Cercariae of *M. gracillimus*. a — living cercaria; b — stylet; c — stained cercaria; d — resting position of cercariae

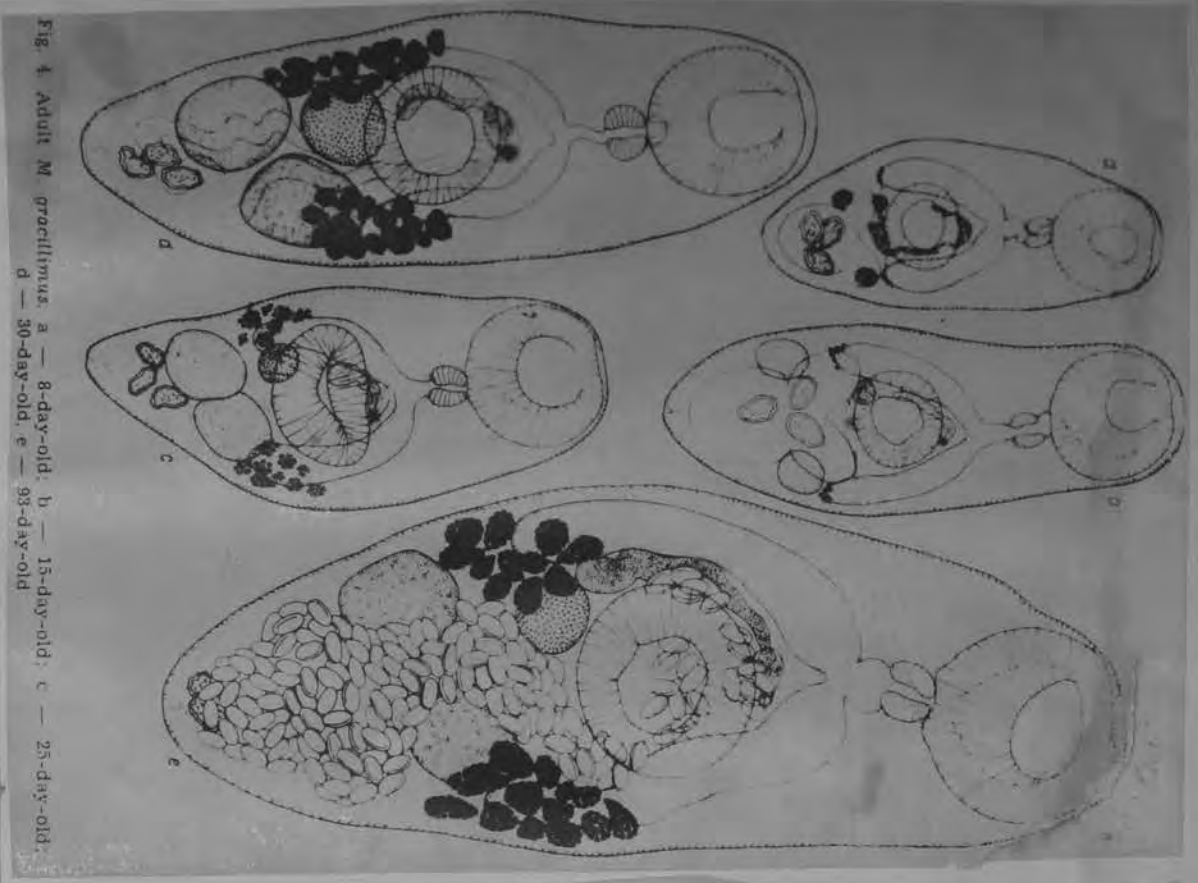


Fig. 4. Adult *M. gracillimus*. a — 8-day-old; b — 15-day-old; c — 25-day-old; d — 30-day-old; e — 93-day-old

