

OBSERVATIONS ON SOME ALREADY KNOWN DIGENETIC TREMATODES OF MARINE FISHES OF ERNAKULAM (SOUTH INDIA)

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ABSTRACT

In this paper are described five digenetic trematodes recovered from marine fishes dissected at Ernakulam. Of these, one form has been kept as sp. inq. and the rest, namely *Bucephalus polymorphus* Baer, 1827, *Decemtestis mehrai* Srivastava, 1936, *Lecithochirium polynemi* Chauhan, 1945, and *Lecithochirium acutum* Chauhan, 1945, have been redescribed with minor variations.

Order GASTEROSTOMATA Odhner, 1905
Family **Bucephalidae** Poche, 1907
Subfamily BUCEPHALINAE Nicoll, 1914

Bucephalus polymorphus Baer, 1827

(Fig. 1)

As many as 10 specimens of *Bucephalus polymorphus* Baer, 1827, were collected from the intestine of two marine fishes, *Therapon jarbua* (Forsk., 1775) and *Pomadasy hasta* (Bloch, 1790), dissected at Ernakulam. The flukes are elongate, narrowing gradually towards both the ends and measure 0.816-1.376 mm. in length and 0.192-0.384 mm. in maximum breadth which occur at the level across the ovary. The cuticle is armed with minute spines. The sucker-like rhynchus, 0.096-0.152 x 0.08-0.144 mm. in size, is equipped with seven tentacles with broad bases and tapering extremities. The basal part of each tentacle is beset with one ventral process. [Wagener (1858) has described the tentacles, each having a single ventral process. Woodhead (1930) has also described a similar condition for the tentacles in respect of *B. elegans* which is a synonym of the type species, i.e. *B. polymorphus*, but Nagaty (1937) has stated that each tentacle typically is provided with two ventral processes.] Of the specimens studied, two were with complete seven tentacles and three were with five complete and two damaged tentacles. Again, in one of the specimens only five tentacles were observed and in another six tentacles. It seems that in these specimens the tentacles were either broken or had retracted and they were not visible.

The mouth lies in the posteriormost region of the anterior half of the body. The pharynx is almost spherical. The intestine is simple, sac-like but its shape may be variable in different specimens on account of the flattening of the fluke.

The testes, two in number, somewhat rounded in shape, are situated one behind the other or slightly diagonally. The anterior testis measures 0.096-0.176 x 0.08-0.144

