

## TWO NEW DIGENETIC TREMATODE OF THE GENUS *LECITHOCHIRIUM* LUHE, 1901 FROM MARINE FISHES AT PURI, ODISHA (INDIA)

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### ABSTRACT

**Backgrounds:** Genus *Lecithochirium* Luhe, 1901 (Trematoda: Hemiuridae Luhe, 1901) is one of the most important digenean trematode parasites with wide geographic distribution in the world. The purpose of the present study was to describe morphometrical characteristics of *Lecithochirium* species, currently prevalent in marine fish *Mugil cephalus* (Russell) and *Tetrad on lunar is* (Bl. and Schn.) of Puri, Odisha with Geographical Coordinates 19°48'17"N 85°49'6"E.

**Methods:** Gastro-intestinal organs of *Mugil cephalus* (Russell) and *Tetrad on lunar is* (Bl. and Schn.) at Puri, Odisha (India), were examined for infectivity with marine fish digenean trematode species. For examination and measurements of digenean, acetoalum carmine staining was performed, followed by camera Lucida drawings of morphological characters and measurements of morphometrical criteria with a calibrated microscope. Using valid trematode systematic keys, almost all the parasites were identified at the level of species.

**Results:** Total 45 marine fishes were found infected with at least two species of *Lecithochirium*. Considering morphological characteristics of *Lecithochirium*, two species were identified as new species including *Lecithochirium mugilensis* sp. nov. and *Lecithochirium deeghai* sp. nov.

**Conclusion:** During the survey of marine digenetic trematode parasites, collected two different species of the genus *Lecithochirium*, out of these two are new species, another are red scribed to show certain variation, the new parasites were obtained from the stomach of the marine fish *Mugil cephalus* (Russell) and *Tetrad on lunar is* (Bl. and Schn).

**KEYWORDS:** Digenea, Fresh Water Fishes, *Mystus Vittatus*, Parasite, India

### INTRODUCTION

Digeneans are an important group of helminth parasites, usually invade the gastro-intestinal tract of marine piscian hosts (Mishra et al, 2013). Fishes are important due to its high nutritional value, medicinal value and economic value, thus we can call it the gold coin of the aquatic environment. Marine fishes are the common host for various species of digenetic trematode parasites in Puri (Odisha). Majority of freshwater fishes carry heavy infection of digenean parasites which cause deterioration in the food value of fish and may even result in their mortality (Yadav et al, 2010). Besides these, there are a number of helminth parasites, which are transmitted to human beings only through fishes due to the weak association of host and parasites called zoonotic parasites. These parasites use the fish for their shelter and food and

destruct more or less each and every organ resulting in pathogenic effects (Lilley *et al.* 1992). Parasites interfere with the nutrition; metabolism and secretory function of the alimentary canal, damaged nervous system and even upset the normal reproduction of the hosts (Rahman *et al.* 1998a and 1998b). In this paper, we are adding to a new species of *Lecithochirium* collected from the marine fish *Mugil cephalus* (Russell) and *Tetradon lunaris* (Bl. and Schn). Many researchers from all over the world collected more efficient and adequate knowledge about the genus *Lecithochirium*. During the helminth parasite survey, we have found 45 infected fish with this genus; two forms are new to science while other forms are redescribed.

## MATERIALS AND METHODS

During the examination of the marine fish specimens of the above genus were recovered from the stomach of fish *Mugil cephalus* (Russell) and *Tetradon lunaris* (Bl. and Schn.). The specimens were collected and identified by standard fish books and cuts open and thoroughly examined after that helminthes parasites were separated in a Petri dish containing normal saline solution (0.89 gm NaCl/100 distilled water). The parasite was flattened with a slight pressure of the cover glass and fixed in A.F.A. fixative (50% alcohol, formalin and acetic acid in a ratio of 100: 6: 2.5). They were stained in acetoalum carmine, differentiated in acid alcohol and dehydrated through ascending grades of ethanols. These were cleared in xylol and mounted in Canada balsam or DPX (Chandra, S. 2015). The diagrams were made with the help of Camera Lucida. All the measurements in millimeters: unless otherwise stated. Prevalence, mean intensity and relative density were calculated for trematode parasites (Chandra, et al. 2016). The Voucher of specimens submitted into the depository of the Helminthological Society of India of Late Prof. S.P. Gupta, University of Lucknow, India.

## RESULTS

**Family: Hemiuridae Luhe, 1901**

**Subfamily: Sterrhurinae Looss, 1907**

*Lecithochirium mugilensis* sp. nov.