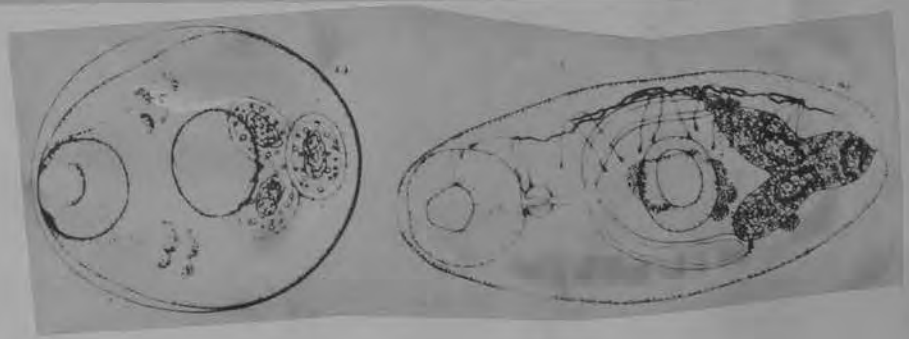


Fig. 3. Metacercariae of *M. gracillimus*. a — 1-day-old; b — 3-day-old; c — 9-day-old; d — 14-day-old; e, f — infective metacercariae 22-day-old

From Grabda-Kazubska, 1963
(Acta Parasitologica Polonica)

METALEPTOPHALLUS

Microderma Mehra, 1931

Generic diagnosis. — Plagiorchiidae, Astiotrematinae: Body slender, long, spinulate. Acetabulum small, in anterior third of body. Oral sucker and pharynx small, esophagus practically absent, bifurcating a considerable distance anterior to acetabulum. Ceca ending near posterior extremity. Testes diagonal, anterior one equatorial or postequatorial. Cirrus pouch claviform, extending back of acetabulum, enclosing large seminal vesicle and well developed prostatic complex. No protrusible cirrus(?). Genital pore practically median, immediately pre-acetabular. Ovary median or slightly to right, halfway between acetabulum and anterior testis. Receptaculum seminis absent, Laurer's canal absent. Uterus passing between two testes and reaching to posterior extremity. Vitellaria lateral, extending greater postacetabular part of ceca. Excretory stems reaching to near oral sucker. Intestinal parasites of tortoises.

Genotype: *M. elingue* Mehra, 1931 (Pl. 55, Fig. 674), in *Kachuga smithii* and *K. dhongoka;* India.

Other species: *M. luehei* (Travassos, 1927) Olsen, 1937, syn. *Plagiorchis luehei* Travassos, 1927, in *Eunectes murinus;* Brazil.

Gupta (AN.) and Sharma (1973) suggest that Allopharynx [sic] Stroma, 1928, and Microderma Mehra, 1931, are subgenera of Glossimetra Mehra, 1937. [reprint in file]

MICRODERMA Mehra 1931

Cuticle beset with minute spines, ventral sucker slightly larger than oral sucker. Esophagus entirely absent, intestinal bifurcation far in front of ventral sucker, ceca reaching a little in front of posterior end . Genital pore median, immediately in front of ventral sucker. Testes spherical, about equal in size, placed obliquely close behind one another. Ovary situated to the right in front of testes, seminal receptacle much smaller. L.canal present. Vitellaria laterally situated, commencing behind ventral sucker and terminating close in front of ends of intestinal ceca. Cirrus sac of moderate size with thick muscular walls, extending behind ventral sucker with terminal part curved closely round right side of latter. Seminal vesicle curling on itself near small and indistinct recognizable pars prostatica . Metraterm prsent; genital atrium well developed. Excretory bladder Y-shaped without lateral branches.

Type species: Microderma elinguis Mehra 1931

Host: Kachuga smithii
Locality: Allahabad, India

Relationships: Sub-family Lepodermatinae Looss

Shows relationship to Lepoderma and Astiotrema on one hand and to Styphlodora on the other

Other species: According to Mehra Plagiorchis luhei Trav. does not belong to Plagiorchis, but to Microderma because of: absence of esophagus, curled seminal vesicle, presence of sem. rec., and position of vitellaria.
This species would then be Microderma luhei (Trav.) Mehra 1931

Microderma Mehra, 1931

Generic diagnosis: Extremities rounded. Cuticle spinose. Oral sucker subterminal; acetabulum preequatorial, about equal to oral sucker in size. Prepharynx and pharynx present, oesophagus absent, intestinal caeca extend almost to posterior end of body, broader anteriorly. Genital pore median, testes round, obliquely placed and near to each other; cirrus pouch extends caudad from acetabulum; seminal vesicle coiled. Ovary round, anterior to testes. Vitellaria lateral, extend from base of cirrus pouch to near end of body. Excretory bladder Y-shaped.