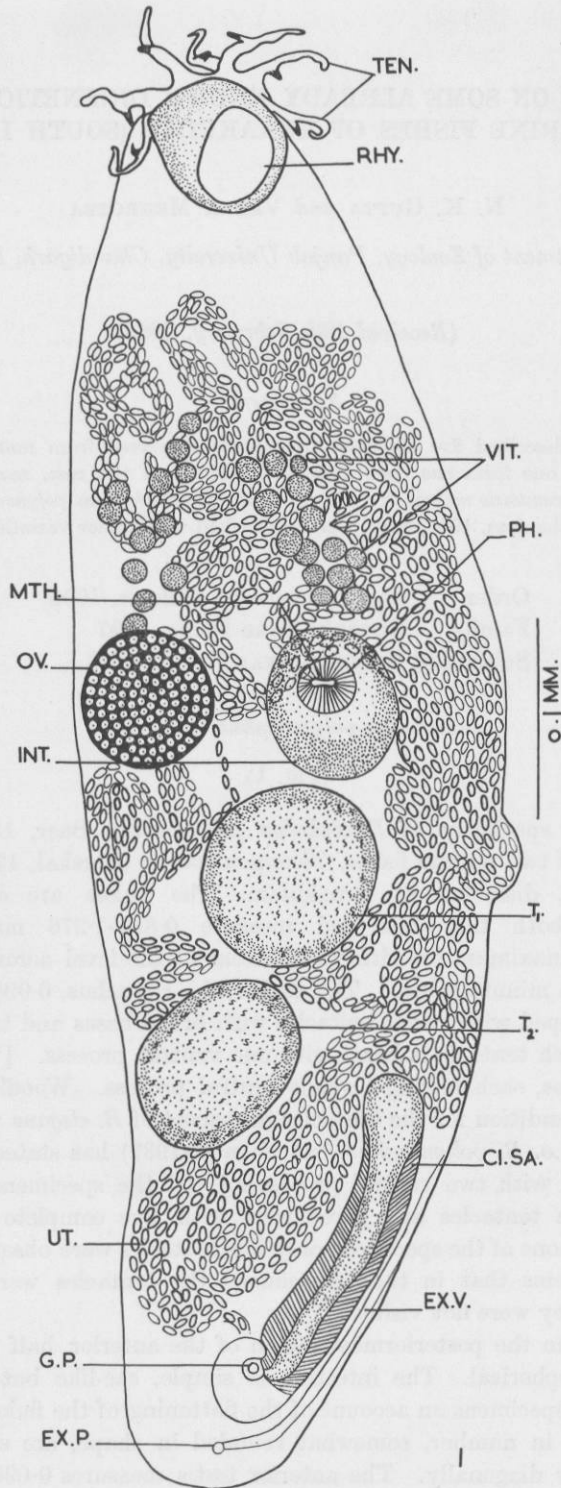


FIG. 1. *Bucephalus polymorphus* Baer, 1827

mm., whereas the posterior $0.12-0.176 \times 0.112-0.128$ mm. The cirrus sac (= pouch) is large and elongate lying to the left of the median line in the posterior region of the body. It measures $0.272-0.384$ mm. in length and $0.032-0.064$ mm. in breadth and contains an oval seminal vesicle, a pars prostatica and a short cirrus. The genital pore lies quite apart from the posterior extremity.

TABLE I
Bucephalus polymorphus Baer, 1827

	Observations from Ben Dawes, 1946	Observations according to the authors
Size of the body ..	About 1 mm. long and 0.2 mm. broad ($0.62-2.29 \times 0.11-0.35$ mm. according to Nagaty, 1937)	0.816-1.376 mm. long and 0.192-0.384 mm. broad
Cuticle	Spinous	Spinous
Rhynchus	$0.08-0.19 \times 0.07-0.17$ mm.	$0.096-0.152 \times 0.08-0.144$ mm.
Tentacles	6-7 (according to Nagaty 1937), basal part of each tentacle having two ventral processes, sometimes one	7, basal part of each tentacle having one ventral process
Mouth	Slightly behind the midbody	Slightly in front of the midbody
Intestine	Sac-like	Sac-like
Testes	Tandem, diameters $0.06-0.19$ mm.	Tandem or diagonal $0.096-0.176 \times 0.08-0.144$ mm. and $0.12-0.176 \times 0.112-0.128$ mm.
Cirrus pouch ..	$0.17-0.57$ mm. long	$0.272-0.384$ mm. long and $0.032-0.064$ mm. broad.
Ovary	$0.05-0.13$ mm.	$0.08-0.16 \times 0.064-0.112$ mm.
Eggs	$0.021-0.027 \times 0.013-0.023$ mm.	$0.0146-0.023 \times 0.0073-0.0121$ mm.
Host	Pike, perch, burbot, gidgeon, etc.	Perch, namely <i>Therapon jarbua</i> and <i>Pomadasys hasta</i>

The ovary, $0.08-0.16 \times 0.064-0.112$ mm. in size and pre-testicular, is situated to the right of the median line. The vitellaria are in two groups, each comprising 11-17 follicles, situated on either side of the median plane in front of the gonads. The uterus is coiled forming both ascending and descending limbs. Anteriorly the coils extend a little in front of the vitellaria. The eggs are numerous, ovoid and measure $0.0146-0.023 \times 0.0073-0.0121$ mm.

Abbreviations:

CI.—cirrus; *CI.SA.*—cirrus sac; *D.H.*—ductus hermaphroditicus; *EC.*—ecsoma; *EG.*—egg; *EX.P.*—excretory pore; *EX.V.*—excretory vesicle; *G.P.*—genital pore; *INT.*—intestine; *INT.C.*—intestinal caecum; *MTH.*—mouth; *O.S.*—oral sucker; *OES.*—oesophagus; *OV.*—ovary; *PH.*—pharynx; *PR.O.LP.*—pre-oral lip; *PR.PT.*—presomatic pit; *R.SE.*—receptaculum seminis; *RHY.*—rhynchus; *T.*—testis; *T₁*—anterior testis; *T₂*—posterior testis; *TEN.*—tentacle; *UT.*—uterus; *V.S.*—ventral sucker; *VES.SEM.*—vesicula seminalis; *VIT.*—vitellaria.

The excretory vesicle is simple and tubular, the excretory pore being situated a little in front of the posterior extremity.

Host: *Therapon jarbua* (Forskål, 1775)
and *Pomadasys hasta* (Bloch, 1790)

Habitat: Intestine

Locality: Ernakulam (South India)

Remarks: The authors' observations on the species *Bucephalus polymorphus* Baer, 1827, tally with those of the original description except for a few minor differences in the measurements of the body and its organs which are given in Table I.