**Description** (Figure 1.1 – 2.1)

Body elongated aspinose with a short posterior ecsoma. Body proper or soma 3.73 mm long, 0.88 mm wide; ecsoma 1.00 mm long, 1.04 mm wide. Total body length, 4.73 in size. Oral sucker sub-terminal, sub-spherical 0.14 mm long, 0.17 mm wide, preoral lobe present. Prepharynx absent. Pharynx small muscular 0.09 mm long, 0.10 mm wide. Oesophagus absent. Intestinal caeca extending posteriorly into ecsoma. Ventral sucker spherical, larger than an oral sucker, 0.55 mm long, 0.55 mm wide, at 0.90 mm from the anterior extremity. Presomatic pit sucker-like, right side with radial and circular muscles. Excretory vesicle 'Y' shaped; excretory pore terminal. Genital pore sub-median, below intestinal bifurcation lying on left intestinal caeca, at 0.49 mm from the anterior extremity. Testes tandem, pre-equatorial, post-acetabular, pre-ovarian, separated from each other by a uterine coil. Anterior testis 0.40 mm long, 0.21 mm wide, at 1.21 mm from anterior extremity. Posterior testis 0.34 mm long, 0.30 mm wide, at 1.76 mm from anterior extremity. Cirrus sac absent. Vesicula seminalis is thin walled, tripartite sac, extending up to the anterior level of ventral sucker, opening into genital sinus through ductus hermaphroditicus, surrounded by prostate gland cells. Ovary sub-spherical, post-equatorial, post-testicular, post-acetabular, 0.24 mm long, 0.15 mm wide, at 2.82 mm from anterior extremity. Receptaculum seminis small ovoid, post ovarian; 0.16 mm long, 0.12 mm wide, at 3.22 mm from anterior extremity.

Vitellaria lying immediately below the ovary in two groups, right group having four lobes and left 3 lobes. Uterus voluminous, extending into ecsoma, open into genital sinus by a short metaterm. Eggs ovoid, numerous, small, non-operculated 0.02 mm long, 0.01 mm wide.

<b>HOST</b>	:	<i>Mugil cephalus</i> (Russell)
<b>LOCATION</b>	:	Stomach
<b>LOCALITY</b>	:	Deegha, West Bengal
<b>PREVALENCE</b>	:	One specimen, from one host, out of thirty examined.
<b>PREVALENCE (%)</b>	:	3.33%
<b>GEO. COORDINATE</b>	:	19°48'17"N 85°49'6"E
<b>ELEVATION</b>	:	3 ft
<b>MEAN INTENSITY</b>	:	0.33
<b>RELATIVE DENSITY</b>	:	0.33

## DISCUSSIONS

The present form belongs to the genus *Lecithochirium* with *L. rufoviridae* Rudolf, 1819 as its genotype. Following species viz. *L. polynemus* and *L. indicus* Chauhan, 1945; *L. indicum* Gupta and Singh, 1984; *L. jairajpuri* Gupta and Singh, 1984; *L. leiperi* Gupta and Singh, 1985; *L. fotedari* Gupta and Gupta, 1990; *L. tetradorie* Gupta and Jain, 1991 and *Lecithochirium guptai* Prakash and Saxena, 2006 known so far.

The present form closely resembles with *L. polynemus*, *L. leiperi* in the extension of uterus and caeca into the ecsoma. However, the present form differs from *L. polynemus* in having genital pore below the intestinal bifurcation on left caeca instead of in the region immediately below the intestinal bifurcation. The present form further differs from *L. polynemus* and *L. leiperi* in having vesicula seminalis extending up to the anterior level of ventral sucker instead of pre-acetabular in *L. polynemus* and anterior 3<sup>rd</sup> of the ventral sucker in *L. leiperi*.

Thus, on account of above-mentioned differences as against all those described earlier, the present form deserves the status of a new species with the specific name *Lecithochirium mugilensis* sp. nov.

*Lecithochirium Deeghai* sp. nov.

## DESCRIPTION (Figure 2.1 – 2.2)

Body elongated with anterior and posterior ends tapering with as short posterior ecsoma. Body proper or soma 3.84 – 4.03 mm long, 0.68 – 0.78 mm wide. Ecsoma 0.68 – 0.78 mm long, 0.35 – 0.38 mm wide. Total body length 4.52 – 4.81 mm. Oral sucker sub-terminal, sub-spherical, 0.16 – 0.17 mm long, 0.14 – 0.17 mm wide; preoral lobe present. Prepharynx absent. Pharynx small, muscular 0.08 – 0.09 mm long, 0.09 – 0.11 mm wide. Oesophagus absent. Intestinal caeca extending posteriorly into ecsoma. Ventral sucker oval larger than oral sucker 0.42 – 0.42 mm long, 0.33 – 0.36 mm wide, at 0.81 – 0.82 mm from anterior extremity. Presomatic pit sucker like, right side with radial and circular muscles. Excretory vesicle 'Y' shaped; excretory pore terminal. Genital pore sub-median, below intestinal