33


34

KEY TO THE SPECIES OF *Microderma*

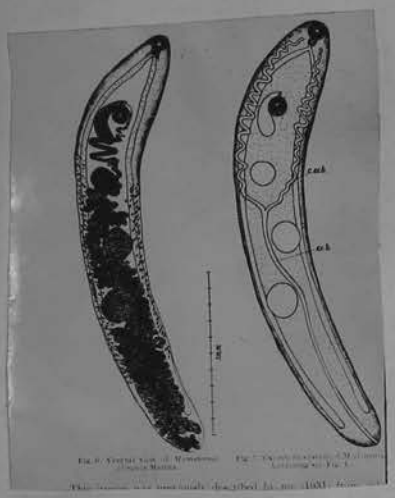
1. Seminal vesicle large; vitelline follicles in groups. (Intestine of *Kauchga smithii;* India; fig. 33.)..... *M. elinquis* Mehra, 1931.
Seminal vesicle thin; vitelline follicles not arranged in groups. (Oesophagus of *Cyclagras gigas;* Brazil; fig. 32.).....
..... *M. luhei* (Trav., 1927) Mehra, 1931.

(over)

M. elingnis.

Recorded in 1937 by Mehra from Kachuga dhongoka.

Redescribed with the following figure



Microderma elinguis Mehra, 1931

(Рис. 155)

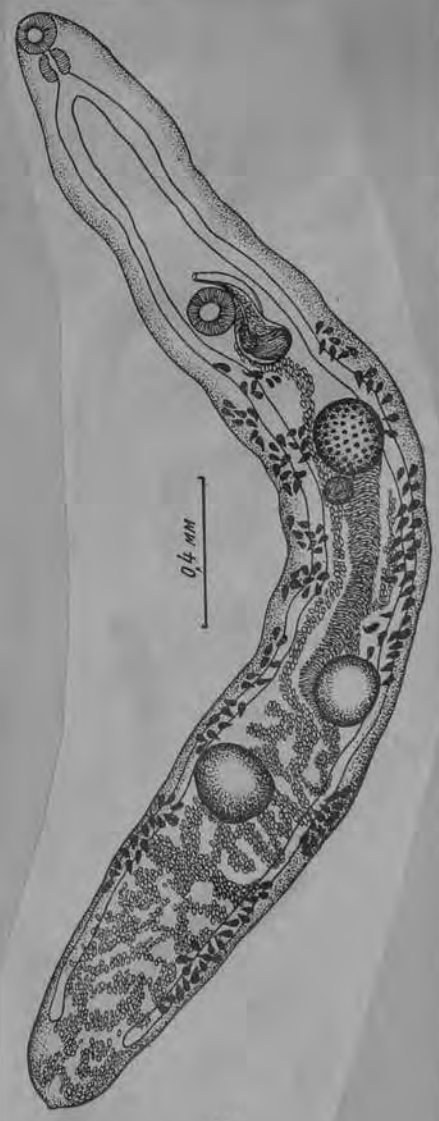
Хозяин: черепаха — *Kachuga smithii*.

Локализация: тонкие кишки.

Место обнаружения: Индия.

Описание вида (по Мэра, 1931). Слегка сплюснутые трематоды достигают в длину 2—3,5 мм при максимальной ширине 0,3—0,4 мм между брюшной присоской и концом заднего семенника. Тело удлиненное, с закругленными концами, из которых задний всегда несколько шире. Впереди яичника тело усеяно острыми, очень маленькими шипиками, едва возвышающимися над поверхностью кутикулы. Вокруг ротовой присоски и фаринкса шипики несколько крупнее и более многочисленны. Ротовая присоска субтерминальная, 0,08—0,09 мм в диаметре. Брюшная присоска несколько крупнее ротовой, достигая 0,11—0,12 мм в диаметре; она лежит на расстоянии 0,48—0,83 мм от головного конца, т. е. в первой четверти длины тела. Соотношение размеров ротовой и брюшной присосок равно приблизительно 3 : 4. Половое отверстие лежит медианно, непосредственно впереди брюшной присоски. Префаринкс маленький; фаринкс шаровидный, 0,04—0,06 мм в диаметре; пищевода нет, так что непосредственно за фариксом следует бифуркация кишечника, лежащая на расстоянии 0,3—0,6 мм впереди брюшной присоски. Кишечные стволы простираются далеко за задний семенник, лишь немного не достигая заднего конца тела; они несколько расширены впереди брюшной присоски и лежат в большей части своей длины на середине расстояния между медианной линией тела и его краями; оканчиваются кишечные стволы симметрично.