Family **Allocreadiidae** Stossich, 1903
Subfamily ALLOCREADIINAE Looss, 1902

Decemtestis mehrai Srivastava, 1936

(Fig. 2)

Three specimens of *Decemtestis mehrai* Srivastava, 1936, were recovered from the intestines of two marine fishes, namely *Triacanthus brevisrostris* Schlegel, 1850, and *Ariodes dussumieri* (Val., 1840). The parasite has an elongate body, slightly tapering in the pre-acetabular zone and broadly rounded off posteriorly. The body is completely devoid of scales or spines and measures 1.77-1.94 × 0.682-0.686 mm., the maximum breadth being across the acetabular zone.

The suckers are fairly muscular. The subterminal oral sucker measures 0.084-0.098 × 0.14-0.15 mm. The ventral sucker, 0.206-0.28 mm. in diameter, is situated anterior to the midbody.

The prepharynx is small, 0.028-0.056 mm. in length. The cup-shaped muscular pharynx measures 0.07 × 0.112 mm. Oesophagus is a straight tube. The intestinal caeca are uniformly broad tubes extending up to the posterior extremity of the body.

The testis are small, spherical bodies, ten in number, 0.098-0.14 × 0.098-0.126 mm. in size and are arranged in a somewhat circular manner in the intercaecal space behind the ovary. The club-shaped cirrus sac is fairly long, extending obliquely from the genital atrium to the level of anterior edge of ventral sucker. The cirrus sac encloses an elongated vesicula seminalis, pars prostatica, ductus ejaculatorius and cirrus. The genital atrium lies at the level with the base of the oesophagus, to the left of the latter.

The ovary, 0.182 × 0.126 mm. in size (measured in one specimen only), is deeply tetra-lobed, slightly overlapping the right caecum. The receptaculum seminis is an elongated sac situated just in front of the testes. The vitellaria are extensively developed and consist of fairly large-sized follicles, extending laterally from the level of the oesophagus to the posterior extremity of the body and meeting mesially in the post-testicular region. The uterine coils containing a large number of eggs extend in the region between the testes and the ventral sucker. Thereafter the uterus runs forward along the

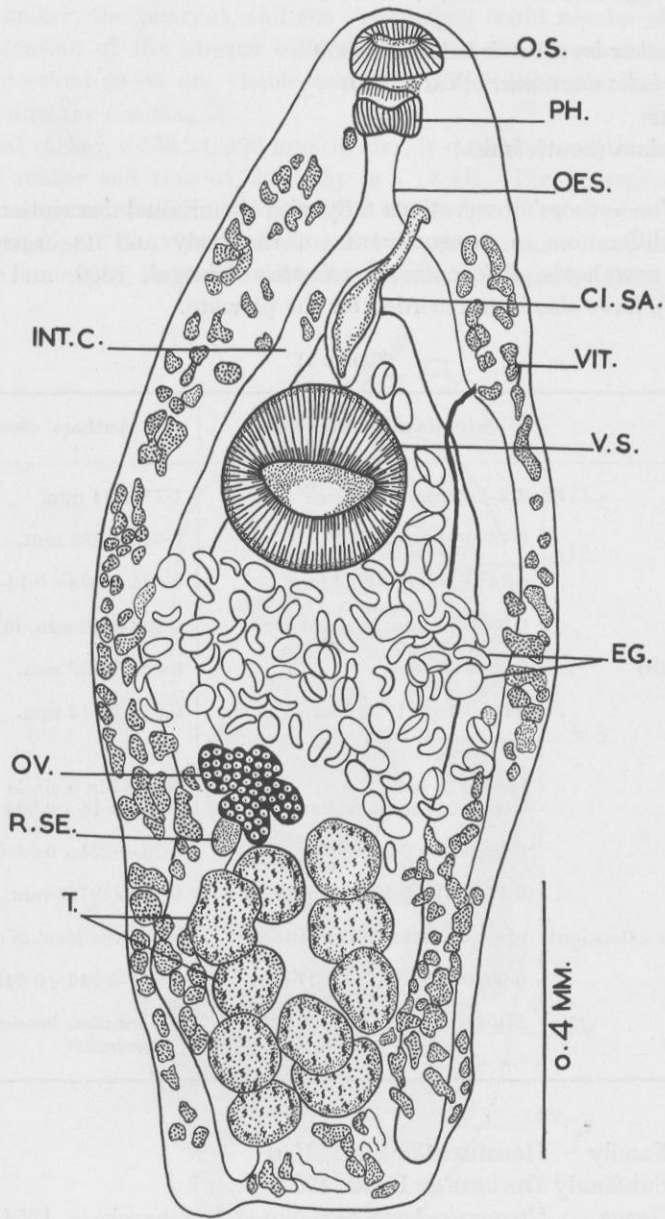


FIG. 2. *Decemtestis mehrai* Srivastava, 1936

left border of the ventral sucker and the cirrus sac and opens into the genital atrium. The oval, yellow eggs measure 0.042-0.049 × 0.042-0.056 mm.