bifurcation, at 0.38 – 0.40 mm from anterior extremity. Testes two tandem, pre-equatorial, post-ace tabular, pre-ovarian, overlapping with each other. Anterior testis 0.26 – 0.32 mm long, 0.28 – 0.33 mm wide, at 1.33 – 1.35 mm from anterior extremity. Posterior testis 0.30 – 0.36 mm long, 0.31 – 0.34 mm wide, at 1.5 – 1.57 mm from anterior extremity. Cirrus sac absent. Vesicula seminalis is thin walled, tripartite extending up to middle of ventral sucker, anterior end opening into the genital sinus through hermaphroditic us, surrounded by a large number of prostate gland cells. Ovary median, sub-spherical, Post-testicular, post-equatorial, post-ace tabular, 0.21 – 0.34 mm long, 0.24 – 0.26 mm wide, at 2.42 – 2.06 mm from anterior extremity. Receptaculum seminis ovoid, post ovarian 0.17 – 0.18 mm long, 0.16 – 0.18 mm wide, at 2.67 – 2.88 mm from anterior extremity. Vitellaria lying below the ovary into two groups right group having 3 lobes and left 4 lobes, Uterus voluminous, not extending into ecsoma. Eggs numerous, ovoid, non-operculated 0.025 – 0.03 mm long, 0.015 – 0.015 mm wide.

<b>HOST</b>	:	<i>Tetradon lunaris</i> (Bl. and Schn.)
<b>LOCATION</b>	:	Stomach
<b>LOCALITY</b>	:	Deegha, West Bengal
<b>PREVALENCE</b>	:	Two specimens, from 1 host, out of fifteen examined
<b>PREVALENCE (%)</b>	:	6.66%
<b>GEO. COORDINATE</b>	:	19°48'17"N 85°49'6"E
<b>ELEVATION</b>	:	3 ft
<b>MEAN INTENSITY</b>	:	0.66
<b>RELATIVE DENSITY</b>	:	0.13

## DISCUSSIONS

The present form closely resembles with *L. polynemus*, *L. leiperi*, *L. indicum*, *L. jairajpuri*, *L. tetradorie*, *L. mugilensis* in having extension of caeca into the ecsoma.

However, the present form differs from *L. polynemus*, *L. leiperi*, *L. mugilensis* in having uterus not extending into ecsoma and from *L. indicum*, *L. jairajpuri*, *L. tetradorie* in the absence of Oesophagus. The present form further differs from *L. polynemus* and *L. leiperi* in having vesicula seminalis extending up to middle of ventral sucker instead of pre acetabular in *L. polynemus* and anterior 3<sup>rd</sup> of the ventral sucker in *L. leiperi*.

Thus, on account of above mentioned differences as against all those described earlier, the present form deserves the status of a new species with the specific name *Lecithochirium deeghai* sp. nov.

**Table 1: Compared Measurements of *Lecithochirium Mugilensis* Sp. Nov. and *Lecithochirium***

*Deeghai* Sp. Nov. with Known Form *Lecithochirium Guptai* Prakash and Saxena, 2006.

Parameters	<i>Lecithochirium Mugilensis</i> Sp. Nov.	<i>Lecithochirium Deeghai</i> Sp. Nov.	<i>Lecithochirium Guptai</i> Prakash and Saxena, 2006
Body length	3.73	3.84 – 4.03	2.12 – 2.78
Body width	0.88	0.68 – 0.78	0.29 – 0.31
Ecsoma length	1.00	0.68 – 0.78	0.29 – 0.31
Ecsoma width	1.04	0.35 – 0.38	0.27 – 0.32
Oral sucker length	0.14	0.16 – 0.17	0.11 – 0.17
Oral sucker width	0.17	0.14 – 0.17	0.08 – 0.11
Ventral sucker length	0.55	0.42 – 0.42	0.19 – 0.21
Ventral sucker width	0.55	0.33 – 0.36	0.18 – 0.20
Pharynx length	0.09	0.08 – 0.09	0.04 – 0.06
Pharynx width	0.10	0.09 – 0.11	0.03 – 0.05
Ant. Testis length	0.40	0.26 – 0.32	0.13 – 0.17
Ant. Testis width	0.21	0.28 – 0.33	0.09 – 0.14
Post. Testis length	0.34	0.30 – 0.36	0.12 – 0.14
Post. Testis width	0.30	0.31 – 0.34	0.08 – 0.11
Receptaculum seminis length	0.16	0.17 – 0.18	0.04 – 0.11
Receptaculum seminis width	0.12	0.16 – 0.18	0.07 – 0.14
Ovary length	0.24	0.21 – 0.34	0.14 – 0.17
Ovary width	0.15	0.24 – 0.26	0.12 – 0.15
Egg length	0.02	0.025 – 0.03	0.016 – 0.019
Egg width	0.01	0.015 – 0.015	0.05 – 0.07