Семенники лежат по диагонали, близко один от другого, в задней половине тела; они шаровидные, с гладкими краями и приблизительно одинакового размера, 0,16—0,23 мм в диаметре. Передний семенник у самого крупного экземпляра лежит справа, на расстоянии 0,5 мм позади яичника и на 0,9 мм позади брюшной присоски, тогда как у экземпляра длиною в 2 мм эти расстояния соответственно достигают 0,27 и 0,67 мм. Задний семенник лежит слева на расстоянии 0,07—0,20 мм от переднего и 0,06—0,20 мм



Microderma lühei (Travassos, 1927) Mehra, 1931

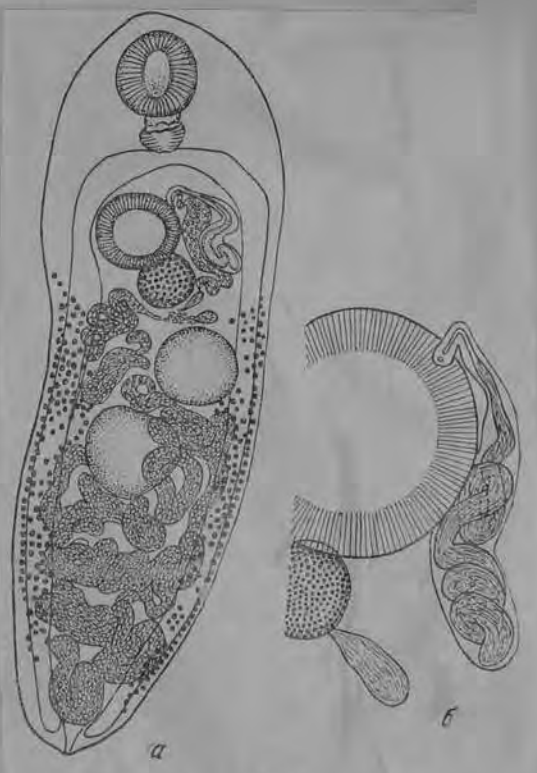
(Рис. 156)

Синоним: *Plagiorchis lühei* Travassos, 1927

Хозяин: анаконда — *Eunectes murinus*.
Локализация: пищевод.
Место обнаружения: Бразилия.

Описание вида (по Травассосу, 1927). Мелкие трематоды с тупыми концами; тело длиною 4,7—5 мм при максимальной ширине 1,3—1,7 мм; кутикула с шипиками. Брюшная присоска мощная, приблизительно одинакового размера с ротовой, расположена впереди середины тела, диаметр ее 0,50—0,65 мм, а расстояние от ротовой присоски 0,55—0,65 мм. Ротовая присоска мощная, субтерминальная, 0,52—0,65 мм в диаметре. Непосредственно за ротовой присоской следует хорошо развитый фаринкс около 0,25 мм длины при максимальной ширине 0,32 мм; он снабжен снаружи железистыми клетками. Пищевода нет; широкие кишечные стволы простираются до заднего конца тела. Половое отверстие субмедианное, лежит в передней части зоны брюшной присоски, рядом с последней (так как брюшная присоска бывает обычно втянута в тело, создается впечатление, что половое отверстие находится над брюшной присоской). В длинной, тонкой половой бурсе заключены циррус, простатическая часть и скрученный семенной пузырек; бурса достигает в длину 0,75—1,00 мм, причем и спереди и сзади выходит за пределы зоны брюшной присоски. Округлые семенники, достигающие 0,62—0,65 мм в диаметре, располагаются наискось в отношении друг друга позади яичника, приблизительно в области середины длины тела. Округлый яичник лежит впереди середины длины тела, в полях семенников впереди зоны переднего семенника, совпадая частично или на половину с зоной брюшной присоски; диаметр яичника достигает около 0,40 мм. Семяприемник и тельце Мелиса расположены в зоне яичника или непосредственно позади нее. Матка состоит из одной восходящей и одной нисходящей ветви, которые лежат в области кишечных стволов и между стволами, не выходя за их пределы и за пределы зоны яичника; метратерм короткий. Желточники расположены латерально, как кнаружи от кишечных стволов, так и в их области; начинаются они от заднего края яичника и доходят почти до окончания кишечных стволов. Яйца желто-коричневого цвета, достигают 0,045—0,050× ×0,025—0,035 мм.

Литература: Travassos, 1927, стр. 97—98.



MICRODERMA