Host: *Triacanthus brevirostris* Schlegel, 1850
and *Ariodes dussumieri* (Val., 1840)

Habitat: Intestine

Locality: Ernakulam (South India)

Remarks: The authors' observations tally with the original description of the species but for minor differences in measurements of the body and its organs as given in Table II. Two new hosts, *Triacanthus brevirostris* Schlegel, 1850, and *Ariodes dussumieri* (Val., 1840), have also been recorded for the parasite.

TABLE II

	Srivastava's observations	Authors' observations
Body length	2.2-2.7 mm.	1.77-1.94 mm.
Breadth	0.73-0.94 mm.	0.682-0.686 mm.
Oral sucker	0.14-0.17 × 0.2-0.23 mm.	0.084-0.098 × 0.14-0.15 mm.
Acetabulum	0.28-0.33 mm. in diameter	0.206-0.28 mm. in diameter
Prepharynx (length)	0.05-0.06 mm.	0.028-0.056 mm.
Pharynx	0.08-0.1 × 0.1-0.12 mm.	0.07 × 0.112 mm.
Testes:		
Arrangement	Mostly in pairs	Almost in a circle
Size	0.08-0.011 mm. in diameter	0.098-0.14 × 0.098-0.126 mm.
Cirrus sac	0.44-0.47 × 0.06-0.07 mm.	0.28-0.294 × 0.04-0.07 mm.
Ovary	0.17-0.21 × 0.18-0.21 mm.	0.182 × 0.126 mm.
Vitellaria (anterior extention)	up to intestinal bifurcation	up to the level of oesophagus
Eggs	0.06-0.063 × 0.03-0.037 mm.	0.042-0.049 × 0.042-0.056 mm.
Host	<i>Sillago sihama</i>	<i>Triacanthus brevirostris</i> and <i>Ariodes dussumieri</i>

Family **Hemiuridae** Lühe, 1901

Subfamily **DINURINAE** Looss, 1907

Genus *Uterovesiculurus* Skrjabin et Guschanskaja, 1954

Uterovesiculurus sp. inq.

(Fig. 3)

A single specimen of *Uterovesiculurus* sp. was recovered from the stomach of a marine fish, *Therapon jarbua* (Forsk., 1775), dissected at Ernakulam. The fluke, 2.4 × 0.96 mm.,

has an elongate, somewhat fusiform body. The ecsoma is completely retracted. The ratio of the length and breadth of the body is 1 : 2.5.

The oral sucker, the pharynx and the oesophagus could not be observed distinctly due to the extension of the uterine coils which fill in the anteriormost portion of the body. The intestinal caeca are visible but their fork could not be seen. The caeca extend a little into the ecsoma.

The ventral sucker, 0.544 × 0.496 mm. in size, is muscular and the ratio of the length of the ventral sucker and that of the body is 1 : 4.41. The ventral sucker is situated in the posterior region of the anterior half of the body. The approximate ratio of the lengths of the oral and the ventral suckers is 1 : 3 (the anterior knob-like portion of the body, 0.18 mm. in length, is considered to be the area occupied by the oral sucker).

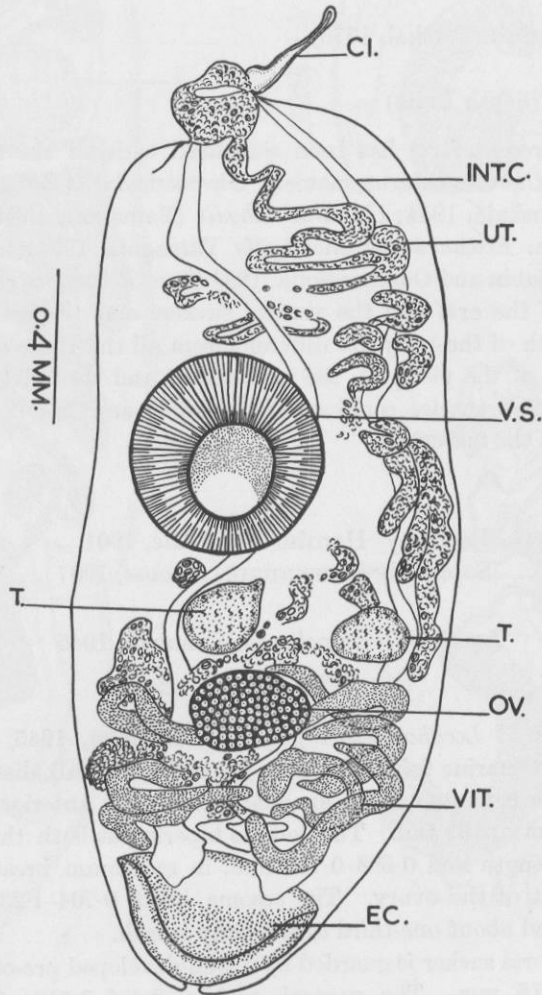


FIG. 3. *Uterovesiculurus* sp. nq.