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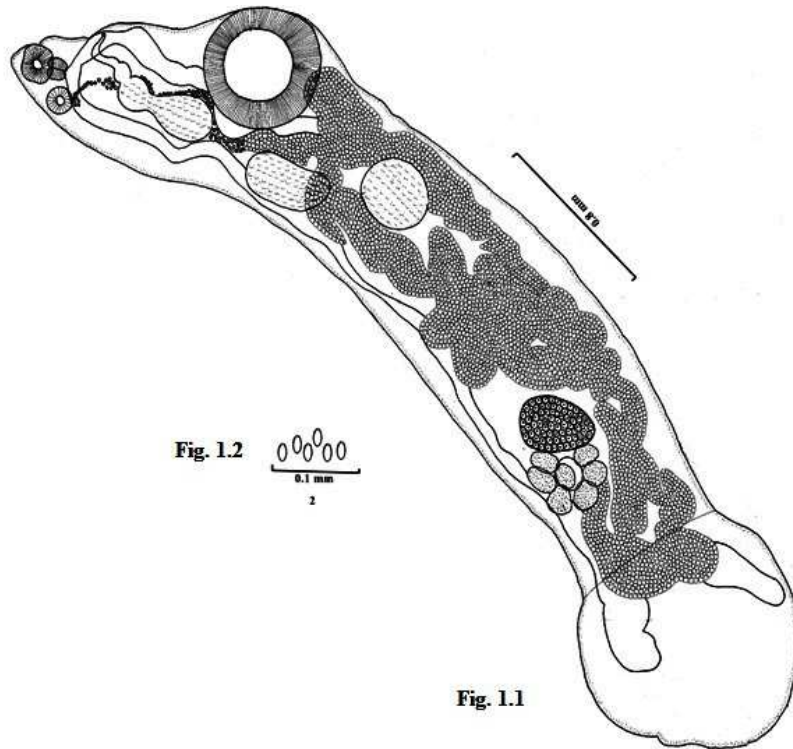


Figure 1: *Lecithochirium Mugilensis* sp. Nov

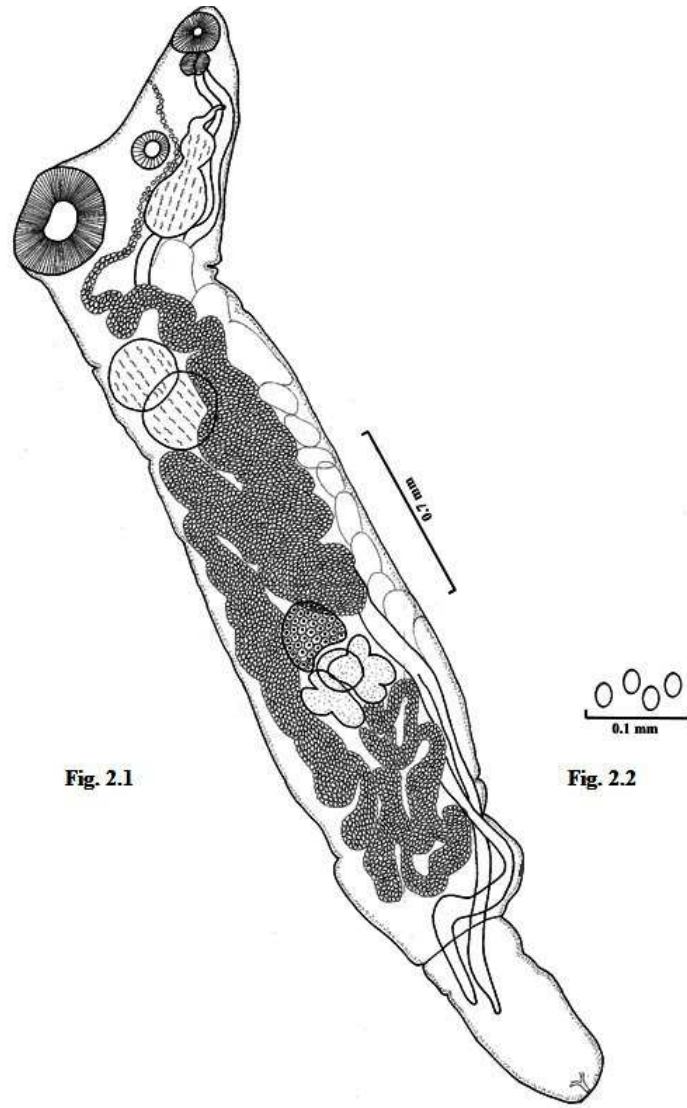


Fig. 2.1

Fig. 2.2

Figure 2: *Lecitochirium Deeghai* sp. Nov