The gonads are post-acetabular. The testes, two in number, are juxtaposed and pre-ovarian. The right testis, 0.16×0.224 mm, lies in the area just above the ovary, whereas the left testis, 0.168×0.208 mm. in size, is in the region a little left to the ovary. The cirrus is seen protruding out at the extreme anterior end of the body, thus indicating the position of the genital pore.

The ovary, 0.32×0.224 mm., is transversely elongate. Mehlis' gland complex could not be observed. The vitellaria are seven, long, winding tubes, 4 on the left and 3 on the right of the ovary. The uterus is fully packed with the eggs and does not extend into the ecsoma. The uterus, after forming several transverse loops in the region of gonads, extends anteriorly restricting its course to the left of the ventral sucker and forming distinct dilated coils mainly in the pre-acetabular zone. The eggs measure $0.013-0.0168 \times 0.0072-0.012$ mm.

Host: *Therapon jarbua* (Forsk., 1775)

Habitat: Stomach

Locality: Ernakulam (South India)

Remarks: The present form has been compared with all the three already known forms of the genus *Uterovesiculurus*, namely *Uterovesiculurus hamati* (Yamaguti, 1934) Skrjabin and Guschanskaja, 1954; *U. paralichthydis* (Yamaguti, 1934) Skrjabin and Guschanskaja, 1954 (Syn. *Ectenurus paralichthydis* Yamaguti, 1934); and *U. platycenphali* (Yamaguti, 1934) Skrjabin and Guschanskaja, 1954 (Syn. *Ectenurus platycephali* Yamaguti, 1934). The ratios of the oral and the ventral suckers and the body length, and of the length and the breadth of the body are different from all the three already known forms. Due to the obscurity of the pharynx, the oral sucker and the ductus hermaphroditicus, the identification of this species could not be possible and has been kept pending till further availability of the material.

Family **Hemiuridae** Lühe, 1901
Subfamily STERRHURINAE LOOSS, 1907

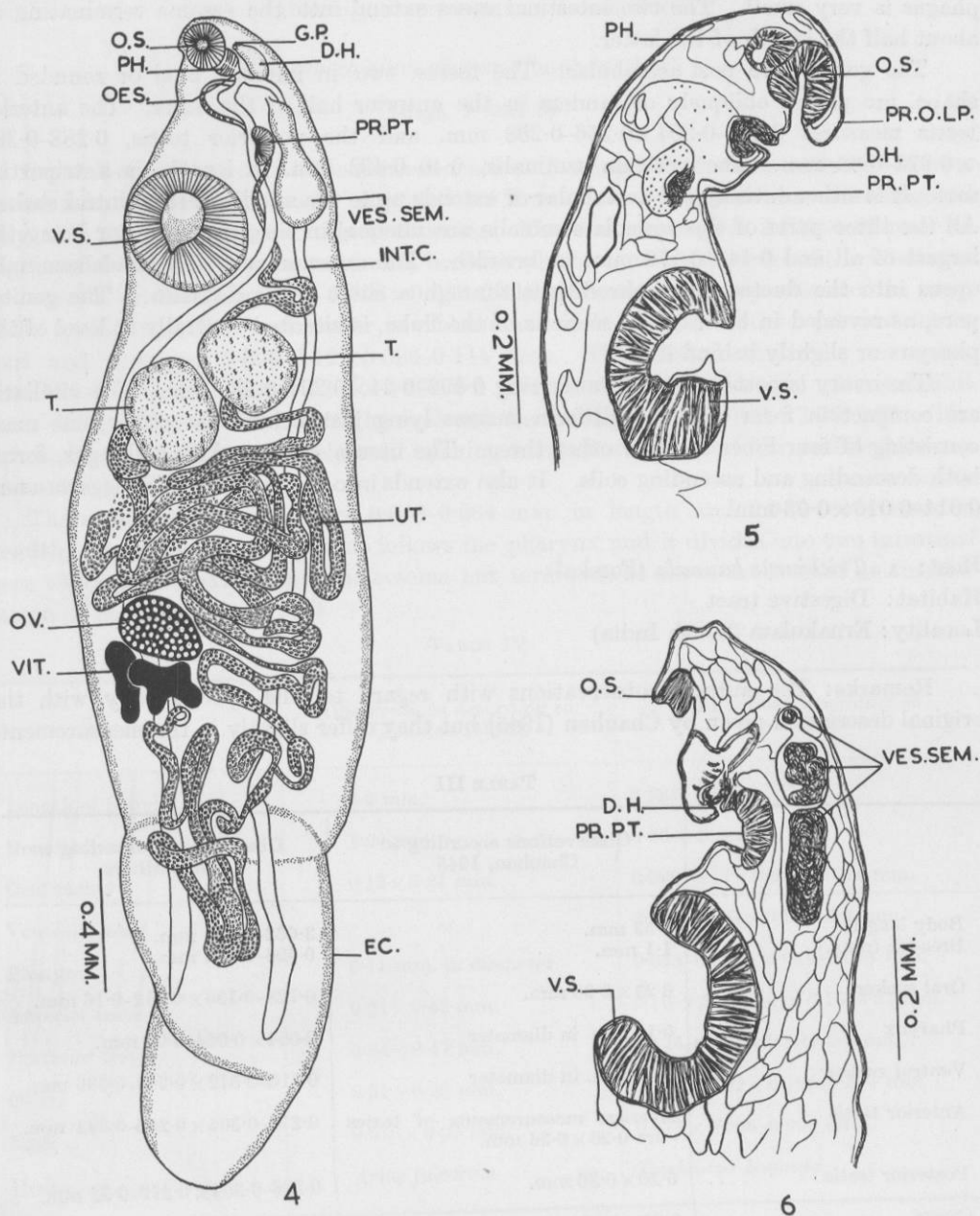
Lecithochirium polynemi Chauhan, 1945

(Figs. 4 to 6)

A few specimens of *Lecithochirium polynemi* Chauhan, 1945, were collected from the digestive tract of a marine fish, *Trichiurus haumela* (Forsk.), dissected at Ernakulam. The body of the fluke consists of two unequal halves: the anterior, long soma and the posterior, short ecsoma or the tail. The body is tapering at both the ends and measures $3.632-4.288$ mm. in length and $0.696-0.712$ mm. in maximum breadth which occurs at the level just in front of the ovary. The ecsoma itself, $0.704-1.232 \times 0.336-0.656$ mm. in size, is retractile and about one-third of the body length.

The subterminal oral sucker is guarded by a well-developed pre-oral lip. It measures $0.128-0.136 \times 0.112-0.16$ mm. The ventral sucker, $0.416-0.512 \times 0.288-0.336$ mm. in size, is $0.464-0.912$ mm. behind the anterior extremity. The ratio between the oral and the ventral suckers is 1 : 3.31-3.76. The pre-somatic pit is situated in the region between the oral and ventral suckers—more near the ventral sucker. In sagittal

sections, same type of radial muscles are revealed in the pre-somatic pit, as in case of the ventral sucker, and these muscles are distinctly delimited from the rest of the body.



FIGS. 4 to 6. 4, *Lecithochirium polynemi* Chauhan, 1945; 5, *Lecithochirium polynemi*—a portion of its sagittal section showing pre-somatic pit, ductus hermaphroditicus and ventral sucker; 6, *Lecithochirium polynemi*—a portion of its sagittal section showing tripartite vesicula seminalis and ventral sucker.

It seems, therefore, that the pre-somatic pit must be regarded as an additional pre-acetabular, small ventral sucker.

The prepharynx is small, compact and measures $0.064 \times 0.064-0.8$ mm. The oesophagus is very small. The two intestinal caeca extend into the ecsoma terminating at about half the length of the latter.

The gonads are post-acetabular. The testes, two in number, oval or rounded in shape, are placed obliquely or tandem in the anterior half of the soma. The anterior testis measures $0.272-0.304 \times 0.256-0.288$ mm. and the posterior testis, $0.288-0.384 \times 0.272-0.32$ mm. The vesicula seminalis, $0.40-0.432$ mm. in length, is a tripartite sac. It is either entirely pre-acetabular or extends up to the middle of the ventral sucker. All the three parts of the vesicula seminalis are unequal in size, the posterior being the largest of all and $0.144-0.176$ mm. in breadth. The anterior part of vesicula seminalis opens into the ductus hermaphroditicus through a short pars prostatica. The genital pharynx or slightly behind it.

The ovary is post-testicular, measuring $0.192-0.24 \times 0.224-0.288$ mm. The vitellaria are compact in form of two digitiform masses lying just behind the ovary, one mass consisting of four lobes and the other three. The uterus, fully packed with eggs, forms both descending and ascending coils. It also extends into the ecsoma. The eggs measure $0.014-0.016 \times 0.08$ mm.

Host: *Trichiurus haumela* (Forsk.)
 Habitat: Digestive tract
 Locality: Ernakulam (South India)

Remarks: The authors' observations with regard to this species tally with the original description given by Chauhan (1945) but they differ slightly in the measurements

TABLE III

	Observations according to Chauhan, 1945	Observations according to the authors
Body length	7.53 mm.	3.632-4.288 mm.
Breadth (max.)	1.1 mm.	0.696-0.712 mm.
Oral sucker	0.23 x 0.26 mm.	0.128-0.136 x 0.112-0.16 mm.
Pharynx	0.13 mm. in diameter	0.064 x 0.064-0.08 mm.
Ventral sucker	0.56 mm. in diameter	0.416-0.512 x 0.288-0.336 mm.
Anterior testis	Average measurements of testes are 0.26 x 0.36 mm.	0.272-0.304 x 0.256-0.344 mm.
Posterior testis	0.26 x 0.36 mm.	0.288-0.304 x 0.272-0.32 mm.
Ovary	0.26 x 0.33 mm.	0.192-0.24 x 0.224-0.288 mm.
Eggs	0.01 x 0.014 mm.	0.08 x 0.014 mm.
Host	<i>Polynemus indicus</i>	<i>Trichiurus haumela</i>

of the body and its organs. A different host, *Trichiurus haumela*, has been recorded for the parasite.

Family **Hemiuridae** Lühe, 1901
Subfamily STERRHURINAE Looss, 1907

Lecithochirium acutum Chauhan, 1945

(Figs. 7 and 8)

Several specimens of *Lecithochirium acutum* Chauhan, 1945, were collected from a marine fish, *Trichiurus haumela*, dissected at Ernakulam. The fluke has an elongated body with its pre-acetabular region tapering. The fluke measures 3.232-4.40 mm. in length and 0.560-0.80 mm. in maximum breadth which occurs at the level of the vitellaria. The ecsoma or the tail, 0.464-0.656 × 0.352-0.416 mm., is completely retracted in most of the specimens. The oral sucker is subterminal with a well-developed pre-oral lip in front and measures 0.096-0.12 × 0.096-0.144 mm. The ventral sucker is muscular, quite large, measuring 0.352-0.384 × 0.204-0.4 mm., and is situated in the anterior third of the body. The ratio between the oral and the ventral suckers is 1 : 3.06-3.83. The pre-somatic pit with transversely oval opening is situated at about the middle between the oral and the ventral suckers.

The small pharynx measures 0.048-0.064 mm. in length and 0.048-0.064 mm. in breadth. A very small oesophagus follows the pharynx and it divides into two intestinal caeca which do not extend into the ecsoma but terminate at about the level of its anterior margin or slightly in front of it.

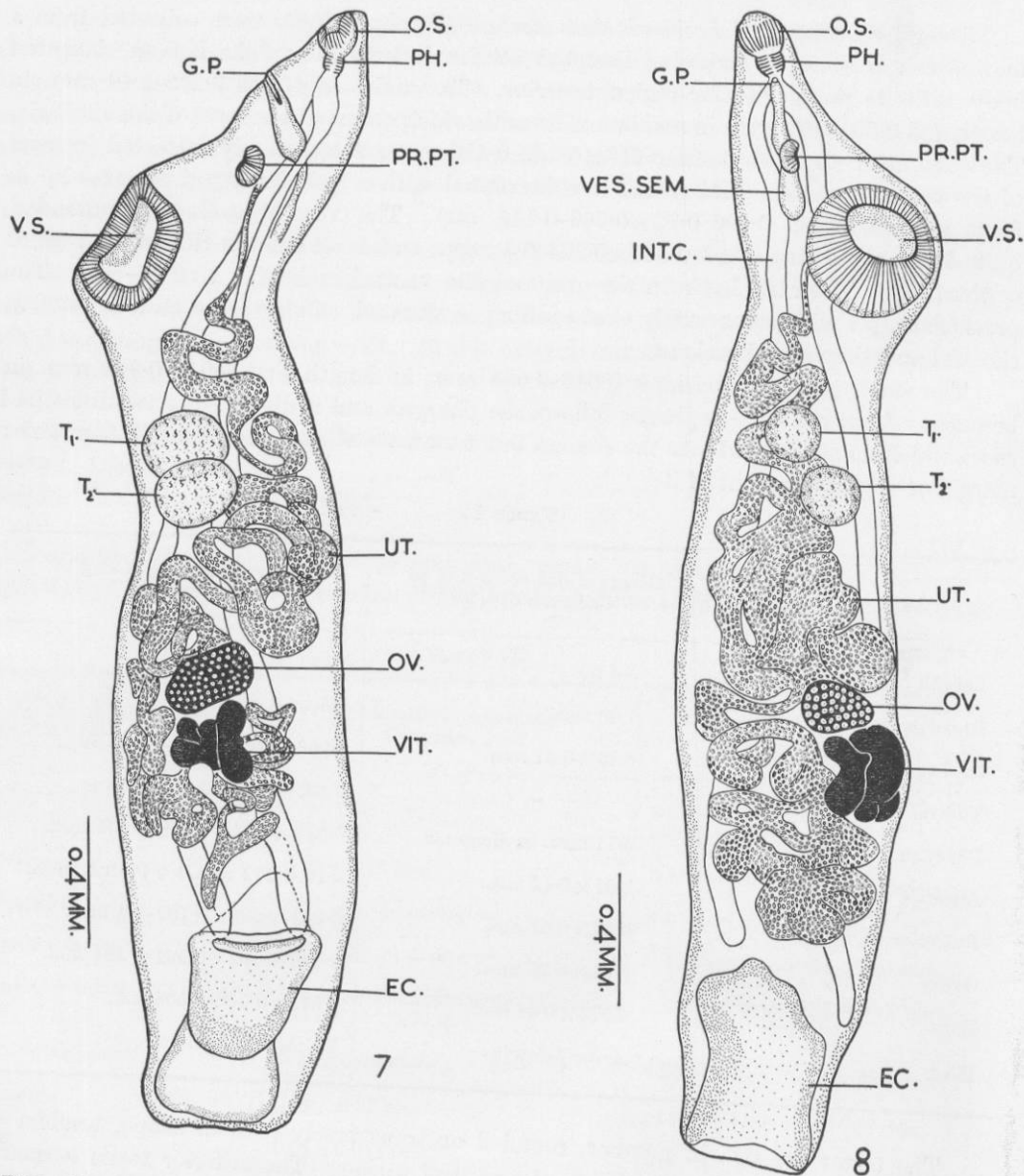
TABLE IV

	Observations according to Chauhan (1945)	Observations according to the authors
Length of body ..	5.4 mm.	3.232-4.4 mm.
Breadth (max.) ..	1.00 mm.	0.56-0.8 mm.
Oral sucker	0.13 × 0.21 mm.	0.096-0.12 × 0.096-0.144 mm.
Ventral sucker ..	-	0.352-0.384 × 0.204-0.4 mm.
Pharynx	0.11 mm. in diameter	0.048-0.064 × 0.048-0.064 mm.
Anterior testis ..	0.31 × 0.42 mm.	0.16-0.272 mm. × 0.16-0.32 mm.
Posterior testis ..	0.34 × 0.47 mm.	0.176-0.288 × 0.192-0.4 mm.
Ovary	0.31 × 0.26 mm.	0.128-0.192 × 0.192-0.304 mm.
Eggs	0.015 × 0.01 mm.	0.012 × 0.006-0.008 mm.
Host	<i>Arius fulcarius</i>	<i>Trichiurus haumela</i>

The testes are two in number, rounded or transversely oval in shape, tandem or slightly diagonal and lie posterior to the ventral sucker. The anterior testis measures 0.16-0.272 × 0.16-0.32 mm., whereas the posterior 0.176-0.288 × 0.192-0.40 mm. The

vesicula seminalis, antero-dorsal to the ventral sucker, is a tripartite sac. It measures 0.336-0.384 mm. in length and 0.048-0.192 mm. in maximum breadth which occurs at its proximal dilated portion. The anterior portion of vesicula seminalis is thin and opens into the ductus hermaphroditicus which is a small sinus. The genital pore is situated at the level of the oesophagus.

The ovary, 0.128-0.192 × 0.192-0.304 mm. in size, is transversely oval in shape, situated behind the testes. The vitellaria are in two indented masses just behind the



FIGS. 7 and 8. 7, *Lecithochirium acutum* Chauhan, 1945; 8, *Lecithochirium acutum*—another whole mount showing variation in shape of the ventral sucker and gonads and position of the latter.

ovary, one consisting of 3 and the other of 4 lobes. The uterus is heavily coiled with descending and ascending coils filled with small elliptical eggs which measure $0.012 \times 0.0068-0.008$ mm.

Host: *Trichiurus haumela* (Forsk., 1775)

Habitat: Digestive tract

Locality: Ernakulam (South India)

Remarks: The observations taken by the authors tally with those of the original description except for a few minor differences in measurements of the body and its organs. A new host, *Trichiurus haumela* (Forsk.), has been recorded for this species, i.e. *Lecithochirium acutum* Chauhan, 1945.

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